Facility: Columbia Generating Station	Date of Examination: 2/27/17
Examination Level: RO ☒ SRO ☐	Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A-1 Conduct of Operations K/A: 2.1.37 (4.3 / 4.6)	(D)(R)	DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY) Description: Determine that criticality has been achieved prior to reaching the minimum Estimated Critical Position (ECP) and correctly identify the next action to be taken due to being critical outside the ECP.
A-2 Conduct of Operations K/A: 2.1.25 (3.9 / 4.2)	(D)(P)(R)	MAIN TURBINE (MT) LOAD RATE CHANGE DETERMINATION Description: Determine the Main Turbine Load Change Recommendation when raising Main Turbine load from 15% to 85%.
A-3 Equipment Control K/A: 2.2.41 (3.5 / 3.9) **OPEX AR 00314141**	(N)(R)	VALIDATE FUSE INSTALLATION PER PPM 1.3.47 (FUSE REPLACEMENT CONTROL) Description: For the RO Candidate, given circumstance requiring fuse replacement and an electrical print, determine correct replacement fuse and provide justification.
A-4 Radiation Control K/A: 2.3.7 (3.5 / 3.6)	(D)(R)	DETERMINE IF TAGOUT CAN BE HUNG Description: Determination will have to be made (with justification) whether or not a tag can be hung based on provided Clearance Order, RWP and Survey Map.

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

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

Facility: Columbia Generating Station Date of Examination: 2/27/17

Examination Level: RO ☐ SRO ☒ Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A-5 Conduct of Operations K/A: 2.1.7 (4.4 / 4.7)	(D)(R)	DETERMINE ACTION BASED ON PLANT CONDITIONS AND PROCEDURAL GUIDANCE Description: Given equipment status and an electrical bus lockout, determine required operator action based on existing plant conditions.
A-6 Conduct of Operations K/A: 2.1.25 (3.9 / 4.2)	(D)(R)	DETERMINE THE OPERABILITY OF THE SLC SYSTEM Description: Given the SLC portion of OSP-INST-H101 (Shift and Daily Instrument Checks for Modes 1, 2 & 3), determine the operability status of the Standby Liquid Control (SLC) System.
A-7 Equipment Control K/A: 2.2.41 (3.5 / 3.9) **OPEX AR 00314141**	(N)(R)	VALIDATE FUSE INSTALLATION PER PPM 1.3.47 (FUSE REPLACEMENT CONTROL) Description: For the SRO Candidate, given circumstance requiring fuse replacement and an electrical print, either authorize or do not authorize fuse replacement with proposed fuse type. Provide justification.
A-8 Radiation Control K/A: 2.3.11 (3.8 / 4.3)	(D)(P)(R)	ESTIMATE MAIN CONDENSER AIR EJECTOR GROSS GAMMA ACTIVITY RATE AND DETERMINE ACTIONS Description: Estimate Main Condenser air ejector Gross gamma activity rate and determine that a reactor power reduction is required to maintain Main Condenser Gross activity LT the LCO 3.7.5 limit.
A-9 Emergency Plan K/A: 2.4.41 (2.9 / 4.6)	(D)(R)	COMPLETE CLASSIFICATION NOTIFICATION FORM (CNF) FOR SAE Description: Given a dose projection printout, classify the event and complete Classification Notification Form. **(Time Critical)**

NOTE:	**All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).**
* Type Codes & Criteria:	(C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 4 for SROs) **(4)** (N)ew or (M)odified from bank (≥ 1) **(1)** (P)revious 2 exams (≤ 1; randomly selected) **(1)**

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR INITIAL TRAINING
COURSE TITLE	ADMIN JOB PERFORMANCE MEASURE
LESSON TITLE	DETERMINE ACTIONS FOR CRITICALITY OUTSIDE OF ECP (EARLY)
LESSON LENGTH	.5 HRS MAXIMUM STUDENTS 1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001587	Rev. No.	4
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	5/11/06
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY:		DATE	
INSTRUCTIONAL REVIEW BY:		DATE	
APPROVED BY:		DATE	
	Operations Training Manager		

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Make a copy of the current pull sheet from the simulator. Determine where Minimum ECP is and indicate it on copy of pull sheet by placing an '*1' next to the step and at the bottom of the column indicate that a *1 is 'Minimum ECP'. Ensure it is AFTER the step indicated in initial conditions by about four control rods. Place a *2 ten rods later and make that the maximum ECP.

Fill out the pull sheet pages. The 'Performed by' column is initialed up to control rod 10-47. The 'Verified column', the 'Continuous Withdrawal Couple Check' column and the 'Full Out Light' columns are initialed to control rod 10-47 by the verifier. Fill in 'Neutron Flux Response' column with a few Ns but mostly Ys. Sign the Reactivity Manager Review on the bottom right ONLY on those move sheets for which the rod moves have been completed.

Have a separate copy of ATTACHMENT 1 (in the form of a handout) available for student reference.

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0156; SRO-0118

Validation Time: 11 minutes

Alternate Path: No

Time Critical: No

PPM Reference: 3.1.2 Rev. 81, 9.3.9 Rev 29

Location: Any

NUREG 1123 Ref: 2.1.37 4.3 / 4.6

Performance Method: Perform

Task Standard:

SRO –State that direction is to be given to the RO to drive control rods in the reverse order until they all are inserted (based on reactor being critical prior to minimum ECP position being reached).

RO - State that control rod withdrawal must be stopped and that the CRS must be informed that the reactor is critical (based on reactor being critical prior to minimum ECP position being reached).

JPM CHECKLIST

INITIAL CONDITIONS:	A plant startup is in progress. PPM 3.1.2 has been completed as shown on ATTACHMENT 1. CRO1 is pulling control rods and notes the following indications: • Time 0953 • Coolant Temp 155°F • Control rod 10-47 • Control rod position 48 • Neutron level 8,000 CPS and rising • Period 145 seconds and stable Control rods have been pulled steadily since starting Group 1 of the Pull Sheet. Control rod motion stopped approximately 1 minute ago.
INITIATING CUE:	Using the given information, PPM 3.1.2 (Attachment 1), and the supplied pull sheets, determine your next action. When you have determined your next action, write it on the page provided along with the basis for the decision and hand it to the examiner.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
Examiner note: • Criticality will be determined using the criteria on Startup Flow Chart 3.1.2 Note N6 (see Attachment 1): Criticality usually occurs in the source range between $1x10^3$ and $1x10^4$ cps. For purposes of this procedure, criticality shall be identified by increasing neutron level, a constant steady period and no simultaneous control rod motion. • The information given identifies 8000 cps and rising (which is between the $1x10^3$ and $1x10^4$ cps) and a constant steady period with no rod motion – these are indications of a critical reactor.					
Examiner note: If SRO position is being evaluated, perform steps 1 through 3 below else skip to step 4.					
	1	Using information provided, determine that the reactor is critical.	Recognized the reactor is critical.		S / U*
	2	Using information provided, determine that criticality was achieved prior to rods being withdrawn to the Minimum ECP position.	Recognized the Minimum ECP position was not reached during rod withdraw (as shown on control rod pull sheets).		S / U*
	3	Determines action to be taken using PPM 3.1.2 (Attachment 1), steps Q-14 and Q-16.	Directed that control rod motion be stopped and that all control rods be inserted in reverse order until all control rods are fully inserted.		S / U*

Examiner note:
If RO position is being evaluated, perform steps 4 through 6 below.

	4	Using information provided, determine that the reactor is critical.	Recognized the reactor is critical.		S / U*
	5	Using information provided, determine that criticality was achieved prior to rods being withdrawn to the Minimum ECP position.	Recognized the Minimum ECP position was not reached during rod withdraw (as shown on control rod pull sheets).		S / U*
	6	Determines action to be taken using PPM 3.1.2 (Attachment 1), steps Q-14 and Q-16.	Notified CRS that he/she has stopped control rod withdrawal due to reactor being critical outside ECP.		S / U*

Termination Criteria: When student hands Student JPM Information Card back to the examiner.

Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

RESULTS OF JPM:

Examinee (Please Print): ______________________________________

Evaluator (Please Print): ______________________________________

Task Standard:

SRO –State that direction is to be given to the RO to drive control rods in the reverse order until they all are inserted (based on reactor being critical prior to minimum ECP position being reached).

RO - State that control rod withdrawal must be stopped and that the CRS must be informed that the reactor is critical (based on reactor being critical prior to minimum ECP position being reached).

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	11 Minutes / NA	

COMMENTS:

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Evaluator's Signature: _________________________ Date: _______________________

STUDENT JPM INFORMATION CARD

Initial Conditions:

A plant startup is in progress. PPM 3.1.2 has been completed as shown on ATTACHMENT 1.

CRO1 is pulling control rods and notes the following indications:

• Time	0953
• Coolant Temp	155°F
• Control rod	10-47
• Control rod position	48
• Neutron level	8,000 CPS and rising
• Period	145 seconds and stable

Control rods have been pulled steadily since starting Group 1 of the Pull Sheet. Control rod motion stopped approximately 1 minute ago.

Initiating Cue:

Using the given information, PPM 3.1.2 (Attachment 1), and the supplied pull sheets, determine your next action.

When you have determined your next action, write it on the page provided along with the basis for the decision and hand it to the examiner.

STUDENT JPM ANSWER SHEET

NEXT ACTION TO BE TAKEN: ______________________________

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BASIS FOR ACTION: ______________________________

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PPM 3.1.2 Start Up Flow Chart (Portion)

C2

B4 **VERIFY** the vacuum breakers AR-V-3A,B,C are open. JJM

C3

B5 **START** a mechanical vacuum pump per SOP-AR-START. JJM

B6 **LINE UP** the SS-EV-1A per PPM SOP-SS-START.

B7 **WARM** the Offgas System per SOP-OG-START.

B8 **PERFORM** SOP-HWC-START Prerequisites in preparation for HWC startup at 5% power.

A8 **REVIEW** the Surveillance In-Progress Log for Mode change limiting conditions. JJM

A9 **CONDUCT** a panel walk down looking for equipment status that may not be consistent with Mode 2 operation.
CRS JJM SM GTB

A10 **PERFORM** search of LCO/INOP/RFO log on "MODE CHANGE ALLOWED=NO". JJM

A11 **INFORM** Security Supervisor of pending Mode change to upgrade associated defensive strategy. JJM

A12 **REVIEW** PPM 3.1.2 Flowchart for completeness and all variances evaluated for applicability **PRIOR** to placing the Mode Switch to START/HOT STBY.
CRS JJM SM GTB

A13 **PRIOR** to shifting to Mode 2, **VERIFY** all personnel are out of the Drywell. {P-254470} JJM

A14 **PRIOR** to shifting to Mode 2, **VERIFY** RPS Trip systems restored to service per SOP-RPS-BYPASS. JJM

A NSSS — A15 **OBTAIN** permission from the Operations Manager to place the Mode Switch in the START/HOT STBY position. JJM

A16 **PRIOR** to shifting to Mode 2, **VERIFY** SDC isolation logic restored to service per SOP-RHR-SDC-BYPASS. JJM

C POWER — A17 **VERIFY** PPM 3.1.1 has been completed. JJM

A18 **VERIFY** SETDOWN mode indicated on APRMs (H13-P608). JJM

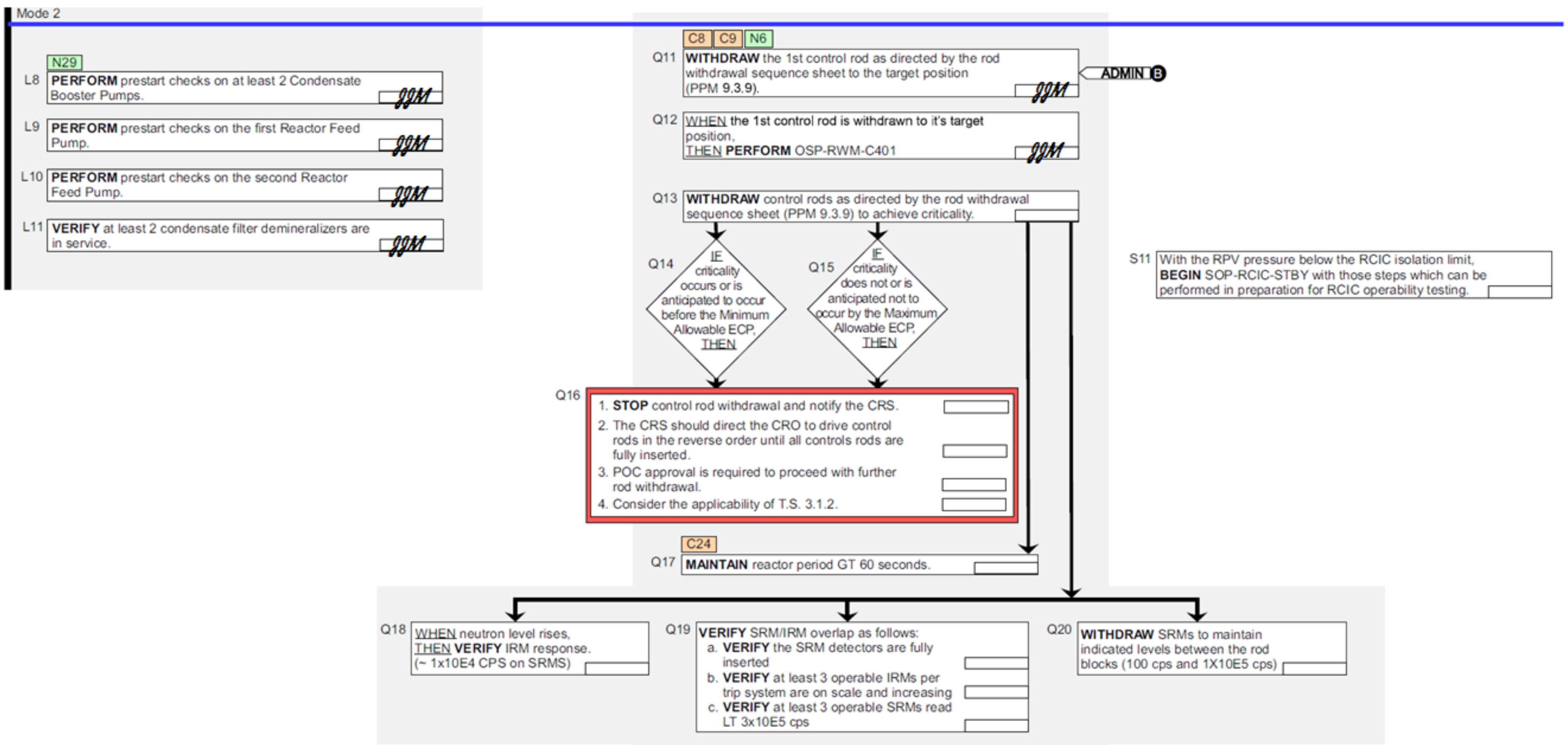
Mode 2

B9 **VERIFY** one Circulating Water pump is operating with at least three cooling towers in service per SOP-CW-START.

A19 **LOG** the Time and Date of entry into Mode 2. JJM
Time: Earlier Date: Today

B POWER — A20 **PRIOR** to withdrawal of control rods to bring the reactor critical, **VERIFY** that at least 15 minutes of data has been collected per OSP-RCS-C101 (Step Q2) and the Minimum Vessel Metal Temperature/Reactor Pressure are to the right of the criticality curve, Technical Specification Figure 3.4-11-3. JJM

PPM 3.1.2 Start Up Flow Chart (Portion)



PPM 3.1.2 Start Up Flow Chart (Portion)

Heating Range

LEVEL

L12 WHEN conditions are established:
RPV level stable
RFW-LIC-620 nulled
RFW-LIC-620 GT 5%
On V Display
THEN

L13 **PLACE** RFW-LIC-620 in AUTO.

70 psig

L14 WHEN RPV pressure is about 70 psig, THEN;
- a. **VERIFY** RWCU-V-31 is closed.
- b. **VERIFY** the startup level control valves are aligned for RPV level control per SOP-COND-OPS.
- c. **START** a second Condensate Pump per SOP-COND-START.
- d. Start a Condensate Booster Pump per SOP-COND-START

L15 **COMPLETE** the RFW Turbine and Pump prestart checks and initiate warming of the first RFT per SOP-RFT-START.

L16 **COMPLETE** the RFW Turbine and Pump prestart checks and initiate warming of the second RFT per SOP-RFT-START.

100 psig

PRESSURE

N24

P1 WHEN RPV pressure is about 30 psig or greater or a DEH pressure controller comes into service, THEN **TRANSFER** Turbine Bypass Control to AUTO as follows:
- a. **VERIFY** DEH pressure controller in AUTO mode per SOP-DEH-OPS .
- b. **ESTABLISH** desuperheat spray to achieve 100-150 psig (COND-PI-40) by one of the following methods:
  - 1) **PLACE** COND-PCV-40 to OPEN
  - 2) **PLACE** COND-V-178 to OPEN
- c. **VERIFY** BPV in AUTO per SOP-DEH-OPS.
- d. **VERIFY** the Bypass valves open to control RPV pressure at setpoint as Reactor power increases.

P2 WHEN the bypass valves are controlling pressure, THEN **RAISE** DEH pressure setpoint to 70 psig at 2 psig/min per SOP-DEH-OPS.

P3 **RAISE** DEH pressure setpoint to 145 psig **at 2** psig/min per SOP-DEH-OPS.

POWER

N30

Q26 **PERFORM** TASK PREVIEW per Note N30

C9 C24 N28

Q27 **WITHDRAW** control rods to establish a heatup rate not exceeding 80 F°/Hr.

Q28 **RETURN** SRM & IRM recorders to slow speed as follows: (see basis for instructions for old style **Yokogawa's**)
- a. **PRESS** FUNC button.
- b. **PRESS** top button directly below "Normal Speed" text on screen.

C26

Q29 **ADVANCE** the IRM range switches to maintain an indication of 8 to 24 on the lower scale and 25 to 75 on the higher scale.

Q30 **CONTINUE** rod withdrawals as directed by the rod withdrawal sequence sheets (PPM 9.3.9) to stop and stabilize any decrease in RPV coolant temperature or pressure.

PPM 3.1.2 Start Up Flow Chart (Portion)

Cautions

C1 The amount of time spent on RFW-FCV-10A(10B) should be minimized to reduce the wear on valve internal components. {P-92005}

C2 The potentials for releasing airborne contamination and rupturing turbine diaphragms are minimized by starting a mechanical vacuum pump with vacuum breakers open prior to turbine sealing.

C3 Pulling a vacuum prior to RPV pressurization may cause a vacuum in the drywell and RPV. Do not close the vacuum breakers until steam is being generated in the RPV. {P-165691}

C4 Do not allow condenser pressure to increase to GE atmospheric pressure to avoid bursting the Main Condenser diaphragm.

C5 The turbine should be on turning gear and sealed prior to pulling condenser vacuum do avoid seal damage.

C6 Conservative action is required whenever an unexpected or unexplained situation arises with respect to reactivity. Operators should take prompt action to place the plant in a known safe condition.

Conservative action should include rod insertion or manually scramming the Reactor if warranted or if in doubt. {P-103837}

C7 During the approach to criticality, avoid activities that can distract the "operator at the controls" and the CRS. Examples are shift turnover, and surveillance testing involving these persons. During the approach to criticality, periodically stop rod withdrawal to allow stabilization of neutron level. {P-103837}{P-104550}

C8 With LT 3 SRMs operable in Mode 2 and subcritical, suspend further control rod withdrawal until 3 SRMs are operable. {P-104550}

C9 Closely monitor flux levels during rod withdrawal especially when high worth rods (the first 4 to 6 in each RWM group) are pulled. {C-8306}{P-104550}

C10 If a reactor period shorter than 25 seconds is observed due to an unplanned reactivity rise, insert control rods until the Reactor is subcritical and notify the CRS/Shift Manager and SNE.

Closely monitor flux level during rod withdrawal especially when high worth rods (the first 4 to 6 in each RWM group) are pulled.

Notes

N1 The CRS/Shift Manager may authorize steps to be performed out of sequence or marked N/A to take into account current Plant configuration or conditions.

N2 MSIV wetting may be required prior to opening MSIVs. {2.6}

N3 Start daily performance of OSP-RRC-D701. Appropriate sections to be performed will be identified as plant conditions change.

N4 RHR-V-9 is required to be closed, with the RHR-V-9 power disconnect (RHR-DISC-V/9) in the OFF position in Modes 1,2,3 when RPV pressure is GT 135 psig.

N5 Placing the Mode switch in START/HOT STBY defines entry into MODE 2.

N6 Criticality usually occurs in the source range between $1x10^3$ and $1x10^4$ cps. For purposes of this procedure, criticality shall be identified by increasing neutron level, a constant steady period and no simultaneous control rod motion. {P-104550}

N7 A scram signal is generated when an IRM reaches 120/125% of scale in any range switch position or when APRM indication increases to 15% scale in the STARTUP/HOT STBY Mode.

N8 Continue logging coolant temperature each 15 minute interval (OSP-RCS-C101).

N9 Single recirculation loop operations requires additional temperature monitoring (OSP-RRC-C102).

N10 Nuclear heating is defined to occur when reactivity addition by control rod withdrawal causes temperature on RRC-TR-650A(B) to rise.

N11 To prevent cracking of the feedwater nozzles and spargers, it is desired to place RFW-LIC-620 in AUTO(A) as soon as possible. {2.1}

N12 Primary containment cooling temperature control valves RCC-TCV-71A, 71B, 71C, 72A & 72B have been deactivated, flow to the cooling coils is controlled by opening and closing the motor operated isolation valves RCC-V-71A, 71B, 71C, 72A & 72B.

PPM 3.1.2 Start Up Flow Chart (Portion)

C11 RWCU differential flow isolation occurs at 58.8 gpm.

C12 RWCU-V-4 closes at 140°F NRHX outlet temperature.

C13 Closing MS-V-1 and MS-V-2 with vacuum already established may cause some RPV level perturbations.

C14 To minimize the potential for hydrogen explosion, DO NOT raise Reactor power above 5% with mechanical vacuum pumps in operation.

C15 MS-V-16, MS-V-19, and MS-V-67A, B, C & D shall be closed whenever reactor power is GE 5% to prevent potential iodine release during accident conditions. {P-90856}

C16 With the mode switch in STARTUP/HOT STBY, a REACTOR SCRAM occurs at 15% on the APRMs.

C17 Failure to maintain proper level in the MSR drain tank(s) may cause a high level in the MSR and a subsequent Main Turbine Trip. {P-198580}

C18 Entry into the Area of Increased Awareness may result in core oscillations. {P-92247}

C20 Bypass valves open with Reactor power GT 30% may cause the REACTOR SCRAM associated with Main Turbine Gov & Throttle valve closure to be bypassed when required to function. {P-104358}

C21 Do not make recirculation flow changes concurrent with control rod withdrawals.

C22 MSRVs tend to begin weeping or leaking during startup as reactor power, main steam line flow and RPV pressure changes. {P-211083}

C23 Closely monitor flux levels during Startup to ensure the Reactor does not go sub-critical after SRMs are withdrawn.

C24 Avoid extended operation (time) near criticality, and below the point of adding heat (POAH). Minor changes in plant conditions could cause the reactor to go critical without Operator control. If already critical, the reactor could go subcritical without Operator control or indication. {P-234184}

C25 RFP discharge pressure should be maintained GT 100 psig above Reactor pressure to ensure Reactor water level is maintained. Monitor RFP discharge pressure frequently when increasing Reactor pressure. {P-256319}

C26 DO NOT range IRMs in Division 1 and 2 concurrently, to prevent a full scram in the event two IRMs in opposite divisions are inadvertently ranged in the down direction. {AR-188982}

C27 Condensate Booster pump (CBP) operation on minimum flow should be limited to a maximum of 3 hours to minimized CBP wear. Isolation of Long Cycle Cleanup should be timed to minimized time CBP is operated on minimum flow.

N13 In BPV Manual mode the ramp rate is 1 %/sec (valve position) if the BPV RAISE or LOWER and GO buttons are used. The ramp rate is 5 %/sec if the FAST ACTION button is used with BPV RAISE or LOWER and GO. BPV position changes in 1% increments if the JOG button is used with BPV RAISE or LOWER.

N14 A 2 psig/min pressure ascension rate should maintain a 60 °F/hr heatup rate.

N15 OSP-RCIC/IST-B501 is required to be performed, if due, within 12 hours after reactor steam pressure and flow are adequate to perform the test (BPV GE 10%).

N16 A 3 psig/min pressure ascension rate should maintain a 69 °F/hr heatup rate.

N17 Due to thermal cycle considerations, the following valves shall remain closed until the Reactor is in Mode 4: {P-90856}

MS-V-67A	MS-V-67C	MS-V-16
MS-V-67B	MS-V-67D	MS-V-19

N18 A 5 psig/min pressure ascension rate should maintain a 73 °F/hr heatup rate.

N19 A 6 psig/min pressure ascension rate should maintain a 74 °F/hr heatup rate.

N20 An 8 psig/min pressure ascension rate should maintain a 71 °F/hr heatup rate.

N21 If RCIC Operability (OSP-RCIC/IST-Q701) is required to be performed, then RCIC pump flow rate requirements are to be verified within 12 hours after reaching 10% power.

N22 A steam flow rate of at least 1.5 million lb/hr is required to roll the turbine.

N23 While on TR-S, limit TR-S load such that the load limit of TR-S X-winding (H13-P800) is not exceeded (28.66 MVA (2.4 ka)). (Ref E/I-02-87-07)

N24 BPVs should be operated in AUTO, and pressure controlled in AUTO mode using the HOLD function to hold pressure at an intermediate value. If required, BPVs may be operated in MANUAL per SOP-DEH-QC. BPVs will begin controlling Reactor Pressure at approximately 30 psig. Initially, the automatic setpoint can be set at approximately 30 psig prior to plant heatup.

N25 A power change of GT 15% in 1 hour requires performance of PPM 16.1-1.2, if offgas release rates are elevated.

PPM 3.1.2 Start Up Flow Chart (Portion)

N26	At approximately 400 MWe, begin placing MSR 2nd stage reheating in service per SOP-MT-START.
N27	Nominal operating pressure is 1020 psig at 100% power.
N28	During plant heatup it is acceptable for the Bypass Valves to close for brief periods of time.
N29	During startup the plant is highly vulnerable to scram from a single RFW pump trip. Therefore, the second RFW pump is started early to minimize single point vulnerability. {P-233972}
N30	TASK PREVIEW REQUIRED DISCUSS Task Preview with Shift Manager, THEN BRIEF crew using elements of Task Preview THEN LOG completion of Task Preview and Brief in the control room log. {P-256309}
N31	If RPV inlet pressure (RFW-PI-5) is GT 300 psig, ensure Condensate/Demin Inlet temperature (COND-TI-8) is GE 89 ºF prior to using feedwater as a source to the reactor. If unable to raise condensate temperature above 89 ºF or it is undesirable to raise Condensate/Demin inlet temperature above 89 ºF and condensate temperature is GT 60 ºF, initiate injection with feedwater if required and document with a Condition Report. {P-260665}
N32	Per GE RICSIL 092, RRC Loop A is limited to 57.5 Mlb/hr, and RRC Loop B is limited to 55.9 Mlb/hr. During automatic operation, RRC Loop A should be biased slightly GT RRC Loop B. {AR-257232}
N33	Computer point F020 provides an accurate feed water temperature indication between 420°F and 80°F, and can be used for validation or substitution of the B050, B051, B052, or B053 computer points if they are unavailable. Computer point F020 is normally within 7°F of B050, B051, B052, B053 computer points.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	MAIN TURBINE CHANGE OF LOAD RATE DETERMINATION
LESSON LENGTH	.5 HRS MAXIMUM STUDENTS 1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001783	Rev. No.	2
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	10/21/14
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Ensure student has access to a calculator, clear ruler, and a copy of SOP-MT-START (when asked for).

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: Calculator; Clear Ruler

Safety Items: None

Task Number: RO-0325

Validation Time: 12 Minutes

Alternate Path: No

Time Critical: No

PPM Reference: SOP-MT-START Rev. 26

Location: Any

NUREG 1123 Ref: 245000 K5.02 (2.8 / 3.1)

Performance Method: Perform

Task Standard:

The time needed to change main turbine load has been calculated and written in the space provided on the Student JPM Information Card and is within the range allowed.

JPM CHECKLIST

INITIAL CONDITIONS:	Columbia is in the process of starting up. The Main Turbine is on the line and is currently 15% loaded.
INITIATING CUE:	You have been directed to determine the time required to change load from 15% to a load of 85%. Assume a fatigue index of 20,000 cycles. Inform the CRS of your determination when complete by writing it in the space provided on the Student JPM Information Card and handing the card back to the examiner.

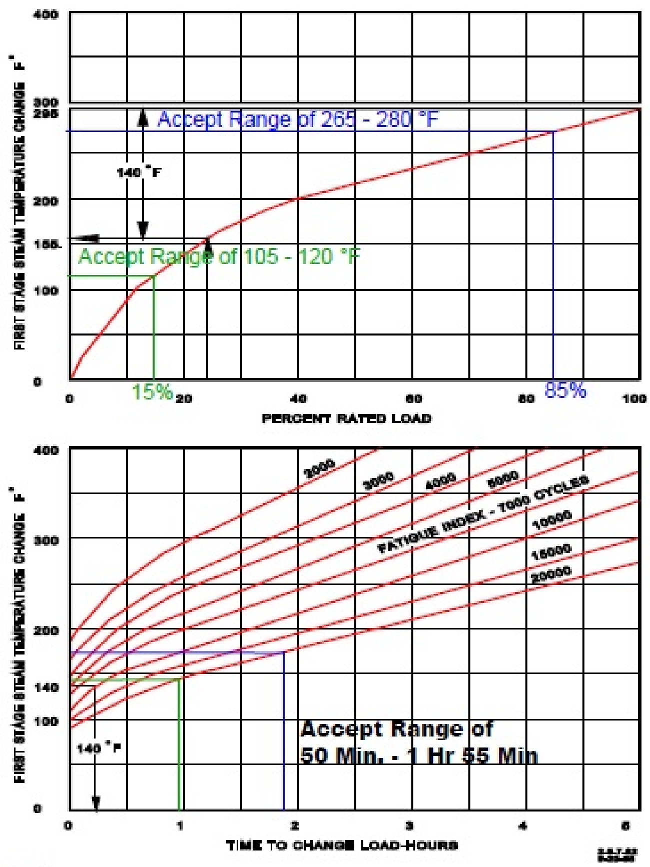
*** Items are Critical Steps**

Time	Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Obtains procedure.	Recognized SOP-MT-START as being the correct procedure and refers to Attachment 6.1.		S / U
	2	SOP-MT-START Attachment 6.1	Referred to example at bottom of Attachment 6.1 to determine use of graphs: • Percent Rated Load vs. First Stage Temp Change • Time to change Load vs. First Stage Temp Change		S / U
	3		Correlated 15% load to a First Stage Steam Temperature of 112°F (accept 105°F to 120°F).	Accept a range of 105° to 120°	S / U *
	4		Correlated 85% load to a First Stage Steam Temperature of 272°F (accept 265°F to 280°F).	Accept a range of 265° to 280°	S / U *
	5		Calculated the temperature difference (272°F - 112°F) to be 160°F (accept 145°F to 175°F).	Accept a range of 145° to 175°	S / U *
	6		Plotted First Stage Steam Temperature Change to Time to Change Load-Hours using the 20,000 cycles curve and determined that the time to change load is 1.5 hours (90 minutes)	Accept a range of 0.95 hours (57 minutes) to 1.75 hours (105 minutes)	S / U *

Termination Criteria: Student hands completed JPM Information Card to the examiner.

Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

LOAD CHANGING RECOMMENDATIONS (HPT FIRST STAGE TEMP CHANGE)



CT-23813-A

EXAMPLE (Shown on Charts)

Determine the time required and load change rate to raise load from 25% to 100%. Use a 10,000 cycle fatigue index for this example.

PROCEDURE

Enter Figure 1 at 25% load and 100% load and determine from curve the first stage temperature change from 0 to 25% load to be 155° F and from 0 to 100% load to be 295° F. By subtracting the 0-25% temperature change from the 0-100% change, the first stage temperature change that occurs in raising load from 25% to 100% is 295° - 155° =140° F.

Enter Figure 2 with the 140° F first stage steam temperature change and project to the selected 10,000 cycle fatigue index curve. It is determined that load should be raised from 25% to 100% load at a uniform rate over 0.2 hours (12 minutes). The load change rate is 75%/12 min.= 6%/min.

END

Attachment 6.1, Load Changing Recommendations (HPT First Stage Temp Change)

RESULTS OF JPM:

Examinee (Please Print): ____

Evaluator (Please Print): ____

Task Standard:
The time needed to change main turbine load has been calculated and written in the space provided on the Student JPM Information Card and is within the range allowed.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ____________________________ **Date:** __________________________

STUDENT JPM INFORMATION CARD

Initial Conditions:

Columbia is in the process of starting up. The Main Turbine is on the line and is currently 15% loaded.

Initiating Cue:

You have been directed to determine the time required to change load from 15% to a load of 85%. **Assume a fatigue index of 20,000 cycles.** **Inform the CRS of your determination when complete by writing it in the space provided on the Student JPM Information Card and handing the card back to the examiner.**

The time required to change load from 15% to 85% is: ______________________

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	VALIDATE FUSE INSTALLATION PER PPM 1.3.47 (RO)

LENGTH OF LESSON 0.5 Hour

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001860	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Steve Bruce	DATE	12/05/16
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

VALIDATE FUSE INSTALLATION PER PPM 1.3.47
MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Obtain a cleared fuse (BUSS F10A/250V/1A) and a choice of 3 replacement fuses (BUSS F10A/250V/1A, BUSS F10A/250V/10A, and BUSS KTK/600V/20A) for the student to select from.

Provide a copy of EWD-15E-042 (see Attachment 1) and PPM 1.3.47 (Fuse Replacement Control).

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: Fuses (as specified above)

Safety Items: None

Task Number: RO-0570, SRO-0212

Validation Time: 5 Minutes

Alternate Path: No

Time Critical: No

PPM Reference: PPM 1.3.47 Rev. 11

Location: Any

NUREG 1123 Ref: 2.2.41 (3.5 / 3.9)

Performance Method: Perform

Task Standard: Student determines that the replacement fuse should be a 10A fuse and hands the correct fuse to the CRS (evaluator).

JPM CHECKLIST

SETUP:	Provide the student with EWD-15E-042 (see Attachment 1), PPM 1.3.47, the cleared fuse, and three choices of replacement fuses.
INITIAL CONDITIONS:	CRD-LIS-601B, MS-LIS-200B, and MS-LIS-300B have lost power. Plant conditions are now stable. EFIN troubleshooting has identified that fuse GG-F02 in H13-P611 has cleared.
INITIATING CUE:	The CRS directs you to determine the correct replacement fuse. Inform the CRS of your decision by completing the Student JPM Information Card provided with justification of your answer and by handing the CRS (evaluator) the card with the correct replacement fuse.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Evaluates EWD-15E-042 (Attachment 1).	Determines that the rating for fuse GG-F02 is 10A.		S / U *
	2	Evaluates the cleared fuse.	Determines that the cleared fuse rating is 1A.	May not refer to cleared (blown fuse) in determining the correct fuse.	S / U
	3	Evaluates available replacement fuses by looking at the rating printed on the fuse.	Determines that the fuse marked as a 10A fuse is the correct fuse.	May refer to PPM 1.3.47 to help identify correct fuse.	S / U *
	4	Informs the CRS.	Informs the CRS that the replacement for fuse GG-F02 should be a 10A fuse and provides the correct replacement fuse to the CRS.	Evaluator may need to prompt the candidate to provide the correct replacement fuse.	S / U *

Termination Criteria: The student turns in the completed answer sheet and selected fuse for replacement.

Termination Cue: This completes the JPM.

Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

RESULTS OF JPM:
VALIDATE FUSE INSTALLATION

Examinee (Please Print): ____

Evaluator (Please Print): ____

Task Standard: Candidate determines that the replacement fuse should be a 10A fuse and hands the correct fuse to the CRS (evaluator).

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

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Evaluator's Signature: __________________________ **Date:** __________________________

Initial Conditions:

CRD-LIS-601B, MS-LIS-200B, and MS-LIS-300B have lost power. Plant conditions are now stable.

EFIN troubleshooting has identified that fuse GG-F02 in H13-P611 has cleared.

Initiating Cue:

The CRS directs you to determine the correct replacement fuse. **Inform the CRS of your decision by completing the Student JPM Information Card provided with justification of your answer and by handing the CRS (evaluator) the card with the correct replacement fuse.**

The correct replacement fuse is: ________________

Provide your justification below:

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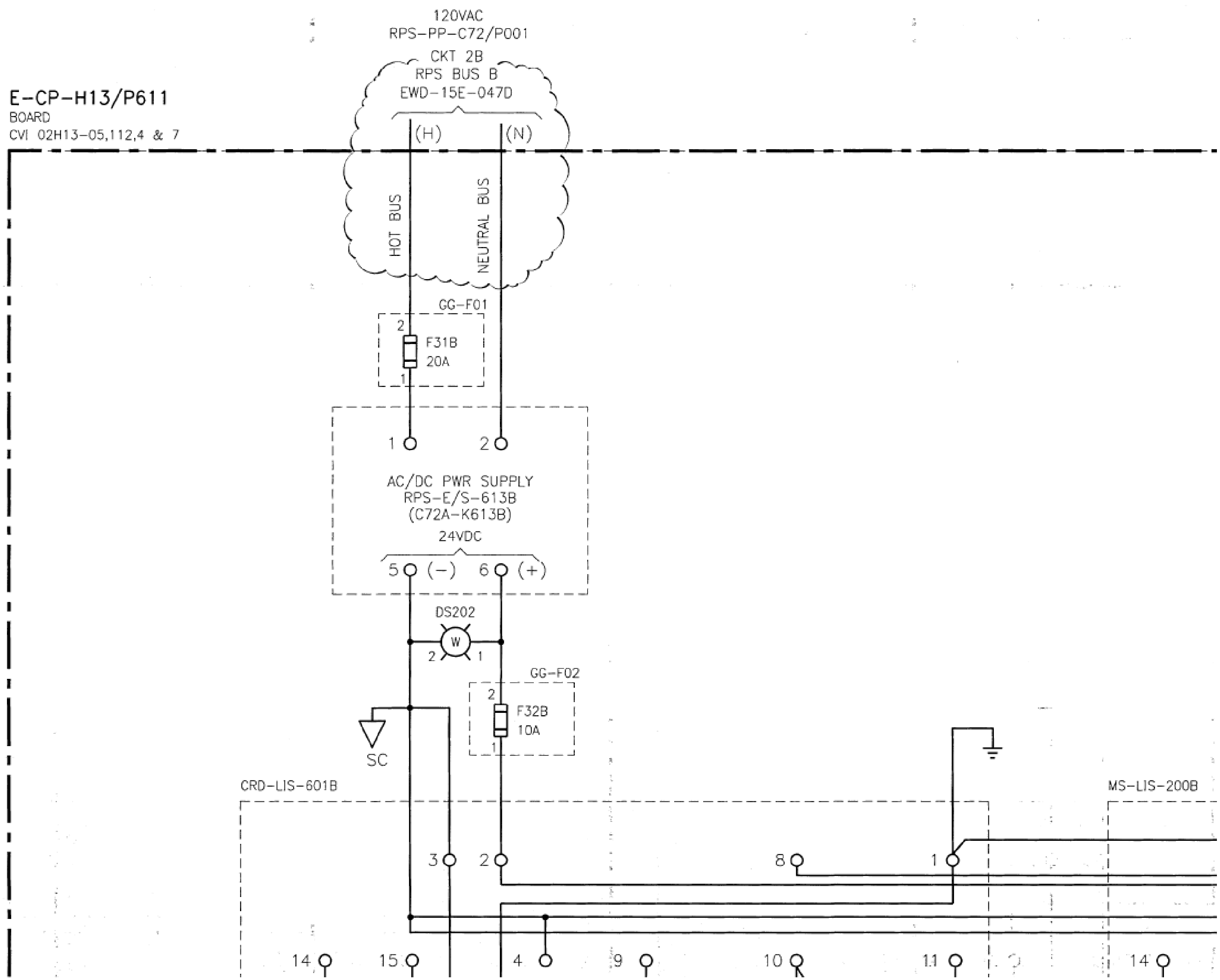
EWD-15E-042



LO001860 Rev. 1 (ATTACHMENT 1)

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE: LICENSED OPERATOR INITIAL TRAINING

COURSE TITLE: ADMIN JOB PERFORMANCE MEASURE

LESSON TITLE: DETERMINE IF TAGOUT CAN BE HUNG (Admin)

LESSON LENGTH: .5 HRS

MAXIMUM STUDENTS: 1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001585	Rev. No.	4
Exam PQD Code		Rev. No.	

DIVISION TITLE: Nuclear Training

DEPARTMENT: Operations Training

PREPARED BY: Ron Hayden DATE: 9/26/06

REVISED BY: Dave E. Crawford DATE: 12/7/16

TECHNICAL REVIEW BY: ______ DATE: ______

INSTRUCTIONAL REVIEW BY: ______ DATE: ______

APPROVED BY: ______ DATE: ______

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Print out copy of ATTACHMENT 1 for student use.

JPM Instructions:

Verify current procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: N/A

Task Number: RO-1293

Prerequisite Training: N/A

Reference: GEN-RPP-01 R8; GEN-RPP-02 R34

NUREG 1123 Ref: 2.3.7 (3.5 / 3.6)

Safety Items: N/A

Validation Time: 15 minutes

Time Critical: No

Location: Any

Performance Method: Perform

Task Standard: Candidate fills out the JPM Answer Sheet and indicates that the tagout cannot be hung due to HPCS-V-4 being in a High Radiation area and because the associated RWP is only authorized for Non-High Rad operation/investigation.

JPM CHECKLIST

INITIAL CONDITIONS:	Columbia Generating Station is shutdown for a refueling outage.
INITIATING CUE:	You have been directed by the Control Room Supervisor to hang tagout D-HPCS-V-102R18-001. Health Physics has been contacted and directed the use of RWP-30001423 for the purpose of hanging tags in the Reactor Building. Review the task and from the information provided, fill out the attached sheet indicating your ability or inability to perform the task assigned.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Reviews the Clearance Tag Hang List	Recognizes that a tag is to be placed on the handwheel for HPCS-V-4.		S / U
	2	Reviews the Survey Map for the Reactor Building 541' areas.	Recognizes the area dose rates around the handwheel for HPCS-V-4 exceed 100mr/hr.		S / U
	3	Reviews the Radiation Work Permit (RWP)	Recognizes that the RWP does not allow for entry into a high radiation area (> 100 mr/hr).		S / U
	4	Document whether or not the task can be completed given the current conditions.	Documents that the task cannot be performed on the answer sheet.		S / U *

		Documents the basis for why the task cannot be completed.	Documents that the task cannot be completed because the RWP does not allow entry into high radiation areas on the answer sheet.		S / U *
Termination Criteria: Candidate hands the examiner the completed answer sheet.					
RECORD TERMINATION TIME: _________					
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.					

RESULTS OF JPM:

Examinee (Please Print): ____

Evaluator (Please Print): ____

Task Standard: Candidate fills out the JPM Answer Sheet and indicates that the tagout cannot be hung due to HPCS-V-4 being in a High Radiation area and because the associated RWP is only authorized for Non-High Rad operation/investigation.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	15 Minutes / NA	

COMMENTS:

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Evaluator's Signature: __________________________ **Date:** ________________________

STUDENT JPM INFORMATION CARD

Initial Conditions:

Columbia Generating Station is shutdown for a refueling outage.

Cue:

You have been directed by the Control Room Supervisor to hang tagout D-HPCS-V-102R18-001. Health Physics has been contacted and directed the use of RWP-30001423 for the purpose of hanging tags in the Reactor Building. Review the task and from the information provided, fill out the attached sheet indicating your ability or inability to perform the task assigned.

STUDENT JPM ANSWER SHEET

I will be able to perform the assigned task (Initial): ________________________

I will not be able to perform the assigned task (Initial): ____________________

Document your justification for the response above:

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****SURVEY MAPS REDACTED*****
****SURVEY MAPS REDACTED*****
****SURVEY MAPS REDACTED*****
****SURVEY MAPS REDACTED*****
****SURVEY MAPS REDACTED*****

Clearance Tag Hang List
Tagout: DANGER 01
Clearance: D-HPCS-V-102R18-001 *16:08*

Tag Serial No.	Tag Type	Equipment ----- * Equipment Description * Equipment Location	Ver. Req.	Place. Seq.	Placement Configuration ----- * Notes	Placement 1st Verif Date/Time	Placement 2nd Verif Date/Time
41014	Equipment	HPCS-RMS-P/1 ----- * RMS-FOR-BKR HPCS * W -501- - -L0/13.0-MAIN CR	IV	1	AUTO AFTER STOP ----- *		
41015	Danger	E-FUSE-SM4/FU13 ----- * FUSE FOR HPCS-P-1 BKR CLOSE 15A * D -441-* - -* -SM-4	IV	2	REMOVED ----- *		
41016	Danger	E-FUSE-SM4/FU14 ----- * FUSE FOR HPCS-P-1 BKR TRIP 35A * D -441-* - -* -SM-4	IV	3	REMOVED ----- *		
41017	Danger	HPCS-CB-P1 ----- * 4160 V HPCS-P-1 BRKR * D -441-D114- -Q5/4.4 -SM-4	IV	4	RACKED OUT ----- *		
41018	Equipment	HPCS-RMS-V/4 ----- * RMS FOR HPCS-V-4 H13-P601 * W -501- - -L0/13.0-MAIN CR	IV	5	AUTO AFTER CLOSED ----- *		
41019	Danger	HPCS-42-4A5B ----- * HPCS-V-4 HPCS PUMP DISCH * D -441-D114- -Q2/4.1 -	IV	6	OFF ----- *		
41020	Danger	HPCS-V-4 ----- * Injection Line MOV * R-541-R404-.-M3/7.3	IV	7	CLOSED ----- *		

Component	Print Number
HPCS-RMS-P/1	EWD-7E-022
E-FUSE-SM4/FU13	EWD-7E-022
E-FUSE-SM4/FU14	EWD-7E-022
HPCS-CB-P1	EWD-7E-022
HPCS-RMS-V/4	EWD-7E-016
HPCS-42-4A5B	EWD-7E-016
HPCS-V-4	M520

Page 1 of 1

Clearance Coversheet
Tagout: DANGER 01
Clearance: D-HPCS-V-102R18-001 [redacted]
Component to be Worked:

HPCS-V-102
High Point Vent for DPIS 9
C-562-.-35-.

Work Description:

Replace valve assembly

Clearance Instructions:

This can be done prior to Wet LLRT's

Hazards:

HPCS-V-102 IS NOT ISOLABLE FROM THE REACTOR AND IS LOCATED AT ELEV 562' (EQUIVALENT TO -35" RX LEVEL)

Clearance Notes:

Clearance Attributes:

Attribute Description	Attribute Value
What Mode(s) Are Required For Clearance?	N -Mode 4 or 5
Is Tech Spec Equipment Affected?	Yes
Are Grounds Placed in this Clearance?	No
Assistance Required For Hang/Lift From:	No
Draining/Venting Required?	Fill & Vent
When Scheduled - Daily, Outage, FO?	Outage
Was A Clearance Walkdown Performed?	TO B EVALUATED BY CREW

Work Order List:

Number / Equipment ID	Description
00 MINOR MAINTENANCE 2003	WO 01079002

Clearance Verification:

Status	Description	Name	Verification Date
Prepared	Prepared By (RO)	Herrington, Arlen R.	
Reviewed	Reviewed By (RO)	Steckler, Thomas T.	
Approved	Approved By (SRO)	Franke, Eric D.	
Tags Being Hung	Released To Hang By (RO)	Herrington, Arlen R.	
Tags Hung	Tags Verified Hung (RO)		
Reviewed For Removal	Restoration Review (RO)		
Tag Removal Approved	Approved For Removal (SRO)		
Tags Verified Removed	Tags Verified Removed (RO)		

List:

Page 1 of 1

PASSPORT - TOTAL EXPOSURE SYSTEM

RADIATION WORK PERMIT

Report ID : TIPH900 RWP Number: **30001423 01** ALARA Task : WO 01079002 01 03

RWP Title : PLANT OPERATION/INVESTIGATION (NON-HIGH RAD)
Type : GR Status: ACTIVE Date : Today 13:04
Area : CGS RCA Location: VARIOUS PSE: N

Approved Dose Estimate: 8.553 ALARA Pre-Job Brief Required: N

Work Begin Date: Today 17:00 Work End Date: tomorrow 23:59
Extension Date : By:
Initiated Date yesterday 13:04 By: SMETZG METZGER SCOTT D

ALARA Task

ALARA Task : WO 01079002 01 03 Status: CLOSED Discipline: H
ALARA Desc : EQUIPMENT OPERATION AND INVESTIGATION IN NON-HIGH RADIATION AREAS

Radiological Conditions

Entry Class : 1 Stay Time: 960 Resp Reqd : N

RAD 5-100 MREM/HR
N/A UNCLASSIFIED

Minimum Remaining Allowable Dose: 1 (mrem)

ED Dose Alarm: 10 (mrem) ED Dose Rate Alarm: 75 (mrem/hr)

Airborne: < 3.000 E -9 (uCi/cc) < 0.3 DACs

Last Updated : Today By: SMETZG METZGER SCOTT D

Radiological Hazards

Radiological Hazard	Type	Distance	Reading	
CONTAMINATION-A	C	NA	N/A	DPM/100 CM2
CONTAMINATION-B/G	C	NA	< 50K	DPM/100 CM2
DOSE-RATE-BETA	R	CONTACT	N/A	MRAD/HR
DOSE-RATE-CONTACT	R	CONTACT	N/A	MREM/HR
DOSE-RATE-GENERAL	R	30 CM	SEE TEXT	MREM/HR

PASSPORT - TOTAL EXPOSURE SYSTEM

RADIATION WORK PERMIT

Report ID : TIPH900 RWP Number: **30001423 01** ALARA Task :**WO 01079002 01 03**

Radiation Protection Requirements

Dosimetry Type : S STANDARD (DRD/TLD) Multi-Pack Type:

Type	Code	Description	Type	Code	Description
BODY	DISP	DISPOSABLE COVERALLS	COVR	PERD	PERIODIC COVERAGE
DOSI	ALRM	INTEGRATING ALARMING DO	FEET	1RBR	1 PAIR RUBBER OVERSHOES
FEET	BOOT	BOOTIES	HAND	1RBG	1 PAIR RUBBER GLOVES
HAND	COTL	COTTON LINERS	HEAD	SKLC	SKULL CAP
SPIN	SPIN	SEE SPECIAL INSTRUCTION			

Special Instructions and Hold Points

Nbr	Special Instructions
1	ENTRY INTO A HIGH, HIGH HIGH, OR VERY HIGH RADIATION
1	AREA, AIRBORNE RADIOACTIVITY AREA, OR PARTICLE
1	CONTROL ZONE IS NOT ALLOWED ON THIS RWP.
1	.
2	RADIOLOGICAL CONDITIONS:
2	** RW BUILDING - POSTED RADIATION AREAS ARE GENERALLY
2	3 - 5 MREM/HR BUT RANGE UP TO 50 MREM/HR NEAR HIGH
2	RADIATION AREA BOUNDRIES.
2	** T/G BUILDING - POSTED RADIATION AREAS ARE GENERALLY
2	10 - 20 MREM/HR BUT RANGE UP TO 80 MREM/HR NEAR HIGH
2	RADIATION AREA BOUNDRIES.
2	** RX BUILDING - POSTED RADIATION AREAS ARE GENERALLY
2	10 - 20 MREM/HR BUT RANGE UP TO 70 MREM/HR NEAR HIGH
2	RADIATION AREA BOUNDRIES AND NEAR 'HOT SPOTS'.
2	* RADIATION AREAS IN ALL BUILDINGS MAY HAVE DOSE RATES
2	UP TO 99 MREM/HR.
2	REVIEW MOST RECENT AREA SURVEY MAP FOR RADIATION AND
2	CONTAMINATION LEVELS IN WORK AREA.
2	.
3	PROTECTIVE CLOTHING LISTED IS THE MINIMUM REQUIRED FOR
3	ENTRY INTO A CONTAMINATED AREA EXCEPT AS STATED BELOW
3	WITH HP APPROVAL:
3	*COTTON LINERS, RUBBER GLOVES AND
3	BOOTIES MAY BE WORN WITH OR WITHOUT A LABCOAT
3	ON A CASE-BY-CASE BASIS FOR WORK REQUIRING ONLY
3	INCIDENTAL CONTACT WITH CONTAMINATED SURFACES.
3	*COTTON LINERS AND RUBBER GLOVES ARE REQUIRED
3	TO REACH ACROSS A CONTAMINATED AREA BOUNDARY.
3	*SURGICAL GLOVES MAY BE WORN IN LIEU OF RUBBER
3	GLOVES AND COTTON LINERS
3	.

PASSPORT - TOTAL EXPOSURE SYSTEM

RADIATION WORK PERMIT

Report ID : TIPH900 RWP Number: **30001423 01** ALARA Task : **WO 01079002 01 03**

Special Instructions and Hold Points

Nbr	Special Instructions
4	CATCH CONTAINERS ARE REQUIRED TO BREACH CONTAMINATED
4	LIQUID SYSTEMS UNLESS THE LIQUID IS DIRECTED TO AN
4	APPROVED DRAIN SYSTEM. SMALL AMOUNTS OF CRD HCU WATER
4	VENTED DURING NORMAL OPERATIONS ARE NOT SUBJECT TO
4	REQ'MT SINCE THE WATER IS TYPICALLY <1000 DPM/PROBE
4	AREA AND SHOULD BE VERIFIED AS SUCH BY THE OPERATOR
4	.
5	TRAINING ON THE REFUEL BRIDGE IS NOT ALLOWED ON THIS
5	RWP.

Nbr	Hold Point Description
1	CONTACT HP PRIOR TO ANY CONTAMINATED SYSTEM BREACH,
1	INSULATION REMOVAL, OR MOVEMENT OF LEAD SHIELDING
1	.
2	NOTIFY HP PRIOR TO DRAINING ANY SYSTEM. DOSE RATES
2	MAY INCREASE IF A SYSTEM IS DRAINED
2	.
3	VENT HOSES SHOULD BE ROUTED DIRECTLY TO AN HP APPROVED
3	DRAIN OR A VENTED POLY BOTTLE. DRAIN HOSES SHOULD BE
3	ROUTED DIRECTLY INTO AN HP APPROVED FLOOR DRAIN.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	Determine Action Based on Plant Conditions and Procedural Guidance
LESSON LENGTH	.5 HRS

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001791	Rev. No.	2
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	02/15/15
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Have copies of ABN-CORE and ABN-RRC-LOSS available for student reference.

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: None

Safety Items: None

Task Number: SRO-0659

Validation Time: 15 minutes

Alternate Path: No

Time Critical: No

PPM Reference: ABN-CORE Rev. 16;
ABN-RRC-LOSS Rev. 13

Location: Any

NUREG 1123 Ref: 2.1.7 (4.4 / 4.7)

Performance Method: Perform

Task Standard:
A determination is made (as documented on Student JPM Answer Sheet) and based on information provided that a Reactor Scram is required as directed by ABN-CORE (Step 3.2).

JPM CHECKLIST

INITIAL CONDITIONS	With Columbia operating at full power, a common cause failure of the OPRMs required the CRS to direct placing both OPRM Manual Enable/Bypass switches in the BYPASS position. Three hours later a lockout on SH-5 occurs. The following plant conditions are reported by CRO1: Reactor power is 50%. Active loop drive flow is 27500 gpm. Rod line is 85%.
INITIATING CUE:	From the information given, determine the procedural action required. On the Student JPM Answer Sheet provided, indicate what that action is and provide the procedural reference (including step) for that action. When completed hand the Student JPM Answer Sheet back to the examiner.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	1	Determine procedure to enter.	Determines that entry into ABN-RRC-LOSS is required due to lockout on SH-5.		S / U
	2	Determine procedure transition.	Determines entry into ABN-CORE is directed from ABN-RRC-LOSS.		S / U
	3	Plots operating points given.	Determines operation is now in Region A of the Single Loop Power to Flow map (using Attachment 6.1 of ABN-RRC-LOSS).		S / U
	4	Determines required procedural action based on conditions given.	Refers to Immediate Operator Actions of ABN-CORE (Step 3.2) and determines that a manual reactor scram is required due to operating in Region A of the Power to Flow map and the OPRM is inoperable.		S / U
	5	Fills out answer sheet.	Indicates that a “Manual Scram” is required per ABN-CORE (Step 3.2).		S / U *
Termination Criteria: Candidate hands in the completed JPM Answer Sheet.					
Transfer the following to the “Results of JPM” page: Any Unsat step(s) and JPM completion time.					

JPM RESULTS:
DETERMINE ACTION BASED ON PLANT CONDITIONS AND PROCEDURAL GUIDANCE

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: A determination is made (as documented on Student JPM Answer Sheet) and based on information provided that a Reactor Scram is required as directed by ABN-CORE (Step 3.2).

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

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Evaluator's Signature: ______________________________ **Date:** ______________

STUDENT JPM INFORMATION CARD

Initial Conditions:

With Columbia operating at full power, a common cause failure of the OPRMs required the CRS to direct placing the OPRM Manual Enable/Bypass switches in the BYPASS position.

Three hours later a lockout on SH-5 occurs.

The following plant conditions are reported by CRO1:

- Reactor power is 50%.
- Active loop drive flow is 27500 gpm
- Rod line is 85%

Initiating Cue:

From the information given, determine the procedural action required.

On the Student JPM Answer Sheet provided, indicate what that action is and provide the procedural reference (including step) for that action.

When completed hand the Student JPM Answer Sheet back to the examiner.

The action required is:

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The action is per procedure/step: _____________/_______

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR/STA REQUALIFICATION TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	DETERMINE THE OPERABILITY OF THE SLC SYSTEM (ADMIN)
LESSON LENGTH	.5 HRS
MAXIMUM STUDENTS	1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001574	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave E. Crawford	DATE	12/29/16
REVISED BY		DATE	

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use.

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

ADMIN JPM – NO SIMULATOR SETUP NEEDED.

Special Setup Instructions:

Print out a copy of OSP-INST-H101 and fill in blocks 53, 54 and 55 with required information. Provide student a copy of Attachments 9.6 and 9.7 in addition to Page containing steps 53, 54 and 55.

JPM Instructions:

Verify current procedure against JPM and ensure procedure steps match. If steps have changed, the JPM should be revised.

The evaluator and student will use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the “Results of JPM” page.

Tools/Equipment: N/A

Task Number: SRO-0163

Prerequisite Training: N/A

PPM Reference: OSP-INST-H101 Rev. 86

NUREG 1123 Ref: 2.2.40 3.4 / 4.7

Safety Items: N/A

Validation Time: 5 Minutes

Time Critical: NO

Location: Simulator/Classroom

Performance Method: Perform

JPM CHECKLIST

INITIAL CONDITIONS:	The plant is operating at 100% power. Per the SLC placard in the P603 ARP holder, SLC Concentration is 14.3 percent.
INITIATING CUE:	You are reviewing OSP-INST-H101, the Shift and Daily Instrument Checks (MODES 1, 2, & 3) for a day shift review. Evaluate steps 53, 54, and 55 to determine if SLC is operable. Notify the CRS (examiner) of your answer by checking the appropriate block on your JPM ANSWER SHEET.

*** Items are Critical Steps**

Comments	Element	Standard	Sat/Unsat
RECORD START TIME: __________			
	Determines SLC operability	From step 53 determines the need to use Att. 9.6 for comparison.	S / U
		Using ATT. 9.6, determines SLC concentration/temperature is outside of the acceptable region. Refers to NOTE 4.	S / U *
		From step 55 determines the need to use Att. 9.7 for comparison.	S / U
		Using Att. 9.7 determines SLC Tank volume is acceptable.	S / U *
		Notifies the CRS that SLC is NOT operable.	S / U *
Termination Criteria: Student hands JPM ANSWER SHEET (with a selected response) to the examiner.			
RECORD TERMINATION TIME: _________			
Transfer to "Results of JPM" page the following information: Procedures validated prior to use; Comments from marked up evaluator's procedure copy; Unsatisfactory critical tasks; Total JPM time; Marked Up procedure and remaining JPM pages may be discarded.			

RESULTS OF JPM:

Examinee (Please Print): ____

Evaluator (Please Print): ____

Task Standard: OSP-INST-H101 is used to determine that the SLC system is NOT operable and 'NOT OPERABLE' is checked on the JPM ANSWER SHEET.

Overall Evaluation	Exam Code
SAT / UNSAT (Circle One)	

Verified Procedure #/Rev. Used for JPM (Initial Box)	Validation/Critical Time	JPM Completion Time
	5 Minutes / NA	

COMMENTS:

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Evaluator's Signature: ____________________________ **Date:** __________________________

STUDENT JPM INFORMATION CARD

Initial Conditions:

The plant is operating at 100% power.

Per the SLC placard in the P603 ARP holder, SLC Storage Tank Concentration is 14.3 percent.

Cue:

You are reviewing OSP-INST-H101, the Shift and Daily Instrument Checks (MODES 1, 2, & 3), for a day shift review. Evaluate steps 53, 54, and 55 to determine if SLC is operable. Notify the CRS (examiner) of your answer by checking the appropriate block on the JPM ANSWER SHEET.

The SLC System is:

☐ OPERABLE

☐ NOT OPERABLE

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	VALIDATE FUSE INSTALLATION PER PPM 1.3.47 (SRO)

LENGTH OF LESSON 0.5 Hour

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001861	Rev. No.	1
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Steve Bruce	DATE	12/05/16
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Obtain a cleared fuse (BUSS F10A/250V/1A) and a choice of 3 replacement fuses (BUSS F10A/250V/1A, BUSS F10A/250V/10A, and BUSS KTK/600V/20A) for the student to select from.

Provide a copy of EWD-15E-042 (see Attachment 1) and PPM 1.3.47 (Fuse Replacement Control).

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: Fuses (as specified above)

Task Number: RO-0570, SRO-0212

Alternate Path: No

PPM Reference: PPM 1.3.47 Rev. 11

NUREG 1123 Ref: 2.2.41 (3.5 / 3.9)

Safety Items: None

Validation Time: 5 Minutes

Time Critical: No

Location: Any

Performance Method: Perform

Task Standard: Student determines that the replacement fuse should be a 10A fuse and hands the correct fuse to the SM (evaluator).

JPM CHECKLIST

SETUP:	Provide the student with EWD-15E-042 (see Attachment 1), PPM 1.3.47, the cleared fuse, and three choices of replacement fuses.
INITIAL CONDITIONS:	CRD-LIS-601B, MS-LIS-200B, and MS-LIS-300B have lost power. Plant conditions are now stable. EFIN troubleshooting has identified that fuse GG-F02 in H13-P611 has cleared.
INITIATING CUE:	The SM directs you as the FIN Team SRO to independently validate the correct replacement fuse. Inform the SM of your decision by completing the JPM Answer Sheet provided with justification of your answer and by handing the SM (evaluator) the correct replacement fuse.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Evaluates EWD-15E-042 (Attachment 1).	Determines that the rating for fuse GG-F02 is 10A.		S / U *
	2	Evaluates the cleared fuse.	Determines that the cleared fuse rating is 1A.	May not refer to cleared (blown fuse) in determining the correct fuse.	S / U
	3	Evaluates available replacement fuses by looking at the rating printed on the fuse.	Determines that the fuse marked as a 10A fuse is the correct fuse.	May refer to PPM 1.3.47 to help identify correct fuse.	S / U *
	4	Informs the SM.	Informs the SM that the replacement for fuse GG-F02 should be a 10A fuse and provides the correct replacement fuse to the SM.	Evaluator may need to prompt the candidate to provide the correct replacement fuse.	S / U *
Termination Criteria: The student turns in the completed answer sheet and selected fuse for replacement.					
Termination Cue: This completes the JPM.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM:

VALIDATE FUSE INSTALLATION PER PPM 1.3.47

Examinee (Please Print): ____

Evaluator (Please Print): ____

Task Standard: Candidate determines that the replacement fuse should be a 10A fuse and hands the correct fuse to the SM (evaluator).

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: __________________________ **Date:** __________________________

LO001860 Rev. 1

Initial Conditions:

CRD-LIS-601B, MS-LIS-200B, and MS-LIS-300B have lost power.

Plant conditions are now stable.

EFIN troubleshooting has identified that fuse GG-F02 in H13-P611 has cleared.

Initiating Cue:

The SM directs you as the FIN Team SRO to independently validate the correct replacement fuse.

Inform the SM of your decision by completing the JPM Answer Sheet provided with justification of your answer and by handing the SM (evaluator) the correct replacement fuse.

The correct replacement fuse is: ____________________

Provide your justification below:

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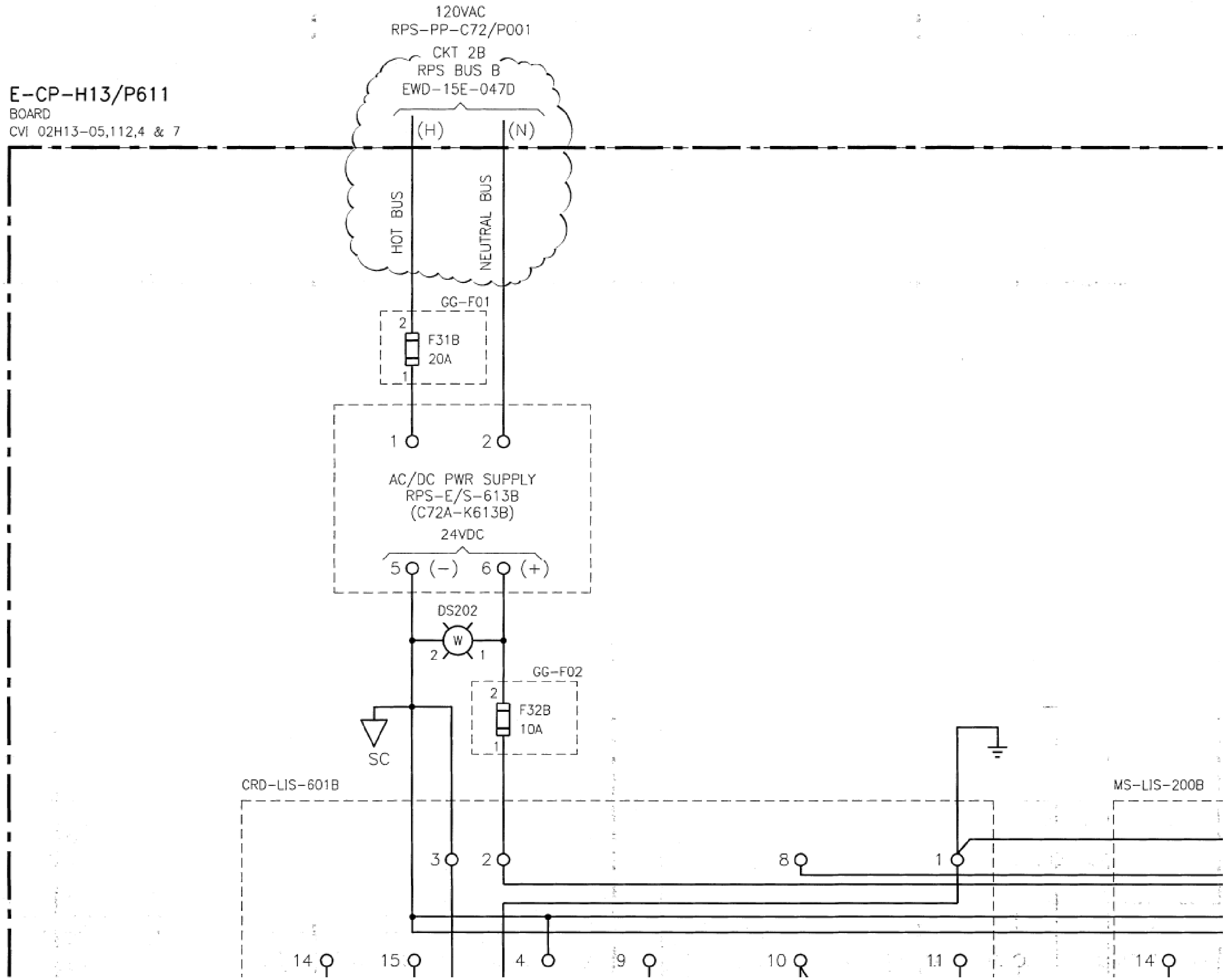
EWD-15E-042



LO001860 Rev. 1 (ATTACHMENT 1)

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	INITIAL LICENSED OPERATOR TRAINING
COURSE TITLE	ADMIN JOB PERFORMANCE MEASURE
LESSON TITLE	ESTIMATE MAIN CONDENSER AIR EJECTOR GROSS GAMMA ACTIVITY RATE AND DETERMINE ACTIONS (ADMIN)
LESSON LENGTH	.5 HRS
MAXIMUM STUDENTS	1

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code		Rev. No.	
JPM PQD Code	LO001590	Rev. No.	5
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	10/21/06
REVISED BY	Dave Crawford	DATE	12/19/16

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY		DATE	
	Operations Training Manager		

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Setup Instructions:

Candidate needs a calculator and access to ABN-OG.

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: N/A

Task Number: SRO-0658

Alternate Path: No

PPM Reference: ABN-OG Rev. 4

NUREG 1123 Ref: 271000A2.04 (3.7 / 4.1)

Safety Items: N/A

Validation Time: 10 minutes

Time Critical: No

Location: Classroom

Performance Method: Perform

Task Standard: Candidate fills out the JPM Answer Sheet and has determined that a power reduction per PPM 3.2.4 is required to maintain Main Condenser Gross gamma activity LT 332 mCi/sec.

JPM CHECKLIST

INITIAL CONDITIONS:	Columbia is operating at full power. Various alarms are locked in due to suspected fuel pin damage. Offgas system parameters are as follows: OFFGAS POST TREATMENT RADIATION MONITOR, OG-RIS-601A, is in alarm. OFFGAS SYSTEM EXHAUST FLOW, OG-FR-620, is reading 43 SCFM. SJAE CONDENSER OUTLET RADIATION MONITOR, OG-RR-604, is reading 7760 mr/hr.
INITIATING CUE:	Based on the above information, determine what action, if any, should be taken. Fill in the result of your conclusion on the attachment provided.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Determine procedure.	Recognizes entry condition into ABN-OG and refers to procedure.		S / U
	2	ABN-OG Step 4.1.4 Estimate Main Condenser air ejector gross gamma activity rate using the following formula: [OG Pretreatment (mRem/hr) (OG-RR-604)] X [OG System flow (scfm) (OG-FR-620)] divided by 1000 = Main Condenser Gross gamma activity (mCi/sec).	Main Condenser Gross gamma activity = 7760 mr/hr times 43 SCFM divided by 1000 OR Main Condenser Gross gamma activity = 333.68 mCi/sec (GT 332mCi/sec).		S / U *

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	3	ABN-OG Step 4.1.5 Determines required action.	Based on a Main Condenser Gross gamma activity reading of 333.68 mCi/sec, candidate determines that a power reduction per PPM 3.2.4 to maintain Main Condenser Gross gamma activity LT 332 mCi/sec is required.		S / U *
Termination Criteria: Hands the JPM Answer Sheet to the examiner.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM:
ESTIMATE MAIN CONDENSER AIR EJECTOR GROSS GAMMA ACTIVITY RATE AND DETERMINE ACTIONS

Examinee (Please Print): ____

Evaluator (Please Print): ____

Task Standard: Candidate fills out the JPM Answer Sheet and has determined that a power reduction per PPM 3.2.4 is required to maintain Main Condenser Gross gamma activity LT 332 mCi/sec.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

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Evaluator's Signature: ___________________________ **Date:** _________________________

STUDENT JPM INFORMATION CARD

Initial Conditions:

Columbia is operating at full power.

Various alarms are locked in due to suspected fuel pin damage.

Offgas system parameters are as follows:

OFFGAS POST TREATMENT RADIATION MONITOR, OG-RIS-601A, is in alarm.

OFFGAS SYSTEM EXHAUST FLOW, OG-FR-620, is reading 43 SCFM.

SJAE CONDENSER OUTLET RADIATION MONITOR, OG-RR-604, is reading 7760 mr/hr.

Cue:

Based on the above, determine what action, if any, should be taken. **Fill in the result of your conclusion on the JPM Answer Sheet. Hand the JPM Answer Sheet to your examiner when complete.**

JPM ANSWER SHEET

INITIAL HERE IF NO ACTIONS ARE REQUIRED: ______________________________

REASON NO ACTIONS ARE REQUIRED: ____________________________________

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INITIAL HERE IF ACTIONS ARE REQUIRED:_________________________________

ACTION(S) IF REQUIRED AND REASON FOR ACTION: ________________________

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INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	COMPLETE CLASSIFICATION NOTIFICATION FORM (SAE) (SRO) (TC)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LR001509	Rev. No.	6
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	05/17/01
REVISED BY	Dave E. Crawford	DATE	01/17/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

Run URI based upon initial conditions. Print the URI Dose Assessment form. Give these to the student after reading the initial conditions and initiating cue.

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: None

Safety Items: None

Task Number: SRO- 0529, 0638

Validation Time: 12 Minutes

Alternate Path: No

Time Critical: Yes (30 Minutes)

PPM Reference: PPM 13.8.1 Rev. 36, CNF Rev. 24

Location: Any

NUREG 1123 Ref: 2.4.41 (2.9/4.6)

Performance Method: Perform

Task Standard: Performs Site Area Emergency event classification within 15 minutes of when Initial Cue is provided and completes Classification Notification Form with required information within 15 minutes of event classification.

JPM CHECKLIST

INITIAL CONDITIONS:	The plant has experienced an event that has resulted in the following conditions: The plant scrammed an hour ago. A release has been ongoing for 3 hours and 44 minutes. Turbine Building exhaust flow is 355,000 cfm with activity reading of 1.30E-01 µCi/cc. Wind direction is from 300°, wind speed is 7 mph, and there is no precipitation. Stability class is A. URI Dose Assessment has been performed.
INITIATING CUE:	The Shift Manager has directed you to complete the Classification Notification Form based only upon the results of the completed Dose Assessment. This is the initial classification of this event. Present the completed CNF to the Shift Manager for signature. This is a Time Critical JPM and your time starts now.
EVALUATOR NOTE:	Record start time: ___________

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
EVALUATOR NOTE: RECORD CLASSIFICATION TIME: ___________ FOR STEP 1 BELOW.					
	1	Classifies event	Classifies event as a SAE based upon Thyroid CDE dose at 1.2 miles of GT 500 mrem **within 15 minutes of start time.**		**S / U ***
EVALUATOR NOTE: THIS STOPS THE FIRST 15 MINUTE CLOCK AND STARTS THE NEXT 15 MINUTE CLOCK					
	2	Completes Classification Notification Form.	Fills in following information on the CNF:		
	3	Block 1	Checks b. (Drill)		S / U
	4	Block 2	Enters a ‘1’		S / U
	5	Block 3	Enters ‘name’ and ‘number’		S / U
	6	Block 4	Checks a. (Initial Classification) and enters date and time		S / U *

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	7	Block 5	Checks c. (Site Area Emergency)		S / U *
	8	Block 6	N/A (left blank)		S / U
	9	Block 7	Checks ‘No’		S / U
	10	Block 8	Enters 7 for Wind Speed		S / U
	11	Block 8	Enters 300 for degrees		S / U
	12	Block 8	Checks ‘No’ for Precipitation		S / U
	13	Block 8	Enters ‘A’ as Stability Classification		S / U
	14	Block 9	Checks ‘Release’		S / U *
	15	Block 10	Checks ‘Airborne’		S / U
	16	Block 11	Enters a time for Estimated Start of Release (part of initial conditions)		S / U
	17	Block 12	Checks ‘No’		S / U
	18	Block 13	Enters 5.1.S.2 for EAL# with short description		S / U *
	19	Block 14	Checks a., b., or c.		S / U
Termination Criteria: Student hands the instructor the completed CNF.					
Transfer the following to the “Results of JPM” page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM
COMPLETE CLASSIFICATION NOTIFICATION FORM (SAE)

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: Performs Site Area Emergency event classification within 15 minutes of when Initial Cue is provided and completes Classification Notification Form with required information within 15 minutes of event classification.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

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Evaluator's Signature: ______________________________ **Date:** ______________

Initial Conditions:

The plant has experienced an event that has resulted in the following conditions:

- The plant scrammed an hour ago
- A release has been ongoing for 3 hours and 44 minutes
- Turbine Building exhaust flow is 355,000 cfm with activity reading of 1.30E-01 μCi/cc
- Wind direction is from 300°
- Wind speed is 7 mph
- No precipitation
- Stability class is A

AN URI Dose Assessment has been performed.

Initiating Cue:

The Shift Manager has directed you to complete a Classification Notification Form based **only** on the results of the completed Dose Assessment.

This is the initial classification of this event.

Present the completed CNF to the Shift Manager for signature.

THIS IS A TIME CRITICAL JPM and your time starts now

1		2
Type of Event: a. ☐ **Emergency** b. ☐ **Drill**	**COLUMBIA GENERATING STATION** **CLASSIFICATION NOTIFICATION FORM (CNF)**	**No:** _____

3 **Notification Provided By: (Emergency Director)** **Phone:**

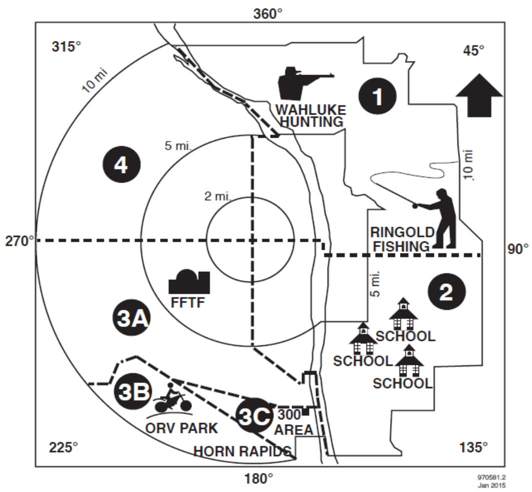
Name (Print): (509)

______________________ ______________________

4 **Classification/Status**

	Classification/Status	Time:	Date:
a.	☐ Initial Classification		
b.	☐ Reclassification		
c.	☐ Termination		
d.	☐ PAR Changes/Additions		
e.	☐ Information		

Section Map



5

a. ☐ **UNUSUAL EVENT**
No Offsite Protective Actions Recommended

b. ☐ **ALERT**
No Offsite Protective Actions Recommended

c. ☐ **SITE AREA EMERGENCY**

Automatic Protective Action Recommendation
EVACUATE:
- Columbia River
- Ringold Fishing Area
- Wahluke Hunting Area
- Schools in EPZ
- Horn Rapids Recreation Area/ORV Park

d. ☐ **GENERAL EMERGENCY**

Automatic Protective Action Recommendation
EVACUATE:
- Columbia River
- Ringold Fishing Area
- Wahluke Hunting Area
- Schools in EPZ
- Horn Rapids Recreation Area/ORV Park

8 **Meteorological Data:**

Wind Speed: ______ mph from ______ degrees

Precipitation: ☐ Yes ☐ No

Stability Classification _______

6 **PROTECTIVE ACTION RECOMMENDATIONS**

IF a **General Emergency** is declared,
THEN **Refer** to PPM 13.2.2 "Determining PARs".
IF A GE is NOT declared, This section is Not Applicable

9 ☐ No Release(Block 10,11&12 are N/A) ☐ Release

Basis for PARs: ☐ Not Applicable ☐ Radiological ☐ Plant

10 **Type of release:**
☐ N/A
☐ Airborne
☐ Water

11 **Estimated Start of Release:**
☐ N/A
Time/Date: _____________

Release Terminated:
Time/Date: _____________

0-2 miles	2-10 miles			
All Sections	Section 1	Section 2	Section 3	Section 4
	☐ **Monitor & Prepare**	☐ **Monitor & Prepare**	☐ **Monitor & Prepare**	☐ **Monitor & Prepare**
☐ **Shelter In Place**	☐ **Shelter In Place**	☐ **Shelter In Place**	☐ **Shelter In Place**	☐ **Shelter In Place**
☐ **Evacuate**	☐ **Evacuate**	☐ **Evacuate**	☐ **Evacuate**	☐ **Evacuate**

12 **State Criteria met for administering KI…**(Information only)
☐ N/A
☐ No
☐ Yes ☐ 250 mrem/hr thyroid
☐ 1.4 x 10^{-7} μci/cc I-131
☐ Unfiltered or unmonitored release

7 **Security Event:** ☐ Yes ☐ No
Responding personnel are to report to:
☐ On-Site Facilities
☐ Alternate Facilities, Energy Northwest Office Complex, 3000 George Washington Way

13 **EAL#** _________ **Description;** _____________

Additional Information;_____________

14 **Prognosis of Situation:** a. ☐ **Unknown** b. ☐ **Stable** c. ☐ **Escalating** d. ☐ **Improving**

15 **Emergency Director Approval Signature:**

Completion of Classification Notification Form (CNF)

Completing the form

Block 1. Type of event: For actual emergencies, the block "Emergency" should be checked.
For drills or exercises, the block "Drill" should be checked.

Block 2. Classification Form Number: This is a sequential number indicating the order of offsite notifications.
The first CNF is #1 followed by #2, etc.

Block 3. Notification provided by. This is the name of the Emergency Director providing the information for the Crash call. Phone number is the number at which the notifier can be contacted.

Block 4. Classification/Statues: a-e.

Item a or b: The time listed is the time at which the ED declares the emergency classification or upgrade. This time starts the 15-minute notification requirement.

Item c.: Termination, no Classification Level should exist or be marked.
A CNF and Crash must be initiated at the termination of a drill or actual event.

Item d.: If additional PARs are required after the CNF for the GE has been transmitted, complete this block. The need for additional PARs requires notifications be completed within 15 minutes of the time in the block.

Item e.: Periodic information updates such as release information, KI, prognosis, and changes in Met conditions should be provided at least once an hour.

Block 5. Check block for appropriate emergency classification.
(UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, GENERAL EMERGENCY)

Block 6. When a General Emergency is declared, Refer to PPM 13.2.2 "Determining Protective Action Recommendations", Check applicable sections/actions and communicated during the Crash call for the GE.
If a GE is NOT declared, this section is N/A and does NOT need to be filled in.

Block 7. Identify whether the event is security based (Auto Dialer Scenario 191) and reporting location for Offsite Response Organization (ie. County and State Personnel) responding to CGS.

Block 8. Enter Meteorological data. Following a release, if meteorological data changes ensure additional PARs are considered and provide offsite notification. To convert Delta T to stability class, refer to PPM 13.8.1.

Block 9. If there is a No RELEASE, then blocks 10, 11 & 12 are N/A.
If there is a RELEASE then enter information in blocks 10, 11 & 12.
If RELEASE starts after CNF and CRASH notification has been completed, then provide new CNF and Crash notifications to offsite agencies as soon as RELEASE Criteria has been met.

Block 10. If there is a RELEASE, mark it as airborne or water.

Block 11. If there is a RELEASE, enter the start time. Enter stop time following release termination.

Block 12. The block with information on the State's criteria for KI is an <u>information</u> notification <u>not</u> a PAR.

Block 13. Enter the EAL number. Provide a short description of the event. Do not use jargon and avoid acronyms.

Block 14. Enter Prognosis of Situation. This is a judgment call primarily relating to the condition of the reactor.

Block 15. Ensure the Emergency Director has signed the form prior to transmittal to the offsite agencies.

Additional information to consider when completing the CNF

- CNF must be filled out in entirely prior to transmittal to offsite agencies. Transmittal of the CNF should occur prior to initiation of each Crash Call. The requirement to complete 15-minute notifications to the offsite agencies should not be delayed if the time needed to complete the form would impact the notification requirement. In cases where the Crash Call is initiated prior to transmittal, the form should be filled out and transmitted as soon as possible.
- When the Control Room is providing emergency classifications, they will ensure the SCC has received the CNF at which time the SCC will follow up with the offsite agencies to ensure they have received the information. If the SCC is not available, the Control Room Notifier must provide the information block by block to the offsite agencies.
- If the CNF information is being communicated from the EOF or TSC, all information on the form must be verbally communicated. When communicating the CNF information, it must be communicated block by block for each of the blocks.
- If an error on the CNF is recognized during the Crash Call, the correction should be noted on the CNF, initialed, and communicated during the Crash Call.
- If an error is recognized in block 4, 5, 6, 8, 9, 10, 11, 12 or 13 after the Crash Call has concluded, a new corrected CNF with the next sequential number should be completed, transmitted, and followed up with a Crash Call.

Facility: Columbia Generating Station Date of Examination: 2/27/17

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test No.: 1

Control Room Systems:* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
S-1: TRANSFER BUS SM-3 FROM TR-S TO TR-N Description: Transfer 4160 VAC Bus SM-3 from the Startup Transformer to the Normal Transformer. K/A: 262001.A4.04 (3.6/3.7)	(D)(S)	6
S-2: (RHR) RESPOND TO LOSS OF SHUTDOWN COOLING Description: Restore Residual Heat Removal (RHR) Loop B shutdown cooling per SOP-RHR-SDC (RHR Loop B Shutdown Cooling Quick Restart). Following pump start, insufficient pump head (and consequently flow) will necessitate securing pump per CAUTION in procedure. K/A: 205000.A2.06 (3.4/3.5)	(A)(L)(N)(S)	4
S-3: (HPCS) HPCS SYSTEM INITIATION Description: Initiate High Pressure Core Spray (HPCS) system per SOP-HPCS-INJECTION and restore RPV level back to directed band. Following start of the HPCS pump its minimum flow valve will fail to automatically close once RPV injection has occurred (resulting in a lower injection rate into the RPV). Valve must be manually closed to maximize injection. K/A: 209002.A4.04 (3.1/3.1)	(A)(N)(EN)(L)(S)	2
S-4: (CR HVAC) INITIATE CR HVAC MANUAL PRESSURIZATION MODE Description: Place both trains of Control Room Ventilation in the Manual Pressurization Mode of operation per SOP-HVAC/CR-OPS (inlet damper for one of the Control Room Emergency Filter Units fail to auto open and must be opened manually). K/A: 290003.A4.01 (3.2/3.2)	(A)(D)(EN)(S)	9
S-5: (RB HVAC) RE-ESTABLISH SECONDARY CONTAINMENT/START RB HVAC Description: Restart Reactor Building (RB) HVAC using RB Outside Air Fan 1A and RB Exhaust Air Fan 1A per SOP-HVAC RB-RESTART-QC to re-establish Secondary Containment integrity. K/A: 290001.A4.01 (3.3/3.4)	(D)(P)(S)	5
S-6: (DEH) LOWER RPV PRESSURE USING DEH Description: Recognize that auto control of bypass valves to lower RPV pressure to a target of 550 psig does not work and that the manual lowering of RPV pressure at a rate LE 50 psig per minute through manual control of Bypass Valves would be required. K/A: 241000.A4.02 (4.1/4.1)	(A)(D)(L)(P)(S)	3
S-7: (RPS) RESTORE RPS A FROM ALTERNATE POWER SOURCE Description: Transfer RPS A to its Alternate power supply by performing subsequent steps in ABN-RPS. K/A: 212000.A2.01 (3.7/3.9)	(D)(P)(S)	7

S-8: (Fire Protection) ABN-FIRE Immediate Actions Description: Given the report of heavy smoke in the field and the observance of several fire alarms, perform the Immediate Actions of ABN-FIRE. K/A: 286000.A4.01 (3.3/3.2)	(N)(S)	8
In-Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P-1: RESTART RPS-MG-1 AND CLOSE EPA BREAKERS Description: Direction is provided to restart the RPS Motor Generator (RPS-MG-1) which supplies power to RPS Bus 'A' using SOP-RPS-START. During the start the expected voltage indication is not present requiring manual reset of the MG overvoltage trip. K/A: 212000.A2.01 (3.7/3.9)	(A)(D)(R)	6
P-2: CHOOSE METHOD - INSERT CONTROL RODS BY VENTING SCRAM AIR HEADER Description: Based on initial conditions provided, recognize that manually venting the scram air header is the next action to take in an attempt to insert control rods. K/A: 295037.EA1.05 (3.9/4.0)	(D)(E)(R)	1
P-3: (RSD) REMOTE SHUTDOWN PANEL ACTIVATION DURING A CONTROL ROOM EVACUATION **(Time Critical)**** Description: Based on a Main Control Room evacuation due to fire, and from a designated starting point, transit to the Remote Shutdown Panel and activate panel within required time using ABN-CR-EVAC Attachment 7.2. K/A: 295016 AA1.07 (4.2/4.3) **** Ref: OI-69, TCOA-3/TCOA-4**	(D)(E)(R)	7

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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 **(5)**
(C)ontrol room	
(D)irect from bank	≤ 9 **(8)**
(E)mergency or abnormal in-plant	≥ 1 **(2)**
(EN)gineered safety feature	≥ 1 **(2)** (control room system)
(L)ow-Power / Shutdown	≥ 1 **(3)**
(N)ew or (M)odified from bank including 1(A)	≥ 2 **(3)**
(P)revious 2 exams	≤ 3 **(3)** (randomly selected)
(R)CA	≥ 1 **(3)**
(S)imulator	

Facility: Columbia Generating Station Date of Examination: 2/27/17

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test No.: 1

Control Room Systems:* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
S-1: TRANSFER BUS SM-3 FROM TR-S TO TR-N Description: Transfer 4160 VAC Bus SM-3 from the Startup Transformer to the Normal Transformer. K/A: 262001.A4.04 (3.6/3.7)	(D)(S)	6
S-2: (RHR) RESPOND TO LOSS OF SHUTDOWN COOLING Description: Restore Residual Heat Removal (RHR) Loop B shutdown cooling per SOP-RHR-SDC (RHR Loop B Shutdown Cooling Quick Restart). Following pump start, insufficient pump head (and consequently flow) will necessitate securing pump per CAUTION in procedure. K/A: 205000.A2.06 (3.4/3.5)	(A)(L)(N)(S)	4
S-3: (HPCS) HPCS SYSTEM INITIATION Description: Initiate High Pressure Core Spray (HPCS) system per SOP-HPCS-INJECTION and restore RPV level back to directed band. Following start of the HPCS pump its minimum flow valve will fail to automatically close once RPV injection has occurred (resulting in a lower injection rate into the RPV). Valve must be manually closed to maximize injection. K/A: 209002.A4.04 (3.1/3.1)	(A)(N)(EN) (L)(S)	2
S-4: (CR HVAC) INITIATE CR HVAC MANUAL PRESSURIZATION MODE Description: Place both trains of Control Room Ventilation in the Manual Pressurization Mode of operation per SOP-HVAC/CR-OPS (inlet damper for one of the Control Room Emergency Filter Units fail to auto open and must be opened manually). K/A: 290003.A4.01 (3.2/3.2)	(A)(D)(EN) (S)	9
S-5: (RB HVAC) RE-ESTABLISH SECONDARY CONTAINMENT/START RB HVAC Description: Restart Reactor Building (RB) HVAC using RB Outside Air Fan 1A and RB Exhaust Air Fan 1A per SOP-HVAC RB-RESTART-QC to re-establish Secondary Containment integrity. K/A: 290001.A4.01 (3.3/3.4)	(D)(P)(S)	5
S-6: (DEH) LOWER RPV PRESSURE USING DEH Description: Recognize that auto control of bypass valves to lower RPV pressure to a target of 550 psig does not work and that the manual lowering of RPV pressure at a rate LE 50 psig per minute through manual control of Bypass Valves would be required. K/A: 241000.A4.02 (4.1/4.1)	(A)(D)(L)(P) (S)	3
S-8: (Fire Protection) ABN-FIRE Immediate Actions Description: Given the report of heavy smoke in the field and the observance of several fire alarms, perform the Immediate Actions of ABN-FIRE. K/A: 286000.A4.01 (3.3/3.2)	(N)(S)	8

In-Plant Systems* (3 for RO); 3 for SRO-I); (3 or 2 for SRO-U)		
P-1: RESTART RPS-MG-1 AND CLOSE EPA BREAKERS Description: Direction is provided to restart the RPS Motor Generator (RPS-MG-1) which supplies power to RPS Bus 'A' using SOP-RPS-START. During the start the expected voltage indication is not present requiring manual reset of the MG overvoltage trip. K/A: 212000.A2.01 (3.7/3.9)	(A)(D)(R)	6
P-2: CHOOSE METHOD - INSERT CONTROL RODS BY VENTING SCRAM AIR HEADER Description: Based on initial conditions provided, recognize that manually venting the scram air header is the next action to take in an attempt to insert control rods. K/A: 295037.EA1.05 (3.9/4.0)	(D)(E)(R)	1
P-3: (RSD) REMOTE SHUTDOWN PANEL ACTIVATION DURING A CONTROL ROOM EVACUATION **(Time Critical)**** Description: Based on a Main Control Room evacuation due to fire, and from a designated starting point, transit to the Remote Shutdown Panel and activate panel within required time using ABN-CR-EVAC Attachment 7.2. K/A: 295016 AA1.07 (4.2/4.3) **** Ref: OI-69, TCOA-3/TCOA-4**	(D)(E)(R)	7

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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 **(5)**
(C)ontrol room	
(D)irect from bank	≤ 8 **(7)**
(E)mergency or abnormal in-plant	≥ 1 **(2)**
(EN)gineered safety feature	≥ 1 **(2)** (control room system)
(L)ow-Power / Shutdown	≥ 1 **(3)**
(N)ew or (M)odified from bank including 1(A)	≥ 2 **(3)**
(P)revious 2 exams	≤ 3 **(2)** (randomly selected)
(R)CA	≥ 1 **(3)**
(S)imulator	

Facility: Columbia Generating Station Date of Examination: 2/27/17

Exam Level: RO ☐ SRO-I ☐ SRO-U ☒ Operating Test No.: 1

Control Room Systems:* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
S-1: TRANSFER BUS SM-3 FROM TR-S TO TR-N Description: Transfer 4160 VAC Bus SM-3 from the Startup Transformer to the Normal Transformer. K/A: 262001.A4.04 (3.6/3.7)	(D)(S)	6
S-2: (RHR) RESPOND TO LOSS OF SHUTDOWN COOLING Description: Restore Residual Heat Removal (RHR) Loop B shutdown cooling per SOP-RHR-SDC (RHR Loop B Shutdown Cooling Quick Restart). Following pump start, insufficient pump head (and consequently flow) will necessitate securing pump per CAUTION in procedure. K/A: 205000.A2.06 (3.4/3.5)	(A)(L)(N)(S)	4
S-3: (HPCS) HPCS SYSTEM INITIATION Description: Initiate High Pressure Core Spray (HPCS) system per SOP-HPCS-INJECTION and restore RPV level back to directed band. Following start of the HPCS pump its minimum flow valve will fail to automatically close once RPV injection has occurred (resulting in a lower injection rate into the RPV). Valve must be manually closed to maximize injection. K/A: 209002.A4.04 (3.1/3.1)	(A)(N)(EN)(L)(S)	2
In-Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
P-2: CHOOSE METHOD - INSERT CONTROL RODS BY VENTING SCRAM AIR HEADER Description: Based on initial conditions provided, recognize that manually venting the scram air header is the next action to take in an attempt to insert control rods. K/A: 295037.EA1.05 (3.9/4.0)	(D)(E)(R)	1
P-3: (RSD) REMOTE SHUTDOWN PANEL ACTIVATION DURING A CONTROL ROOM EVACUATION **(Time Critical)**** Description: Based on a Main Control Room evacuation due to fire, and from a designated starting point, transit to the Remote Shutdown Panel and activate panel within required time using ABN-CR-EVAC Attachment 7.2. K/A: 295016 AA1.07 (4.2/4.3) ** **Ref: OI-69, TCOA-3/TCOA-4**	(D)(E)(R)	7

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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	2-3 **(2)**
(C)ontrol room	
(D)irect from bank	≤ 4 **(3)**
(E)mergency or abnormal in-plant	≥ 1 **(2)**
(EN)gineered safety feature	≥ 1 **(1)** (control room system)
(L)ow-Power / Shutdown	≥ 1 **(2)**
(N)ew or (M)odified from bank including 1(A)	≥ 1 **(2)**
(P)revious 2 exams	≤ 2 **(0)**
(R)CA	≥ 1 **(2)**
(S)imulator	

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	RESTART OF RPS-MG-1 AND REPOWER RPS BUS (Plant) (Alt Path)
LESSON LENGTH	.5 HRS

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001641	Rev. No.	4
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	6/10/08
REVISED BY	John Miller	DATE	9/14/16

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

None

Special Setup Instructions:

None

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

The student is given SOP-RPS-START Sections 5.1 and 5.3.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0248

Validation Time: 12 Minutes

Alternate Path: Yes

Time Critical: No

PPM Reference: SOP-RPS-START Section 5.1 and 5.3 Rev. 5

Location: Plant

NUREG 1123 Ref: 212000A2.01 (3.7/3.9)

Performance Method: Simulate

Task Standard: RPS-MG-1 is running and the A RPS EPA breakers have been closed.

INITIAL CONDITIONS:	RPS Division A has been de-energized due to a fault. The fault has been identified and corrected.
INITIATING CUE:	The CRS directs you to restart RPS-MG-1 and repower the Division A RPS bus in accordance with SOP-RPS-START section 5.1 and 5.3. Inform the CRS when the RPS EPA breakers have been closed. The performance of this JPM is simulated. Control manipulations will not be performed.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Step 5.1.1 Verify RPS-DISC-7A1B is Closed (RPS Bus Mtr Gen MG-1 Supply Breaker) (E-MC-7A).	Observes RPS-DISC-7A1B's handle.	The handle is pointing to On.	S / U
	2	Step 5.1.2 Perform the following at E-CP-C72/S001A (RPS-MG-1 Control Panel):	Performs this step.		S / U
	3	Step 5.1.2a Verify Motor Off indicating light illuminated (Green).	Observes the Green Motor Off indicating light is on.	The Green light is on.	S / U
	4	Step 5.1.2b Verify RPS-CB-MG1 Open (Generator Output Breaker).	Observes RPS-CB-MG1 is open with lever in Off position.	Indicate that the lever is pointed downward (towards off).	S / U

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	5	Step 5.1.2c Depress and Hold RPS-RMS-MG1/ START, pushbutton (Motor On).	Simulates depressing and holding RPS-RMS-MG1/START, MOTOR ON pushbutton depressed.	The start pushbutton is depressed. Red light On, Green light Off The motor starts to make noise and starts to spin.	S / U *
	6	Step 5.1.2d Verify the following: • Motor Off indicating light extinguished (Green) • Motor On light illuminates (Red)	Observes the Green Motor Off indicating light off and the Red Motor On indicating light is on.	The Green light is off and the Red light is on.	S / U
	7	Step 5.1.2e When RPS-MG-1 has come up to speed, then release RPS-RMS- MG1/START pushbutton.	Simulates releasing the MOTOR ON pushbutton (when cue is read).	(If the MG set is actually running in the plant) The motor is now spinning as you see it and making the noise you now hear it; OR (If the MG set is not actually running in the plant) The MG motor speed is not visible rising and motor noise is constant.	S / U *
NOTE: Motor On pushbutton doubles as an Over Voltage Trip Reset pushbutton.					

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	8	Step 5.1.2f If voltage is not indicated at rated speed, then momentarily depress RPS-RMS-MG1/ START, Motor On pushbutton to reset the overvoltage trip.	Verbalizes that voltage indication would be expected on RPS-VM-MG1A.	Indicate zero volts on RPS-VM-MG1A.	S / U *
Alt Path Step	9	Recognizes need to momentarily depress the Motor On pushbutton.	Simulates momentarily depressing the RPS-RMS-MG1/START, Motor On pushbutton.	The pushbutton has been depressed and released. Indicate 120 volts on RPS-VM-MG1A.	S / U *
	10	Step 5.1.2g Verify RPS-VM-MG1A voltage stabilizes at about 120 VAC.	Observes voltage on RPS-VM-MG1A.	Continue to indicate 120 volts on RPS-VM-MG1A.	S / U
	11	5.1.2h Close RPS-CB-MG1.	Simulates closing RPS-CB-MG1 by pushing up on lever to On.	(If RPS-CB-MG1 is closed) The lever is as you see it. OR (If RPS-CB-MG1 is not closed) Indicate that the lever is pointed up (towards On).	S / U *
	12	Step 5.1.3 Proceed to Section 5.3.	Performs section 5.3 as follows:		S / U
	13	Step 5.3.1 Verify Section 5.1 completed.	Recognizes Section 5.1 was just completed.		S / U

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	14	Step 5.3.2 Obtain required EPA breaker keys from the Control Room key locker: • Key 166 (RPS C72-S003-A Div A Test) (RPS-EPA-3A) • Key 168, (RPS C72-S003-B Div A Test) (RPS-EPA-3B)	Verbalizes where the EPA breaker keys # 166 & 168 are located (Control Room in key locker outside Shift Managers office).	The student does not have to go to the control room to obtain keys – an explanation on where the keys are is sufficient. You have obtained the keys.	S / U *
	15	Step 5.3.3 Close RPS-EPA-3A as follows (EPA Breaker) (RPS-MG2 Room):	Performs this step.		S / U
	16	Step 5.3.3a Verify breaker keylock switch S-1 in Normal.	Observes S-1 is in Normal position.	The keylock switch is pointed to Normal.	S / U
	17	Step 5.3.3b Verify breaker keylock switch S-2 in OPER.	Observes S-2 is in OPER position.	The keylock switch is pointed to OPER.	S / U
	18	Step 5.3 3c Verify the Power In indicator illuminated.	Observes Power In Indicator is on.	The Red, RPS-MG-1 Power In light is on.	S / U

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	19	Step 5.3.3d If any of the following indicators are illuminated, then rotate keylock switch S-2 to RESET, and return to OPER • Overvoltage • Undervoltage • Underfrequency • Power Out	Observes the following indicators: • Overvoltage • Undervoltage • Underfrequency • Power Out	All indicator lights are off.	S / U
	20	Step 5.3.3e Verify the following indicators extinguished: • Overvoltage • Undervoltage • Underfrequency • Power Out	Verifies the following indicators are extinguished: • Overvoltage • Undervoltage • Underfrequency • Power Out	All indicator lights are off.	S / U
	21	Step 5.3.3f Open RPS-EPA-3A to reset it.	Simulates opening EPA breaker RPS-EPA-3A by pushing down on lever towards OFF position.	Indicate that the breakers lever is in the lowered position (towards Off).	S / U *
	22	Step 5.3.3g Close RPS-EPA-3A.	Simulates closing EPA breaker RPS-EPA-3B by pushing up on lever towards ON position.	Indicate that the breakers lever is in the raised position (towards On).	S / U *
	23	Step 5.3.3h Verify the Power Out indicator illuminated.	Observes the Power Out indicator is on.	The Red RPS-EPA-3C Power Out light is on.	S / U

NOTE: EPA breakers are designed such that the undervoltage lights for RPS-EPA breakers may illuminate indicating an undervoltage condition without activating the undervoltage trip circuit.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	24	Step 5.3.4 If the under voltage light is illuminated and the breaker is closed, then initiate a work request.	Verifies under voltage light is not on with breaker closed.	The under voltage light is off.	S / U
	25	Step 5.3.5 Close RPS-EPA-3C as follows (EPA Breaker) (RPS-MG2 Room).	Performs this step.		S / U
	26	Step 5.3.5a Verify breaker keylock switch S-1 in the NORMAL.	Observes S-1 is in Normal position.	The keylock switch is pointed to Normal.	S / U
	27	Step 5.3.5b Verify breaker keylock switch S-2 in the OPER.	Observes S-2 is in OPER position.	The keylock switch is pointed to OPER.	S / U
	28	Step 5.3.5c Verify the Power In indicator illuminated.	Observes Power In Indicator is on.	The Power In light is lit.	S / U
Alt Path Step	29	Step 5.3.5d If any of the following indicators are not extinguished, then rotate keylock switch S-2 to the RESET position, and return to OPER • Overvoltage • Undervoltage • Underfrequency • Power Out	Observes the following indicators: • Overvoltage • Undervoltage • Underfrequency • Power Out	All indicators are off except the white under frequency light is on.	S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
Alt Path Step	30	Recognizes need to reset indicators.	Simulates rotating Keylock switch S-2 to RESET and back to OPER.	The switch has been turned to RESET and back to OPER.	S / U *
	31	Step 5.3.5e Verify the following indicators extinguished: • Overvoltage • Undervoltage • Underfrequency • Power Out	Verifies the following indicators are extinguished: • Overvoltage • Undervoltage • Underfrequency • Power Out	All indicator lights are off.	S / U
	32	Step 5.3.5f Open RPS-EPA-3C to reset it.	Simulates opening EPA breaker RPS-EPA-3C by pushing down on lever towards OFF position.	Indicate that the breakers lever is in the lowered position (towards Off).	S / U *
	33	Step 5.3.5g Close RPS-EPA-3C.	Simulates closing EPA breaker RPS-EPA-3C by pushing up on lever towards ON position.	Indicate that the breakers lever is in the raised position (towards On).	S / U *
	34	Step 5.3.5h Verify the Power Out indicator illuminated.	Observes the Power Out indicator is on.	The Power Out light is on.	S / U
NOTE: EPA breakers are designed such that the undervoltage lights for RPS-EPA breakers may illuminate indicating an undervoltage condition without activating the undervoltage trip circuit.					
	35	Step 5.3.5i If the under voltage light is illuminated and the breaker is closed, then initiate a work request.	Verifies under voltage light is off with the breaker closed.	The under voltage light is off.	S / U
Termination Criteria: Student informs the CRS that RPS-EPA-3A and RPS-EPA-3C breakers are closed.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM
RESTART RPS MG-1 AND REPOWER THE RPS BUS

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: RPS-MG-1 is running and the A RPS EPA Breakers have been closed.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

<u>COMMENTS:</u>

Evaluator's Signature: ______________________________ **Date:** ____________

Initial Conditions:

RPS Division A has been de-energized due to a fault

The fault has been identified and corrected

Initiating Cue:

The CRS directs you to restart RPS-MG-1 and repower the Division A RPS bus in accordance with SOP-RPS-START section 5.1 and 5.3.

Inform the CRS when the RPS EPA breakers have been closed.

THE PERFORMANCE OF THIS JPM IS SIMULATED.

CONTROL MANIPULATIONS <u>WILL NOT</u> BE PERFORMED.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	INSERT CONTROL RODS BY VENTING SCRAM AIR HEADER (Plant)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001593	Rev. No.	1
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	5/11/06
REVISED BY	Ron Hayden	DATE	5/01/11

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY		DATE	
	Operations Training Manager		

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

None

JPM Instructions:

The student is handed the Student Information JPM Card and PPM 5.5.11 Tab D.

Tools/Equipment: Pre staged EOP Tools

Safety Items: Hard Hat; Safety Glasses; Gloves

Task Number: RO-0680

Validation Time: 9 Minutes

Alternate Path: No

Time Critical: No

PPM Reference: PPM 5.5.11 Rev. 8

Location: Plant

NUREG 1123 Ref: 295037 EA1.05 (3.9/4.0)

Performance Method: Simulate

Task Standard: The scram air header has been vented and PPM 5.5.11 Tab D has been completed.

JPM CHECKLIST

INITIAL CONDITIONS:	A scram has been initiated and the blue scram lights are extinguished at H13-P603. Reactor pressure is stable at 930 psig and Reactor Power is 38%.
INITIATING CUE:	The CRS has directed you to insert control rods by venting the Scram Air Header per PPM 5.5.11 Tab D. Inform the CRS when Tab D has been completed. The performance of this JPM will be simulated. Control manipulations will not be performed.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	1	Close CRD-V-95, Scram Air Header Isolation	Simulates turning the handwheel for CRD-V-95 clockwise to close valve	Handwheel stops moving	S / U *
	2	Close CRD-V-729, CRD-PI-13 Isolation	Simulates turning the handwheel for CRD-V-729 clockwise to close valve	Handwheel stops moving	S / U *
Note/Caution: Pressurized air will be released when drain plug is removed from CRD-PI-13 which could cause personnel injury					
	3	Remove instrument drain plug for CRD-PI-13	Using pre-staged wrench, simulates rotating the instrument drain plug counterclockwise on CRD-PI-13 until drain plug is removed	Drain plug is in hand	S / U *
	4	Open CRD-V-729, CRD-PI-13 isolation	Simulates turning the handwheel for CRD-V-729 counter-clockwise to open the valve	Air can be heard/felt coming from drain line Handwheel stops moving	S / U *

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	5	When scram air header is fully depressurized and no further rod motion observed	Verifies CRD-PI-13 indicates the air header is depressurized Contacts the Control Room to verify the status of rod motion.	Air can no longer be heard/felt coming from drain line Indicate 0 psig on the gauge face Inform the candidate that no further rod motion is observed	S / U
	6	Restore system alignment as follows:			
	7	Close CRD-V-729	Simulates turning the handwheel for CRD-V-729 clockwise until valve is closed	Handwheel stops moving	S / U *
	8	Install instrument drain plug for CRD-PI-13	Simulates inserting the drain plug back into the pipe and simulates turning the drain plug for CRD-PI-13 clockwise to reinstall it	Plug is connected to the pipe and has stopped turning	S / U *
	9	Open CRD-V-729	Simulates turning the handwheel CRD-V-729 counter-clockwise until valve is opened	Handwheel stops moving	S / U *
	10	Open CRD-V-95	Simulates turning the handwheel for CRD-V-95 counter-clockwise until valve is opened	Handwheel stops moving	S / U *

Termination Criteria: Student informs the CRS that actions to vent Scram Air Header have been completed.

Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

RESULTS OF JPM

INSERT CONTROL ROD BY VENTING SCRAM AIR HEADER

Examinee (Print): ______________________________

Evaluator (Print): ______________________________

Task Standard: The scram air header has been vented and PPM 5.5.11 Tab D has been completed.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ______________________ **Date:** ____________

Initial Conditions:

A scram has been initiated and the blue scram lights are extinguished at H13-P603.

Reactor pressure is stable at 930 psig and Reactor Power is 38%.

Initiating Cue:

The CRS has directed you to insert control rods by venting the Scram Air Header per PPM 5.5.11 Tab D.

Inform the CRS when actions for Tab D have been completed

THE PERFORMANCE OF THIS JPM IS SIMULATED

CONTROL MANIPULATIONS <u>WILL NOT</u> BE PERFORMED

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	REMOTE SHUTDOWN PANEL ACTIVATION DURING A CONTROL ROOM EVACUATION (Plant) (Time Critical)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LR001767	Rev. No.	4
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	8/24/06
REVISED BY	Steve Bruce	DATE	11/15/16

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

N/A

Special Setup Instructions:

This JPM should be started from the outside of the exit door from the Control Room. The student should be handed the JPM Information Card and the examiner will read the initial conditions and cue to the student.

It expected that the student will go to the Remote Shutdown Room to get a copy of ABN-CR-EVAC. When the procedure is identified in the RSD Room, then hand the student a copy of Attachment 7.2.

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: None

Task Number: RO-1057, SRO-0251

Alternate Path: No

PPM Reference: ABN-CR-EVAC Rev. 35

NUREG 1123 Ref: 295016AK2.01 (4.4/4.5)

Safety Items: Hard Hat, Safety Glasses

Validation Time: 9 Minutes

Time Critical: YES - 10 Minutes

Location: Plant

Performance Method: Simulate

Task Standard: Remote Shutdown Panel Activation has been accomplished within the time requirement.

JPM CHECKLIST

INITIAL CONDITIONS:	The Control Room has been evacuated due to fire. The immediate and subsequent operator actions of PPM ABN-CR-EVAC have been completed.
INITIATING CUE:	The CRS has directed you to perform Attachment 7.2 to activate the Remote Shutdown Panel. The performance of this JPM will be simulated. No control manipulations will be performed. This is a time critical JPM and your time starts now.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
WHEN THE STUDENT HAS ENTERED THE RSD ROOM AND HAS A COPY OF ABN-CR-EVAC IN HAND, GIVE THE STUDENT HIS COPY OF ATTACHMENT 7.2.					
Note: The RSD panel must be activated within 10 minutes from the time the Shift Manager (or designee) orders a reactor scram due to a design basis fire.					
CAUTION: Failure to transfer RCIC flow control to EMERG may cause RCIC to trip when DP-S1-1A feeder is tripped in the subsequent step.					
	1	Step 7.2.1 Place RCIC-RMS-RSTS7 in EMERG (RCIC FLOW CONTROL RCIC-FIC-1R POWER TRANSFER) (C61-P001, RSD).	Simulates placing RCIC-RMS-RSTS7 (transfer switch 1) in the EMERG position	The switches arrow is pointing to EMERG	S / U *
Note: De-energizing DP-S1-1A will defeat the automatic ADS function from Division 1.					

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	2	Step 7.2.2 Verify open the following breakers on DP-S1/1 within 15 minutes (Battery Charger Room 1): • E-DISC-DPS11/2B (IN-3A feeder) • E-DISC-DPS11/2C (DP-S1-1A feeder) • E-DISC-DPS11/2D (IN-3B feeder)	Simulates opening breakers on DP-S1/1: • IN-3A feeder (Cubicle 2B - if ON - simulates turning handle CW to OFF position) • DP-S1-1A feeder (Cubicle 2C - if ON - simulates turning handle CCW to OFF position) • IN-3B feeder (Cubicle 2D - if ON - simulates turning handle CW to OFF position)	As each breaker is opened: The handle is pointing to the OFF position When step 7.2.2 is completed, inform the student that the time critical portion of the JPM has been completed.	S / U *
	3	Step 7.2.3 Place the following four (4) power transfer switches to EMERG (E-CP-ARS, ARSD): • 41 • 47 • 48 • 59	In ARSD Room, simulates placing the following power transfer switches to the EMERG position: • 41 • 47 • 48 • 59	As each switch is turned: The switches arrow is pointing to EMERG	S / U *
	4	Step 7.2.4 Place all five (5) FRTS power transfer switches to EMERG (E-CP-FRTP, RSD): • 31 • 32 • 33 • 34 • 35	In RSD Room, simulates placing the following power transfer switches to EMERG: • 31 • 32 • 33 • 34 • 35	As each switch is turned: The switches arrow is pointing to EMERG	S / U *

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	5	Step 7.2.5 Place the following twelve (12) power transfer switches to EMERG (EC61-P001, RSD): • 2 and 5 • 6 and 7 • 8 and 11 • 12 and 13 • 15 and 16 • 17 and 18	Simulates placing the following power transfer switches to EMERG: • 2 and 5 • 6 and 7 • 8 and 11 • 12 and 13 • 15 and 16 • 17 and 18	As each switch is turned: The switches arrow is pointing to EMERG	S / U *
	6	Step 7.2.6 Place the following four (4) power transfer switches to EMERG (H22-P100, RSD): • 21 • 22 • 23 • 24	Simulates placing the following power transfer switches to EMERG: • 21 • 22 • 23 • 24	As each switch is turned: The switches arrow is pointing to EMERG	S / U *
	7	Notify the CRS that Attachment 7.2 is complete.	Notifies CRS that attachment 7.2 is complete.	Inform the student that the JPM is complete.	S /U
Termination Criteria: Student informs CRS that Attachment 7.2 is complete.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM
REMOTE SHUTDOWN PANEL ACTIVATION DURING A CONTROL ROOM EVACUATION

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: Remote Shutdown Panel Activation has been accomplished within the time requirement.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

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Evaluator's Signature: ____________________________ **Date:** ______________

Initial Conditions:

The Control Room has been evacuated due to fire.

The immediate and subsequent operator actions of ABN-CR-EVAC have been completed.

Initiating Cue:

The CRS has directed you to perform Attachment 7.2 to activate the Remote Shutdown Panel.

THE PERFORMANCE OF THIS JPM WILL BE SIMULATED.

CONTROL MANIPULATIONS <u>WILL NOT</u> BE PERFORMED.

THIS IS A TIME CRITICAL JPM.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	TRANSFER SM-3 FROM TR-S TO TR-N (SIMULATOR)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LR001898	Rev. No.	1
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	09/04/08
REVISED BY	Dave Crawford	DATE	12/21/16

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY		DATE	
	Operations Training Manager		

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Any IC where SM-1 is being powered from N1-1

Special Setup Instructions:

None

JPM Instructions:

Verify the current procedure against the JPM. If the procedure is a different revision than listed in the JPM, ensure the critical steps still match. If the critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None

Safety Items: None

Task Number: R0-0414

Validation Time: 5 minutes

Alternate Path: No

Time Critical: No

PPM Reference: SOP-ELEC-4160V-OPS Section 5.3 Rev. 12

Location: SIMULATOR

NUREG 1123 Ref: 262001A4.04 (3.6/3.7)

Performance Method: PERFORM

Task Standard: SM-3 has been transferred from the Startup Transformer to the Normal Transformer per SOP-ELEC-4160V-OPS.

JPM CHECKLIST

INITIAL CONDITIONS:	SM-3 is currently powered from the Startup Transformer. Work on breaker CB-N1/3 has been completed and CB-N1/3 has been racked in. All conditions, limitations, and prerequisites for this evolution are completed.
INITIATING CUE:	The CRS has directed you to transfer SM-3 from the Startup Transformer to the Normal Transformer. Inform the CRS when SM-3 is being powered from the Normal Transformer.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
NOTE: The control and indications necessary to perform this section are located at H13-P800 (Bd C).					
	1	Step 5.3.1 Verify CB-N1/3 white Lockout Circuit Avail light is illuminated	Observes CB-N1/3 white Lockout Circuit Avail light is illuminated		S / U
	2	Step 5.3.2 Verify CB-N1/3 green light illuminated and green flag displayed	Observes CB-N1/3 green light illuminated and green flag displayed		S / U
	3	Step 5.3.3 Verify CB-S3 white Lockout Circuit Avail light illuminated	Observes CB-S3 white Lockout Circuit Avail light illuminated		S / U
	4	Step 5.3.4 Verify CB-S3 red light illuminated	Observes CB-S3 red light illuminated		S / U

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	5	Step 5.3.5 Place CB-N1/3 Sync Selector switch in MAN	Places CB-N1/3 Sync Selector switch to the MAN position		S / U *
	6	Step 5.3.6 Verify voltages present on both incoming and running buses	Observes voltages present on both incoming and running buses		S / U
NOTE: The blue Sync Permit light for E-CB-N1/3 is illuminated from initiation of breaker closure until closure actually occurs.					
NOTE: E-CB-S3 should automatically trip when E-CB-N1/3 closes.					
NOTE: H13-800.C3.3-3, BKR S3 TRIP will alarm when the following step is performed.					
	7	Step 5.3.7 Close CB-N1/3	Places CB-N1/3 control switch to close by turning to the right		S / U *
	8	Step 5.3.8 Verify CB-S3 auto trips	Observes CB-S3 green light illuminated and red light out		S / U
	9	Step 5.3.9 Place CB-S3 control switch in TRIP	Places CB-S3 control switch in TRIP by turning to the left		S / U
	10	Step 5.3.10 Verify CB-S3 green light illuminated and green flag displayed	Observes S3 green light illuminated and green flag displayed		S / U

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	11	Step 5.3.11 Place CB-N1/3 Sync Selector switch in OFF	Places CB-N1/3 Sync Selector switch to the OFF position		S / U

Termination Criteria: Student informs CRS that SM-3 is being powered by the Normal Transformer.

Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

RESULTS OF JPM
TRANSFER SM-3 FROM TR-S TO TR-N

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: SM-3 has been transferred from the Startup Transformer to the Normal Transformer per SOP-ELEC-4160V-OPS.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ______________________________ **Date:** ____________

Initial Conditions:

SM-3 is currently powered from the Startup Transformer.

Work on breaker CB-N1/3 has been completed and CB-N1/3 has been racked in.

All conditions, limitations, and prerequisites for this evolution are completed.

Initiating Cue:

The CRS has directed you to transfer SM-3 from the Startup Transformer to the Normal Transformer.

Inform the CRS when SM-3 is being powered from the Normal Transformer.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE: LICENSED OPERATOR TRAINING

COURSE TITLE: JOB PERFORMANCE MEASURE

LESSON TITLE: RESPOND TO A LOSS OF SHUTDOWN COOLING

LESSON LENGTH: .5 HRS

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001862	Rev. No.	1
EXAM PQD CODE		Rev. No.	

DIVISION TITLE: Nuclear Training

DEPARTMENT: Operations Training

PREPARED BY: Dave E. Crawford DATE: 12/29/16

REVISED BY: Dave E. Crawford DATE: 01/13/17

TECHNICAL REVIEW BY: DATE:

INSTRUCTIONAL REVIEW BY: DATE:

APPROVED BY: DATE:

Operations Training Manager

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

INITIALIZE to IC-210 – OR –

Manually place simulator in MODE 4 with RHR-P-2B lined-up for SDC with SW-P-1B operating. Insert inadvertent closure of RHR-V-8 and RHR-V-9. Perform steps to secure RHR Loop "B" Shutdown Cooling Lineup using SOP-RHR-SDC (Section 5.5).

Special Setup Instructions:

Place Danger Tag on RHR-V-64B (RHR "B" Min Flow valve control switch)

Have copy of SOP-RHR-SDC, section 5.7, available to student with previously performed steps marked complete (all of section 3 and 4 initialed (or N/A'd and initialed), as appropriate for plant conditions and steps 5.7.1 & 5.7.2 initialed with step 5.7.3 marked N/A and initialed.)

Clear BISIs on H13-P601 after simulator placed in RUN

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: None

Safety Items: None

Task Number: RO-1300

Validation Time: 25 Minutes

Alternate Path: Yes

Time Critical: No

PPM Reference: SOP-RHR-SDC rev 25

Location: Simulator

NUREG 1123 Ref: 205000.A2.06 (3.4 / 3.5)

Performance Method: Perform

Task Standard: Perform RHR Loop "B" Shutdown Cooling Quick Restart in accordance with SOP-RHR-SDC Section 5.7. When RHR Pump B is started**,** recognize that RHR-P-2B fails to develop sufficient head following pump start, and secure RHR-P-2B per the procedural caution on page 48 of SOP-RHR-SDC.

INITIAL CONDITIONS:	Given the following: • The reactor is in Mode 4. • RHR Loop B was in Shutdown Cooling when RHR-V-8 and RHR-V-9 were inadvertently closed, tripping RHR-P-2B. • Shutdown Cooling has been off for 30 minutes. • No activities have occurred that could cause the formation of voids in RHR-B. • RHR Loop B Shutdown Cooling lineup has been secured per SOP-RHR-SDC, Section 5.5. • SW-P-1B is operating per SOP-SW-START. • OSP-RCS-C102 (Cooldown Rate Log) is secured.
INITIATING CUE:	The CRS directs you to restore RHR Loop B shutdown cooling per SOP-RHR-SDC, section 5.7, RHR Loop B Shutdown Cooling Quick Restart. Steps 5.7.1 – 5.7.3 are complete; begin at step 5.7.4.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
CAUTION: To prevent failure of the RHR pumps due to excessive radiation exposure, alternate shutdown cooling, by Suppression Pool Cooling, is the only allowable mode for shutdown cooling once a degraded core condition has been identified.					
CAUTION: Two Loop RHR Shutdown Cooling operations may cause actuation of Excess Flow Trip Isolation if ICP-RHR-Q901, RHR SDC Mode High Flow Isolation – CFT/CC, has not been completed within its required surveillance interval.					
CAUTION: Failure to warm the RHR pump suction line may cause excessive thermal stress on the RHR injection line/Recirculation piping tee.					
NOTE: This section is used if the Delta-T between RHR B Heat Exchanger Outlet and RRC-P-1A Suction (RRC-TR-650, pt. 1, or TDAS pt. X292) is LT 80 degrees F.					
NOTE: If normal Shutdown Cooling cannot be used, then refer to ABN-RHR-SDC-ALT.					
NOTE: Technical Specifications require Reactor Vessel and head flange temperatures be maintained GT 80 degrees F when the Vessel head bolting studs are being tensioned. (SR 3.4.11.7)					
NOTE: If core decay heat is present, or if system metal temperature is high, a recirculation pump of RHR pump (do not use a recirculation pump if an RHR pump is available) along with a means of determining Reactor water temperature should be kept in service.					
Examiner Note: Candidate may bring up Shutdown Cooling screen on PDIS computer to validate system parameters.					

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	VERIFY RHR-V-8 OPEN (RHR Shutdown Cooling Suction Outboard Isolation) (H13-P601).	Observed RHR-V-8 CLOSED. Repositioned RHR-V-8 Switch to open. Observed that RHR-V-8 Red Light is ON and Green Light is OFF.		S / U *
	2	VERIFY RHR-V-9 OPEN (RHR Shutdown Cooling Suction Inboard Isol) (H13-P601).	Observed RHR-V-9 CLOSED. Repositioned RHR-V-9 Switch to open. Observed that RHR-V-9 8 Red Light is ON and Green Light is OFF.		S / U *
	3	VERIFY RHR-V-4B CLOSED (Pump Suction from Supp Pool) (H13-P601).	Observed RHR-V-4B Red Light is OFF and Green Light is ON.		S / U
	4	**VERIFY** RHR-V-6B **OPEN** (Shutdown Cooling Suction) (H13-P601).	Observed RHR-V-6B Red Light is ON and Green Light is OFF.		S / U
Examiner Note: The following step is N/A per initial cue provided to the candidate.					
	5	IF RHR-V-6B, RHR-V-8, or RHR-V-9 were closed, AND any activity occurred that could cause the formation of voids while they were closed, THEN **FILL** and **VENT** RHR-P-2B suction piping as follows:	N/A per initial cue.		S / U
	6	**VERIFY** RRC-P-1B **OFF** per SOP-RRC-SHUTDOWN.	Observed RRC-P-1B Red RUN Light is OFF and Green STOP Light is ON.		S / U
<u>NOTE</u>: IF CRD Recirculation Pump seal purge is in operation, do <u>not</u> close both RRC-V-67B and RRC-V-23B.					

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	7	**VERIFY** one of the following **CLOSED**. N/A the other. RRC-V-67B (preferred) (Recirc Pump B Discharge) (H13-P602) RRC-V-23B (Recirc Pump B Suction) (H13-P602)	Verified RRC-V-67B Red Light is OFF and Green Light is ON or RRC-V-23B Red Light is OFF and Green Light is ON.		S / U
Examiner Note: The following step is N/A.					
	8	IF unable to close either RRC-V-23B or RRC-V-67B, THEN **REFER** to ABN-RHR-SDC-ALT.	N/A		S / U
NOTE: IF the RRC pump is not in service, than an alternate RRC temperature as determined by the CRS/Shift Manager should be used.					
Examiner Note: The following step is N/A per initial cue.					
	9	IF RHR-SDC-B has been off GT two hours, THEN **VERIFY** the ΔT between RHR B Heat Exchanger Outlet (RHR-TRS-601 or TDAS pt. X059) and RRC-P-1A Suction (RRC-TR-650, pt. 1, or TDAS pt. X292) is LT 80° F. RRC pump suction temperature. ______F RHR B Heat Exchanger (HX) Outlet temperature. ______F ΔT between suction and HX Outlet temperatures. ______	N/A per initial cue.		S / U
	10	**VERIFY** RHR-V-3B is **CLOSED** (RHR-HX-1B Isolation) (H13-P601).	Verified RHR-V-3B Red Light is OFF and Green Light is ON.		S / U

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	11	**CLOSE** or **VERIFY CLOSED** RHR-V-48B (RHR-HX-1B Shell Side Bypass) (H13-P601).	If open, repositioned RHR-V-48B control switch to closed and/or verified RHR-V-48B Red Light is OFF and Green Light is ON.		S / U
NOTE: The following steps are designed to minimize the potential of a water hammer when RHR-P-2B is started.					
Examiner Note: Power is available to RHR-V-53B.					
	12	IF power is available to RHR-V-53B, THEN **THROTTLE OPEN** RHR-V-48B approximately 8 seconds.	Verified either RHR-V-53B Red or Green Light is ON. Repositioned and held RHR-V-48B to open for approximately 8 seconds and released. Verified both RHR-V-48B Red and Green Lights are ON.		S / U *
Examiner Note: The following step is N/A. OSP-RCS-C102 secured in MODE 4.					
	13	IF required, THEN **LOG** RPV cooldown rate per OSP-RCS-C102.	N/A		S / U
Examiner Note: The following step is N/A. No refueling activities in progress.					
	14	IF starting the RHR pump during refuel activities, THEN **NOTIFY** the Refuel Supervisor RPV water clarity may be reduced.	N/A		S / U
	15	**VERIFY** SW-P-1B operating per SOP-SW-START.	Verified SW-P-1B Red Light is ON and Green Light is OFF and flow is indicated in normal band.		S / U
CAUTION: Exceeding a flow of 8000 gpm or failure to maintain 800 gpm may cause RHR pump damage/failure.					
NOTE: Attachment 6.1 shows RHR recommended operating conditions.					
NOTE: With RHR B PUMP DISCH PRESS HIGH/LOW in alarm, RHR-P-2B may be started for EOP related activities.					
Examiner Note: Two-handed operation is allowed.					

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	16	**START** RHR-P-2B.	Rotated RHR-P-2B control-switch to start. Verified Red Light is ON and Green Light is OFF and discharge pressure increased.		S / U *
Examiner Note: The student may secure RHR-P-2B any time following pump start, within 10 minutes of pump start.					
Examiner Note: Power is available to RHR-V-53B. Two-handed operation is allowed.					
Alt Path	17	IF power is available to RHR-V-53B, THEN **IMMEDIATELY OPEN** RHR-V-53B (Shutdown Cooling Return) (H13-P601).	Verified either RHR-V-53B Red or Green Light is ON. Rotated RHR-V-53B control-switch to Open. Verified RHR-V-53B Red Light is ON and Green Light is OFF.		S / U *
Examiner Note: The following step is N/A.					
Alt Path	18	IF power is not available to RHR-V-53B, AND RHR-V-53B has been left **OPEN**, THEN **IMMEDIATELY THROTTLE OPEN** RHR-V-48B approximately 8 seconds:	N/A		S / U
Alt Path	19	IF flow is not GE 3000 gpm, THEN **THROTTLE** RHR-V-48B to establish approximately 3000 gpm.	Verified flow LT 3000 gpm then rotated and held RHR-V-48B control-switch in Open in an attempt to raise flow (which is unsuccessful). Informs CRS of the inability to raise flowrate as required.		S / U
Alt Path	20	After 30 seconds, **THROTTLE** RHR-V-48B to establish GT 5400 gpm, and preferably GT 7000 gpm.	May completely open RHR-V-48B in an attempt to establish flow (which is unsuccessful).		S / U
Alt Path	21	Secures RHR-P-2B.	Rotated RHR-P-2B control-switch to stop, within 10 minutes of pump start.		S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
TERMINATING CUE: This JPM is Complete.					

RESULTS OF JPM
RESPOND TO A LOSS OF SHUTDOWN COOLING

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: Perform RHR Loop "B" Shutdown Cooling Quick Restart in accordance with SOP-RHR-SDC Section 5.7. When RHR Pump B is started**,** recognize that RHR-P-2B fails to develop sufficient head following pump start, and secure RHR-P-2B per the procedural caution on page 48 of SOP-RHR-SDC.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

<u>COMMENTS:</u>

Evaluator's Signature: ______________________________ **Date:** ______________

Initial Conditions:

Given the following:

- The reactor is in Mode 4.
- RHR Loop B was in Shutdown Cooling when RHR-V-8 and RHR-V-9 were inadvertently closed, tripping RHR-P-2B.
- Shutdown Cooling has been off for 30 minutes.
- No activities have occurred that could cause the formation of voids in RHR-B.
- RHR Loop B Shutdown Cooling lineup has been secured per SOP-RHR-SDC, Section 5.5.
- SW-P-1B is operating per SOP-SW-START.
- OSP-RCS-C102 (Cooldown Rate Log) is secured.

Initiating Cue:

The CRS directs you to restore RHR Loop B shutdown cooling per SOP-RHR-SDC, section 5.7, RHR Loop B Shutdown Cooling Quick Restart.

Steps 5.7.1 – 5.7.3 are complete (begin at step 5.7.4).

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING
COURSE TITLE	JOB PERFORMANCE MEASURE
LESSON TITLE	HPCS SYSTEM INITIATION (MIN FLOW VALVE FAILS TO AUTO CLOSE)
LESSON LENGTH	.5 HRS

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001864	Rev. No.	1
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave E. Crawford	DATE	12/29/16
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY	SAT Coordinator	DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Initialize to IC-212
Execute associated Schedule/Event files

Special Setup Instructions:

Insert a manual scram and allow RPV/L to recover to about 0” then trip both RFPs. Reduce RPV inventory to -40 inches

Insert malfunction MOV-CSS004F to FAIL_AUTO_CLOSE
Insert malfunction PMP-CSS001H to 30.00000

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0235

Validation Time: 13 minutes

Alternate Path: Yes

Time Critical: No

PPM Reference: SOP-HPCS-INJECTION-QC Rev. 4
ABN-SW Rev. 15

Location: Simulator

NUREG 1123 Ref: 209002 A1.01 (3.6 / 3.7)

Performance Method: Perform

Task Standard: HPCS Min Flow valve (HPCS-V-12) has been manually closed within 2 minutes of HPCS-V-4 being fully open. RPV level is in the band of +13” to +54” with HPCS-V-4 closed.

JPM CHECKLIST

INITIAL CONDITIONS:	A failure of the master controller caused RPV level to drop. The Control Room Supervisor directed a manual scram. Both Reactor Feed Pumps tripped as RPV level approached 0". PPM 5.1.1, RPV Control, has been entered. RCIC system in not available.
INITIATING CUE:	The CRS has directed you to initiate the HPCS system, verify proper system operation, and restore RPV level back to a band of +13" to +54". Inform the CRS when system operation has been verified, RPV level is in the band of +13" to +54", and HPCS-V-4 has been closed.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	1	Step 2.1 Verify Reactor Level 8 Seal-in (HPCS-RMS-E22A/S6) is reset	Observes Level 8 amber seal-in light is not lit		S / U
	2	Step 2.2 If not already running, then ARM and DEPRESS the HPCS MANUAL INITIATION pushbutton	Rotates the collar in the clockwise direction and depresses the pushbutton to initiate HPCS		S / U *
	3	Step 2.3 Verify HPCS-P-1 running	Observes HPCS-P-1 Red light on and Green light off. May also verify discharge pressure and amps		S / U
	4	Step 2.4 Verify HPCS-V-4 open (RPV Injection)	Observes HPCS-V-4 Red light on and Green light off	2 minute clock starts upon step completion. Start Time: ___________ (min:sec)	S / U

Evaluator note: Min Flow valve (HPCS-V-12) should automatically close when HPCS injection rate exceeds ~1300 gpm. Student should recognize that HPCS-V-12 is full open when it should have closed.					
	5	Recognize HPCS-V-12 failed to close with RPV injection flow above 1330 gpm.	Manually close HPCS-V-12 when RPV injection flow rate exceeds ~1330 gpm and within 2 minutes of start time (see previous step).		S / U *
Evaluator note: Min Flow valve (HPCS-V-12) should automatically close when HPCS injection rate exceeds ~1300 gpm. Student should recognize that HPCS-V-12 is full open when it should have closed.					
	6	Step 2.5 Operate HPCS-V-4 as necessary to maintain the desired RPV level	Observes RPV level and when level is approaching +13" and prior to RPV level reaching +54" takes the control switch for HPCS-V-4 to closed and observes Green light on and Red light off. Level is in band immediately following HPCS-V-4 closure.		S / U *
	7	Verifies proper HPCS System operation (given in Initiating Cue to perform)	Observes indications that HPCS DG is running Observes that HPCS-P-2 Green light is off and Red light is on		S / U S / U
Termination Criteria: Student informs CRS that RPV level is in the band given, HPCS-V-4 is closed and may also add that HPCS-V-12 did not automatically close but was closed manually.					
Terminating Cue: This JPM is complete.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM

HPCS INITIATION WITH HPCS-P-2 FAILS TO AUTO START

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: HPCS Min Flow valve (HPCS-V-12) has been manually closed within 2 minutes of HPCS-V-4 being fully open. RPV level is in the band of +13” to +54” with HPCS-V-4 closed.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

____

Evaluator's Signature: ______________________________ **Date:** ______________

Initial Conditions:

- **A failure of the master controller caused RPV level to drop.**
- **The Control Room Supervisor directed a manual scram.**
- **Both Reactor Feed Pumps tripped as RPV level approached 0”.**
- **PPM 5.1.1, RPV Control, has been entered.**
- **RCIC system in not available.**

Initiating Cue:

The CRS has directed you to initiate the HPCS system, verify proper system operation, and restore RPV level back to a band of +13” to +54”. **Inform the CRS when system operation has been verified, RPV level is in the band of +13” to +54”, and HPCS-V-4 has been closed.**

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	INITIATE CR HVAC IN MANUAL PRESSURIZATION MODE		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001823	Rev. No.	1
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Steve Bruce	DATE	11/16/16
REVISED BY	Dave E. Crawford	DATE	01/13/17

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

INITIALIZE to IC-210 or any MODE with CR HVAC in normal line-up.

AND perform ONE the following:

- Load JPM S-4.SCH file and JPM S-4.EVT files
- Enter following into a newly created Schedule file and Event file:

  Schedule file:

  - Insert malfunction MOV-RWB005F to FAIL_AUTO_OPEN
  - Insert malfunction MOV-RWB002F to CLOSE on event 1
  - Insert override OVR-RWB027A to OFF on event 1
  - Insert override OVR-RWB027B to OFF on event 1

  Event file:

  - XWNI096C == 1

Special Setup Instructions:

Note: TRIGGER 1 – “Removal of Fuse 3 in HVAC Panel COHV-2 on RW 525” can be accomplished by turning switch for TMU-V-18A (on H13-P824) to CLOSE (performed by evaluator) or via the Booth.

Provide copy of SOP-HVAC/CR-OPS with steps 5.12.1 & 5.12.2 initialed as complete.

JPM Instructions:

Verify current procedure against JPM. Revise JPM if any steps have changed.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0502

Validation Time: 7 Minutes

Alternate Path: Yes

Time Critical: No

PPM Reference: SOP-HVAC/CR-OPS Rev. 24

Location: Simulator

NUREG 1123 Ref: 290003 A2.01 (3.1 / 3.2)

Performance Method: Perform

Task Standard: Control Room Ventilation Train “B” has been placed in Control Room Pressurization Mode.

JPM CHECKLIST

INITIAL CONDITIONS:	Control Room HVAC is normal operation with WMA-FN-51B running.
INITIATING CUE:	CRS has directed Control Room Ventilation Train B be placed in Pressurization Mode per SOP-HVAC/CR-OPS section 5.12. Steps 5.12.1 and 5.12.2 are complete. Inform CRS when task is complete.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
Note: Unless otherwise noted, all control switches and annunciators are located on H13-P826.					
Examiner Note: Start at step 5.12.4 for CR HVAC Train B.					
	1	Step 5.12.3 is N/A	N/A because direction is to lineup CR HVAC Train B		S / U
	2	Step 5.12.4.a. **VERIFY** WMA-FN-51B running (Recirc Fan).	Verified WMA-FN-51B Red light ON and the Green light OFF		S / U
Examiner Note: CUE: If asked, these valves are verified locked open in the Lock Valve Checklist PPM 1.3.29 page 38.					
Simulator Operator: If asked, verify as field operator that the valves are locked open on RW 525'.					

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	3	Step 5.12.4.b. **VERIFY** the following intake pathways locked open: (H13-P826) Remote Intake Number 1 (NW) Isol): WOA-V-51A (Remote Air Intake No. 1 **LOCKED OPEN** WOA-V-52A (Remote Air Intake No. 1 **LOCKED OPEN** Remote Intake Number 2 (SE) Isol): WOA-V-51B (Remote Air Intake No. 2 **LOCKED OPEN** WOA-V-52B (Remote Air Intake No. 2 **LOCKED OPEN**	Verified (4) valves open by observing Red Light ON and Green Light OFF on H13-P826. Verified LOCKED OPEN by Lock Valve Checklist or Field Operator.	If asked, valves in this step are verified locked open as annotated in the Lock Valve Checklist PPM 1.3.29, page 38. If asked to verify as a field operator, report the valves in this step are verified locked open.	S / U
	4	Step 5.12.4.c. **CLOSE** the following: WOA-V-51C (Outside Air Intake) WOA-V-52C (Outside Air Intake)	Rotated WOA-V-51C control-switch to close and verified Red Light OFF and Green Light ON. Rotated WOA-V-52C control-switch to close and verified Red Light OFF and Green Light ON.		S / U *

Examiner Note: ROLEPLAY: Grant permission as CRS/Shift Manager to install temporary modification.

	5	Step 5.12.4.d. **REQUEST PERMISSION** from CRS/Shift Manager to install temporary modification to disable (fail closed) WMA-AD-51B1 (Fresh Air Inlet).	Formally requested permission from CRS/Shift Manager to install temporary Modification per SOP-HVAC/CR-OPS.	ROLEPLAY: Grant permission as CRS/Shift Manager to install temporary modification.	S / U

Examiner Note: Trigger 1 may be inserted by you using the switch for TMU-V-18A (located on H13-P824) by taking it to CLOSE or through coordination with the Booth Operator. Method to be used should be discussed before starting JPM.

Simulator Operator: <u>If Trigger 1 is not being inserted directly by the evaluator, and when requested to remove fuse</u>, insert Trigger 1 then call CRO as field operator and simultaneous verifier and report that Fuse 3 in HVAC Panel COHV-2 on RW 525' has been REMOVED.

	6	Step 5.12.4.e. **REMOVE** Fuse 3 in HVAC Panel COHV-2. (Ref. EWD-84E-002)	Confirmed field operator and simultaneous verifier removed Fuse 3 in HVAC Panel COHV-2.	If using local (switch) activation of Trigger 1: Take switch for TMU-V-18A (located on H13-P824) to CLOSE ROLEPLAY: Report as field operator and simultaneous verifier that Fuse 3 in HVAC Panel COHV-2 on RW 525' has been removed.	S / U *
	7	Step 5.12.4.f. **START** WMA-FN-54B by placing control switch in **ON** (Emergency Filter Unit Fan).	Rotated WMA-FN-54B control-switch to ON, observed Red Light ON and Green Light OFF.		S / U *

	8	Step 5.12.4.g.1. **VERIFY** the following occurs: 1) WMA-FN-54B starts.	WMA-FN-54B Red Light ON and Green Light OFF.		S / U
Examiner Note: This next step constitutes the Alternate Path portion of the JPM.					
Alt Path	9	Step 5.12.4.g.2. **VERIFY** the following occurs: 2) WMA-AD-54B1 **OPEN** (WMA-FU-54B Inlet).	WMA-AD-54B1 Red Light OFF and Green Light ON. Examinee recognizes WMA-AD-54B1 failed to OPEN and turns control-switch to open and verifies Red Light ON and Green Light Off.		S / U *
	10	Step 5.12.4.g.3. **VERIFY** the following occurs: 3) WEA-FN-51 stops (Toilet/Kitchen Exhaust Fan).	WEA-FN-51 Red Light OFF and Green Light ON		S / U
	11	Step 5.12.4.g.4. **VERIFY** the following occurs: 4) WEA-AD-51 **CLOSED** (Outlet Damper).	WEA-AD-51 Red Light OFF and Green Light ON.		S / U
	12	Step 5.12.4.g.5. **VERIFY** the following occurs: 5) WMA-AD-54B2) **CLOSED** (WMA-FU-54B Inlet Bypass)	Verified the following: WMA-AD-54B2 Red Light OFF and Green Light ON.		S / U

Termination Criteria: Control Room HVAC Train B has been placed in Control Room Pressurization Mode.
Terminating Cue: Student reports Control Room HVAC Train B has been placed in Control Room Pressurization Mode.
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

RESULTS OF JPM

INITIATE CR HVAC IN MANUAL PRESSURIZATION MODE

Examinee (Print): ______________________________

Evaluator (Print): ______________________________

Task Standard:

Control Room Ventilation Train B has been placed in Control Room Pressurization Mode.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ______________________ **Date:** __________

Initial Conditions:

Control Room HVAC is in normal operation with WMA-FN-51B running.

Initiating Cue:

CRS has directed Control Room Ventilation Train B be placed in Pressurization Mode per SOP-HVAC/CR-OPS section 5.12.

Steps 5.12.1 and 5.12.2 are complete.

Inform CRS when task is complete.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	RE-ESTABLISH SECONDARY CONTAINMENT/START RB HVAC (Sim)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001637	Rev. No.	2
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	06/03/08
REVISED BY	Dave E. Crawford	DATE	12/6/16

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

None

Special Setup Instructions:

Reset to any IC. Turn off both ROA and REA fans. Allow secondary D/P to decay such that all expected annunciators are received. Acknowledge all associated annunciators.

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0497

Validation Time: 8 Minutes

Alternate Path: No

Time Critical: No

PPM Reference: SOP-HVAC/ RB-RESTART-QC Rev. 1

Location: Simulator

NUREG 1123 Ref: 290001 A4.01 (3.3 / 3.4)

Performance Method: Perform

Task Standard: ROA-FN-1A and REA-FN-1A are running and REA-DPIC-1A is in Auto and adjusted to achieve approximately -0.8” W.G.

JPM CHECKLIST

INITIAL CONDITIONS:	A series of events occurred that resulted in no running Reactor Building Supply or Exhaust fan. PPM 5.3.1, Secondary Containment Control, was entered due to high Reactor Building differential pressure. Prior to starting Standby Gas Treatment, the Control Room received information that Reactor Building HVAC could be restarted.
INITIATING CUE:	The CRC directs you to restart RB HVAC by starting ROA-FN-1A and REA-FN-1A per SOP-HVAC RB-RESTART-QC. Inform the CRS when Secondary Containment may be declared operable.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
Student uses the quick card to perform this JPM.					
	1	Step 2.1 Place REA-DPIC-1A(1B) (ΔP Control RX Bldg/Outside) in manual.	Places toggle for REA-DPIC-1A to the Manual position.		S / U *
	2	Step 2.2 Set REA-DPIC-1A(1B) output signal at approximately 60% of scale	Depresses the open and/or closed pushbutton for REA-DPIC-1A to have red indicator at approximately 60% of scale.		S / U *
	3	Step 2.3 Place the control switch for the following fans in PULL-TO-LOCK: • ROA-FN-1A (Reactor Bldg Supply Fan) • ROA-FN-1B (Reactor Bldg Supply Fan) • REA-FN-1A (Reactor Building Exhaust Fan) • REA-FN-1B (Reactor Building Exhaust Fan)	Turns the handles counter-clockwise and pulls out to engage the Pull-To-Lock position for: • ROA-FN-1A (Reactor Bldg Supply Fan) • ROA-FN-1B (Reactor Bldg Supply Fan) • REA-FN-1A (Reactor Building Exhaust Fan) • REA-FN-1B (Reactor Building Exhaust Fan)		S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	4	Step 2.4 Verify the following valves are open: • ROA-V-1 (RB Supply Outboard Isolation) • ROA-V-2 (RB Supply Inboard Iso) • REA-V-1 (RB Exhaust Inboard Iso) • REA-V-2 (RB Exhaust Outboard Isol)	Observes the Red light on and Green light off for: • ROA-V-1 • ROA-V-2 • REA-V-1 • REA-V-2		S / U
	5	Step 2.5 (2H) Place REA-RMS-FN1A(B) in Start (Reactor Bldg Exhaust Fan Control Switch).	Depresses the control switch handle for REA-FN-1A to the neutral position. Turns the same handle clockwise to the Start position and then releases it.	If student attempts to make a plant announcement STOP THEM. Inform them announcement has been made.	S / U *
	6	Step 2.6 When REA-FN-1A(1B) breaker closure is observed (red light), then immediately place ROA-RMS-FN1A(B) in Start (Reactor Bldg Supply Fan Control Switch).	Observes the red light for REA-FN-1A comes on. Depresses the control switch handle for ROA-FN-1A to the neutral position. Turns the same handle to the Start position and releases it.		S / U *
	7	Step 2.7 Manually adjust REA-DPIC-1A(1B) controller output until Reactor Building pressure on REA-DPR-1A(1B) is approximately -0.8O W.G.	Adjusts REA-DPIC-1A to achieve approximately -0.8” W.G.. on REA-DPR-1A.		S / U *
	8	Step 2.8 Null REA-DPIC-1A (1B), and place REA-DPIC-1A (1B) in AUTO.	Turns thumbwheel until REA-DPIC-1A is nulled <u>or</u> waits until red arrow lines up with green band and then moves lever to AUTO position.		S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	9	Step 2.9 Place the control switch for the following non-running fans in the NORMAL-after-STOP position. • ROA-FN-1B(1A) • REA-FN-1B(1A)	Depresses the control switch handles for ROA-FN-1B and REA-FN-1B from PTL and allows switches to go to the neutral position. Observes the green flag is visible on each switch.		S / U
	10	Step 2.10 Notify the CRS that Secondary Containment may be declared operable.	Informs the CRS that Secondary Containment may be declared operable.		S / U
Termination Criteria: Student informs CRS that Secondary Containment may be declared operable.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM
RE-ESTABLISH SECONDARY CONTAINMENT/START RB HVAC

Examinee (Print): ______________________________

Evaluator (Print): ______________________________

Task Standard: ROA-FN-1A and REA-FN-1A are running and REA-DPIC-1A is in Auto and adjusted to achieve approximately -0.8” W.G.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

____

Evaluator's Signature: ______________________________ **Date:** ______________

STUDENT JPM INFORMATION CARD

Initial Conditions:

A series of events occurred that resulted in no running Reactor Building Supply or Exhaust fan.

PPM 5.3.1, Secondary Containment Control, was entered due to high Reactor Building differential pressure.

Prior to starting Standby Gas Treatment, the Control Room received information that Reactor Building HVAC could be restarted.

Initiating Cue:

The Control Room Supervisor has directed you to restart RB HVAC by starting ROA-FN-1A and REA-FN-1A per SOP-HVAC RB-RESTART-QC. Inform the CRS when Secondary Containment may be declared operable.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	LOWER RPV PRESSURE USING DEH (CR/SIM) (Alt Path)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001780	Rev. No.	0
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	10/21/14
REVISED BY		DATE	
TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Reset to IC with reactor shutdown and pressure being controlled by bypass valves.

Special Setup Instructions:

Insert MAL-DEH017.

Set Pressure Rate to any value other than 50 psig.

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0348

Validation Time: 7 Minutes

Alternate Path: Yes

Time Critical: No

PPM Reference: SOP-DEH-QC Rev. 5

Location: Simulator

NUREG 1123 Ref: 241000 A4.02 (4.1 / 4.1)

Performance Method: Perform

Task Standard: Recognize that auto control of bypass valves to lower RPV pressure to a target of 550 psig does not work and RPV pressure has been lowered at a rate LE 50 psig per minute and in a controlled manner by taking manual control of the Bypass Valves.

JPM CHECKLIST

INITIAL CONDITIONS:	Columbia was operating at full power when RFW-P-1A tripped followed by RFW-P-1B tripping five minutes later. CRO1 has lined up on the startup flow control valves.
INITIATING CUE:	The CRS directs you to lower RPV pressure to 550 psig at the rate of 50 psig per minute to facilitate feeding the RPV with the Condensate Booster pumps per SOP-DEH-QC. Inform the CRS when RPV pressure is 550 psig.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
NOTE: If the plant is operating in Mode 1 and is GT 25% power, then the DEH set point should be 960 psi. If a reactor pressure change is desired refer to ABN-PRESSURE.					
	1	Step 2.1.1 Initiate Pressure setpoint change as follows (Turbine Start Up; Reactor Startup Display) or (Main Display):	Selects a display screen.		S / U
	2	a. Select Pressure Target.	Selects Pressure Target.		S / U *
	3	b. Enter desired pressure.	Enters "5,5,0" psig.		S / U *
	4	c. Select OK.	Selects OK.		S / U *
	5	d. If a change in pressure rate is desired, then perform the following:	Observes Pressure Rate is not 50 psig and performs step.		S / U
	6	1) Select Pressure Rate.	Selects Pressure Rate.		S / U *
	7	2) Enter desired Pressure rate.	Enters "5,0".		S / U *
	8	3) Select OK.	Selects OK.		S / U *
	9	e. Select GO.	Selects GO.		S / U *
	10	f. Select YES.	Selects YES.		S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
ALTERNATE PATH STEP	11	g. Verify Press Demand and Throttle Press change at the Pressure Rate.	Observes no change in Pressure Demand or Bypass Valve position. Observes green Hold light is still illuminated. Informs the CRS.	CRS – What actions would you recommend to lower RPV pressure to 550 psig at 50 psig per minute?	S / U *
EVALUATOR: If SOP-DEH-OPS is referenced, when section for manual bypass valve operation is found, cue to use the DEH Quick Card. [OPTION A]					
	12	SOP-DEH-QC Step 2.2 Manual Bypass Valve Operation.	Performs this section.		S / U
NOTE: In Manual, raising BPV demand will open the BPVs and cause Reactor pressure to lower. The BPVs will not respond to pressure changes in Manual.					
	13	Step 2.2.1 Operate the Bypass Valves Manually as follows (Turbine Start-up, Reactor Start screen):	Performs this step.		S / U
NOTE: In manual, raising BPV demand will open the BPVs and cause Reactor pressure to lower. The BPVs will not respond to pressure changes in Manual.					
	14	a. Select BPV MANUAL.	Selects BPV Manual.		S / U *
	15	b. Select YES.	Selects Yes.		S / U *
	16	c. If rapid Bypass Valve movement is desired, then select FAST ACTION.	Verbalizes step (it is anticipated that this step will not be performed but it is OK if it is performed).		S / U
	17	d. If opening Bypass Valves, then select BPV Raise.	Selects BPV Raise.		S / U *
	18	e. If closing Bypass Valves, then select BPV Lower.	Does not perform this step.		S / U

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
NOTE: The JOG button illuminates green when the command is accepted, and extinguishes when the command is complete.					
EVALUATOR: Either step f or steps g, h, and i are performed to lower RPV pressure. Whichever is performed makes the other steps not critical steps. It is anticipated that step f will be used to reduce RPV pressure.					
	19	f. If incremental Bypass Valve movement is desired, then depress JOG button once for each 1% of valve demand change desired.	Depresses the JOG button to achieve approximately a 50 psig pressure drop per minute.		S / U *
If JPM step 19 was performed, skip JPM steps 20, 21, and 22 (which are now NOT critical step).					
	20	g. Select GO for full range motion to 100% demand or 0% demand.	Selects Go.		S / U *
	21	h. Select YES.	Selects Yes and observes bypass valves starting to open.		S / U *
	22	i. If desired to stop BPV motion, then depress hold.	Selects Hold to stop bypass valve motion.		S / U *
EVALUATOR: No matter which steps were performed to lower pressure - When you determine that RPV pressure is being lowered in a controlled manner at less than or equal to 50 psig per minute, inform the operator that at the next RPV pressure 50 psig increment to close the Bypass Valves and stop the pressure reduction.					
	23	Stops RPV pressure reduction and closes Bypass Valves.	Selects BPV Lower.		S / U *
EVALUATOR: Student may perform JPM step 24 or steps 25, 26, and 27 to close the Bypass Valves. Whichever is performed makes the other NOT critical.					
	24		Selects the JOG button until the BPVs are closed.		S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
Step 24 or 25-27 will be performed.					
	25		Selects Fast Action.		S / U *
	26		Selects Go.		S / U *
	27		Selects Yes.		S / U *
IF SOP-DEH-OPS is utilized, these steps will be performed. [OPTION B]					
	28	SOP-DEH-OPS Step 5.5.1: Operate the Bypass Valves Manually as follows:	Performs this step.		S / U
	29	a. Select BPV Manual.	Selects BPV Manual		S / U *
	30	b. Select YES.	Selects Yes		S / U *
	31	c. Verify BPV Manual illuminates.	Observes BPV Manual illuminates.		S / U
NOTE: In BPV Manual mode the ramp rate is 1 %/sec (valve position) if the BPV RAISE or LOWER and GO buttons are used. The ramp rate is 5 %/sec if the FAST ACTION button is used with BPV RAISE or LOWER and GO. BPV position changes in 1% increments if the JOG button is used with BPV RAISE or LOWER.					
	32	d. If incremental Bypass Valve movement is desired, then depress JOG button once for each 1% of valve demand change desired.	Depresses the JOG button to achieve approximately a 50 psig pressure drop per minute.		S / U *
Candidate may decide to do rapid valve movement and perform the following steps instead of step 'd' above. If the below steps are performed then above step is not critical. If d is performed then e, f, g ,and h are not critical.					
	33	e. If rapid Bypass valve movement is desired, then select fast action.	Selects Fast Action.		S / U *
	34	f. If lowering pressure, then select BPV raise.	Selects BPV raise.		S / U *
	35	g. If raising pressure, then select BPV lower.	Does not perform this step.		S / U *
	36	h. Select GO for full range motion to 100% demand or 0% demand.	Selects Go.		S / U *

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	37	i. Select yes.	Select yes.		S / U *
	38	j. Verifies Go illuminates	Observes Go illuminates.		S / U *
	39	k. Monitor BPV position and RPV pressure during BPV motion.	Monitors BPV position.		S / U
	40	l. If desired to stop BPV motion, then perform the following: 1. Select Hold 2. Verify Hold illuminates.	Selects Hold Observes Hold illuminates.		S / U *
EVALUATOR: No matter which steps were performed to lower pressure - When you determine that RPV pressure is being lowered in a controlled manner at less than or equal to 50 psig per minute, inform the operator that at the next RPV pressure 50 psig increment to close the Bypass Valves and stop the pressure reduction.					
	41	Stops RPV pressure reduction and closes Bypass Valves.	Selects BPV Lower.		S / U *
EVALUATOR: Student may perform JPM step 42 or steps 43, 44, and 45 to close the Bypass Valves. Whichever is performed makes the other NOT critical.					
	42		Selects the JOG button until the BPVs are closed.		S / U *
Step 42 or 43-45 will be performed.					
	43		Selects Fast Action.		S / U *
	44		Selects Go.		S / U *
	45		Selects Yes.		S / U *
Termination Criteria: When the BPVs are closed, inform the Student that the termination point of the JPM has been reached.					
Transfer the following to the "Results of JPM" page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.					

RESULTS OF JPM
LOWER RPV PRESSURE USING BPVs IN MANUAL

Examinee (Print): ______________________________

Evaluator (Print): ______________________________

Task Standard: Recognize that auto control of bypass valves to lower RPV pressure to a target of 550 psig does not work and RPV pressure has been lowered at a rate LE 50 psig per minute and in a controlled manner by taking manual control of the Bypass Valves.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ______________________ **Date:** __________

Initial Conditions:

Columbia was operating at full power when RFW-P-1A tripped followed by RFW-P-1B tripping five minutes later.

CRO1 has lined up on the startup flow control valves.

Initiating Cue:

The CRS directs you to lower RPV pressure to 550 psig at the rate of 50 psig per minute to facilitate feeding the RPV with the Condensate Booster pumps per SOP-DEH-QC.

Inform the CRS when RPV pressure is 550 psig.

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	INITIAL LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	RESTORE RPS A FROM ALTERNATE POWER SOURCE (SIMULATOR)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE	LO001597	Rev. No.	1
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Ron Hayden	DATE	9/02/06
REVISED BY	Dave Crawford	DATE	12/20/16

TECHNICAL REVIEW BY		
INSTRUCTIONAL REVIEW BY		
APPROVED BY	Operations Training Manager	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

Any IC with a normal electrical lineup – all load centers energized
Ensure AR-EX-1B is in service

Special Setup Instructions:

Open RPS EPA BKR 3A, acknowledge all annunciators, and allow plant to stabilize.

JPM Instructions:

Verify the current procedure against the JPM. If the procedure is a different revision than listed in the JPM, ensure the critical steps still match. If the critical steps have changed, the JPM should be revised.

The evaluator and student shall use current procedure. The evaluator should mark off steps as they are completed, note comments, and transfer the comments to the "Results of JPM" page.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0248

Validation Time: 15 minutes

Alternate Path:

Time Critical: NO

PPM Reference: ABN-RPS Rev. 11

Location: Simulator

NUREG 1123 Ref: 212000 A4.14 (3.8/3.8)

Performance Method: Perform

Task Standard: The subsequent actions for ABN-RPS have been completed and RPS A has been re-powered from Alternate Power Supply.

JPM CHECKLIST

INITIAL CONDITIONS:	A loss of RPS 'A' occurred 20 minutes ago. All maintenance and surveillance testing has been stopped. Investigation revealed a failure of the 'A' RPS MG set motor.
INITIATING CUE:	The CRS has directed you to transfer 'A' RPS to its Alternate power supply by performing steps 4.1 through 4.8 of ABN-RPS. Inform the CRS when the subsequent actions for ABN-RPS have been completed and 'A' RPS has been restored.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
Examiner Note: The candidate is given ABN-RPS					
	1	Step 4.1 IF power is available to RWCU-V-104 (Cleanup System Bypass), THEN THROTTLE OPEN RWCU-V-104.	Takes control switch for RWCU-V-104 to the open position until it indicates dual (both Red and Green lights lit for RWCU-V-104)		S / U *
	2	Step 4.2 IF the alternate Gland Exhauster (AR-EX-1A(B) is required, THEN START the alternate Gland Exhauster, AND PLACE the tripped Gland Exhauster in OFF.	**N/A** AR-EX-1B continues to run.		S / U

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	3	Step 4.3 IF the alternate Mechanical Vacuum Pump (AR-P-1A(B) is required, THEN START the alternate Mechanical Vacuum Pump.	**N/A** AR-EX-1B continues to run.		S / U
	4	Step 4.4 ENSURE automatic actions have occurred.	Verifies: • Half Scram • Half trip on RC-1 • Half trip on RC-2 • The following valves close: ○ RRC-V-20 ○ FDR-V-4 ○ EDR-V-20 ○ RWCU-V-4 ○ RHR-V-8 ○ RHR-V-40 ○ RHR-V-23 ○ RHR-V-53A and 53B ○ MS-V-67A-D ○ MS-V-19 • AR-EX-1A trips • AR-P-1A trips • APRM Chassis 1 and 3 default to RUN Refers to Attachment 7.1 for list of annunciation		S / U

Note: Due to loss of RPS A power to APRM Voter 1 and 3, the APRM Chassis 1 and 3 will default to the RUN setpoint. Due to loss of RPS B power to APRM Voter 2 and 4, the APRM Chassis 2 and 4 will default to the RUN setpoint.

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	5	Step 4.5 IF the Reactor Mode switch is not in the RUN position, THEN REFER to Technical Specifications for the required actions.	**N/A** Mode Switch is in RUN.		S / U
	6	Step 4.6 PERFORM the following to reenergize RPS:	**Proceeds to 4.6.1.**		S / U
	7	Step 4.6.1 IF the condition of the RPS MG set is known to be operable, AND the RPS bus is known to be operable, THEN RESTART the RPS MG set, AND REPOWER the bus per SOP-RPS-START and SOP-RPS-OPS.	**N/A** The status of the A RPS MG set is NOT known to be operable. The initiating cue directs the candidate to restore power from the Alternate Source.		S / U
	8	Step 4.6.2. IF the condition of the RPS MG set is uncertain, THEN REPOWER RPS A or B from H13-P610 as follows:	**Proceeds to 4.6.2.a**		S / U

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	9	Step 4.6.2.a. VERIFY power available from the Reactor Protection System Alternate Power Supply, MC-6B, by observing the Alternate Feed white light illuminated.	Check power available from the RPS Alternate Power Supply, MC-6B, by observing the Alternate Feed white light illuminated.		S / U
CAUTION: The MG Set Transfer switch is break before make and positioning it to the wrong supply will result in a full REACTOR SCRAM.					
	10	Step 4.6.2.b. IF repowering RPS A, THEN PLACE RPS Power Source Select switch in ALT A position.	Place the RPS power source selector switch in the position (ALT A) to be powered from the Alternate Supply		S / U *
	11	Step 4.6.2.c. IF repowering RPS B, THEN PLACE RPS Power Source Select switch in ALT B position.	**N/A** RPS B was not de-energized.		S / U
	12	Step 4.7. When RPS power has been restored stabilized, then perform the following:	If restoring RPS A then perform the following:		S / U

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	13	Step 4.7.a. RESET the Half SCRAM at H13-P603.	Reset the Half Scram at H13-P603		S / U *
	14	Step 4.7.b. RESET Main Steam Line Rad Monitor alarms at H13-P606: • MS-RIS-610A • MS-RIS-610C	Reset Main Steam Line Rad Monitor alarms at H13-P606.		S / U *
	15	Step 4.7.c. DEPRESS the following pushbuttons at H13-P601: • Isolation logic A&B reset pushbutton • Isolation logic C&D reset pushbutton	Depresses the “Isolation logic A & B” and “Isolation logic C & D” reset pushbuttons at H13-P601.		S / U *
	16	Step 4.7.1.d. RETURN RWCU to service per SOP-RWCU-START.	**N/A** Read the candidate the cue for this step.	**Inform the candidate that another operator is placing RWCU into service and to continue with ABN-RPS.**	S / U
	17	Step 4.7.1.e RESET RC-1 by depressing WMA-RMS-FAZ/3AXY pushbutton.	Resets RC-1 by depressing WMA-RMS-FAZ/3AXY pushbutton.		S / U *
	18	Step 4.7.1.f. RESET RC-2 by depressing WMA-RMS-FAZ/3BXY pushbutton.	Resets RC-2 by depressing WMA-RMS-FAZ/3BXY pushbutton.		S / U *

*** Items are Critical Steps**

Time	Step	Element	Standard	Cue	Sat/Unsat
	19	Step 4.7.1.g. RHR SDC was in service, THEN REFER to ABN-RHR-SDC-LOSS.	**N/A** SDC was not in service.		S / U
	20	Step 4.7.1.h. OPEN RRC-V-20.	Opens RRC-V-20		S / U *
	21	Step 4.7.1.i. OPEN EDR-V-20.	Opens EDR-V-20		S / U *
	22	Step 4.7.2	**N/A** RPS B remains energized.		S / U
	23	Step 4.8. FDR-V-3 and FDR-V-4 have been isolated for LT 8 hours, THEN OPEN the following: (H13-P601) • FDR-V-3 • FDR-V-4	Opens FDR-V-3 and 4		S / U *

Termination Criteria: Candidate completes steps 4.1 through 4.8 of ABN-RPS.

Termination Cue: This completes the JPM.

Transfer the following to the “Results of JPM” page: Any Unsat step - indicate if step was a Critical Step; JPM completion time.

RESULTS OF JPM

RESTORE RPS A FROM ALTERNATE POWER SOURCE

Examinee (Print): ______________________________

Evaluator (Print): ______________________________

Task Standard: The subsequent actions for ABN-RPS have been completed and RPS A has been re-powered from Alternate Power Supply.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ______________________ **Date:** __________

STUDENT JPM INFORMATION CARD

Initial Conditions:

A loss of RPS ‘A’ occurred 20 minutes ago.

All maintenance and surveillance testing has been stopped.

Investigation revealed a failure of the ‘A’ RPS MG set motor.

Initiating Cue:

The CRS has directed you to transfer ‘A’ RPS to its Alternate power supply by performing steps 4.1 through 4.8 of ABN-RPS.

Inform the CRS when the subsequent actions for ABN-RPS have been completed and ‘A’ RPS has been restored.

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	LICENSED OPERATOR TRAINING		
COURSE TITLE	JOB PERFORMANCE MEASURE		
LESSON TITLE	RESPOND TO INDICATIONS OF A FIRE (CR/SIM)		
LESSON LENGTH	.5 HRS		

INSTRUCTIONAL MATERIALS INCLUDED

LESSON PLAN PQD CODE		Rev. No.	
SIMULATOR GUIDE PQD CODE		Rev. No.	
JPM PQD CODE		Rev. No.	
EXAM PQD CODE		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave Crawford	DATE	12/20/16
REVISED BY		DATE	

TECHNICAL REVIEW BY		DATE	
INSTRUCTIONAL REVIEW BY		DATE	
APPROVED BY	Operations Training Manager	DATE	

Verify materials current IAW SWP-TQS-01 prior to use

MINOR REVISION RECORD

Minor Rev Number	Description of Revision	Affected Pages	Entered By	Effective Date	Manager Approval

JPM SETUP

Simulator ICs; Malfunctions; Triggers; Overrides:

INITIALIZE to IC-212 or ANY MODE.

AND

PERFORM the following:

Load **NRCjpms-8.sch** OR insert the following:

1. START FP-P-2A
2. START FP-P-2B
3. Insert ANN-FCP1A05A to ON (TG Bldg 471 East Mezzanine)
4. Insert ANN-FCP1A05C to ON (TG Bldg 471 East Mezzanine FIRE)
5. Insert ANN-FCP2C03A to ON (SYS 9 Wet Pipe TG Bldg 471 East Mezzanine)
6. Insert ANN-FCP2C03C to ON (SYS 9 Wet Pipe TG Bldg 471 East Mezzanine Fire)

Special Setup Instructions:

N/A

JPM Instructions:

Verify Current Procedure against JPM. If any steps have changed, the JPM should be revised.

Tools/Equipment: None

Safety Items: None

Task Number: RO-0124

Validation Time: 5 Minutes

Alternate Path: No

Time Critical: No

PPM Reference: ABN-FIRE

Location: Simulator

NUREG 1123 Ref: 286000.A4.01 (3.3 / 3.2)

Performance Method: Perform

Task Standard: ABN-FIRE Immediate Actions have been completed.

JPM CHECKLIST

INITIAL CONDITIONS:	Given the following:
	• Report from OPS-3 that there is heavy smoke on the TB-501 East End coming up from below and he was leaving the area.
	• Alarms on FCP-1, FCP-2, and FCP-3:
	  • TG BLDG 471’ EAST END Mezzanine Fire alarm.
	  • SYS 9 WET PIPE TG BLDG 471’ EAST MEZZANINE Fire alarm.
	  • FP-P-2A PUMP RUNNING.
	  • FP-P-2B PUMP RUNNING.

INITIATING CUE:	• The CRS has directed you to take actions in response to the given conditions. • From memory, take appropriate actions and report to the CRS when you are complete.

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator’s Cue	Results
	1	Reviews alarms on FCP-1, FCP-2, and FCP-3: • TG BLDG 471’ EAST END Mezzanine Fire alarm. • SYS 9 WET PIPE TG BLDG 471’ EAST MEZZANINE Fire alarm. • FP-P-2A PUMP RUNNING. • FP-P-2B PUMP RUNNING.	Determined by multiple conditions that a Fire exists in the TB 471’ East End.		S / U

*** Items are Critical Steps**

Time	JPM Step	Task Element	Performance Standard	Evaluator's Cue	Results
	2	Reviews report from OPS-3.	Determined that local verification requirement has been met.		S / U
	3	Enters ABN-FIRE.	Enters ABN-FIRE.		S / U
	4	Performs Immediate Actions of ABN-FIRE.	Performed Immediate Actions of ABN-FIRE.		S / U
	5	**SOUND** the alerting tone for ~5 seconds.	Sounded the Alerting Tone for approximately 5 seconds.		S / U *
	6	**ANNOUNCE** the location of the fire.	Announced the location of the fire as TB 471' East End.		S / U *
	7	IF the fire is WITHIN a Protected Area Plant Building, THEN **DISPATCH** the Fire Brigade	Dispatched Fire Brigade.		S / U *
	8	**REPEAT** the above three steps	Repeat steps 3.1, 3.2, and 3.3.		S / U *
	9	IF the fire is not extinguished, THEN **DEPRESS** the Hanford Fire Department pushbutton on FCP-1.	Depressed the Hanford Fire Department pushbutton on FCP-1.		S / U *
Examiner Note: Stop the JPM if examinee attempts to continue past the Immediate Actions.					
Terminating Cue: This JPM is complete.					

RESULTS OF JPM
RESPOND TO INDICATIONS OF A FIRE

Examinee (Print): ____

Evaluator (Print): ____

Task Standard: ABN-FIRE Immediate Actions have been completed.

Overall Evaluation	JPM Completion Time
SAT / UNSAT (Circle One)	**Minutes**

COMMENTS:

Evaluator's Signature: ______________________________ **Date:** ______________

Initial Conditions:

Given the following:

- Report from OPS-3 that there is heavy smoke on the TB-501 East End coming up from below and he was leaving the area.
- Alarms on FCP-1, FCP-2, and FCP-3:
  - TG BLDG 471’ EAST END Mezzanine Fire alarm.
  - SYS 9 WET PIPE TG BLDG 471’ EAST MEZZANINE Fire alarm.
  - FP-P-2A PUMP RUNNING.
  - FP-P-2B PUMP RUNNING.

Initiating Cue:

The CRS has directed you to take actions in response to the given conditions. **FROM MEMORY, take appropriate actions and report to the CRS when you are complete.**

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	COLUMBIA GENERATING STATION SIMULATOR EXAMINATION
LESSON TITLE	RFW-DPT-4A fails downscale (Tech Spec); RWCU NRHX fouling causes high temperature isolation on RWCU-V-4; CRD-P-1A trips requiring CRD-P-1B to be started; HPCS-P-1 control power failure (Tech Spec); RRC-FT-14A fails low causing APRM-CHS-1 to trip; SRV MS-RV-2B inadvertently opens (will close upon fuse removal); LOCA from RRC-P-1B suction line requiring manual scram; Spray Wetwell and Drywell; RFW-FIC-620 controller failure with RFW-V-109 failing to open and RFW-V-112A & B failing to open once closed; RCIC–FIC-600 fails low on startup requiring manual trip of RCIC turbine; Initiate Emergency Depressurization (ED) on low RPV level and restore RPV level to above TAF

LENGTH OF LESSON 1.5 Hours

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code	LO001856	Rev. No.	0
JPM PQD Code		Rev. No.	
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave E. Crawford	DATE	12/22/16
REVISED BY		DATE	
VALIDATED BY		DATE	
TECHNICAL REVIEW		DATE	
INSTRUCTIONAL REVIEW		DATE	
APPROVED		DATE	

Facility:	Columbia Generating Station	Scenario No.: 1	Op Test No.: 1
Examiners:	____________	Operators:	____________
	____________		____________
	____________		____________

Initial Conditions:	The reactor is in Mode 1 at 100% power. RCIC Operability Test surveillance was just completed to satisfy Post Maintenance Testing (PMT) requirements and has been returned to a Standby status and declared operable. RHR-SYS-B was placed in Suppression Pool Cooling three (3) hours ago to restore Suppression Pool temperature following the testing and to satisfy RHR-P-2B PMT requirements. LCO 3.5.1 A.1, LCO 3.6.1.5 A.1, LCO 3.6.2.3 A.1, and RFO 1.6.1.5 A.1 have been entered for RHR-SYS-B being inoperable.
Turnover:	Maintain RHR-P-2B in operation for the next three (3) hours to satisfy pump PMT requirements.

Critical Tasks:

CT-1	Initiate Drywell sprays when Wetwell pressure exceeds 12 psig but prior to exceeding PSP, after verifying Drywell parameters are within DSIL and RHR is NOT required for adequate core cooling.
CT-2	Initiate Emergency Depressurization (ED) by opening seven (7) Safety Relief Valves (ADS preferred) after RPV water level reaches TAF (-161 inches) and within 10 minutes of level dropping below TAF.
CT-3	After ED, and within 10 minutes of RPV pressure lowering to 200 psig, restore and maintain RPV water level above TAF (-161 inches) using Low Pressure ECCS systems.

Event No.	Malf No.	Event Type*	Event Description
1	TRG-1	I (ATC,SRO) TS (SRO)	RFW-DPT-4A fails downscale (Tech Spec)
2	TRG-2	C (BOP,SRO)	RWCU NRHX fouling causes high temperature isolation on RWCU-V-4
3	TRG-3	C (ATC,SRO)	CRD-P-1A trips requiring CRD-P-1B to be started
4	TRG-4	TS (SRO)	HPCS-P-1 control power failure (Tech Spec)
5	TRG-5	I (ATC,SRO)	RRC-FT-14A fails low causing APRM-CHS-1 to trip
6	TRG-6	C (BOP,SRO) R (ATC,SRO)	SRV MS-RV-2B inadvertently opens (will close upon fuse removal)
7	TRG-7	M (ALL)	LOCA from RRC-P-1B suction line requiring manual scram Spray Wetwell and Drywell **(CT #1)**
8	N/A	C (ATC,SRO)	RFW-FIC-620 controller failure with RFW-V-109 failing to open and RFW-V-112A & B failing to open once closed
9	N/A	C (BOP)	RCIC–FIC-600 fails low on startup requiring manual trip of RCIC turbine
10	N/A	---	Initiate Emergency Depressurization (ED) on low RPV level and restore RPV level to above TAF **(CT #2) (CT #3)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Technical Specifications

Target Quantitative Attributes	Actual	Description
Malfunctions after EOP entry (1-2)	**2**	Inability to inject with feedwater; RCIC-FIC-600 output fails low
Abnormal events (2-4)	**3**	RWCU NRHX fouling; CRD-P-1A trip; SRV MS-RV-2B opens
Major transients (1-2)	**1**	LOCA from RRC-P-1B suction line
EOPs entered/requiring substantive actions (1-2)	**2**	PPM 5.1.1 (RPV Control); PPM 5.2.1 (Primary Containment Control)
EOP contingencies requiring substantive actions (0-2)	**1**	PPM 5.1.3 (Emergency RPV Depressurization)
Critical tasks (2-3)	**3**	See Critical Task Determination table

Trigger (TRG-x)	Evaluator Directed	How Triggered	Purpose	Malfunction Numbers
TRG-1	YES	Manually	Event Initiator	XMT-RRS106A
TRG-2	YES	Manually	Event Initiator	HTX-RCC010F
TRG-3	YES	Manually	Event Initiator	BKR-CRD001
TRG-4	YES	Manually	Event Initiator	BKR-CSS001
TRG-5	YES	Manually	Event Initiator	XMT-RRS036A
TRG-6	YES	Manually	Event Initiator	OVR-RRS022D
TRG-7	YES	Manually	Event Initiator	MAL-RRS004B
TRG-8		Automatically	Malf Trigger	MAL-RRS004D
TRG-9		Automatically	Malf Trigger	MOV-CFW044F
TRG-10		Automatically	Malf Trigger	MOV-CFW045F
TRG-11	**YES**(2)	Manually	Malf Trigger	BKR-CFW004; BKR-CFW005; BKR-CFW006
			Initial Condition	MAL-FWC011
			Initial Condition	MOV-CFW043F
			Initial Condition	CNH-RCI002B
			Initial Condition	MAL-RWU008

(2) Contingency action (see Event 8 description).

SCENARIO 1 SUMMARY

Event 1

(TRG-1) The first event is a failure of RFW-DPT-4A/RFW-LI-606A downscale. The crew performs actions per Alarm Response Procedure (ARP) 603.A8.3-7 and enters ABN-INSTRUMENTATION and ABN-LEVEL. The CRS directs the BOP to verify FWLC system has automatically shifted to Channel B and directs the ATC to place the Reactor Vessel Level Control Channel selector switch to Channel B. The SRO refers to Technical Specifications and determines that LCO 3.3.2.2, action A.1 applies which requires tripping the affected channel within 7 days.

Event 2

(TRG-2) Reactor Water Cleanup Non-Regenerative Heat Exchanger (RWCU-HX-2A/2B NRHX) fouling causes a rising temperature at the outlet of the NRHX leading to the RWCU filter demineralizers. The crew takes actions per ARP 4.602.A5 6-8 (CLEANUP FLTR INLET TEMP HI) to include monitoring temperature, verifying system lineup, and ensuring proper Reactor Closed Cooling (RCC) flow to the RWCU NRHX exist. When the crew recognizes that the RWCU NRHX outlet temperature is approaching 140°F, and isolation appears imminent, the BOP operator will stop the running RWCU pump (RWCU-P-1A) and close the RWCU Suction Outboard Isolation Motor-Operated Valve (MOV) (RWCU-V-4). The crew may also elect to close the Inboard isolation MOV (RWCU-V-1).

Note that if the crew does not take action to prevent automatic closure of RWCU-V-4 (which occurs at 140°F), RWCU-V-4 will automatically close but the running RWCU pump (RWCU-P-1A) will fail to trip. The BOP operator will have to manually trip the pump.

Event 3

(TRG-3) Control Rod Drive Pump 1A (CRD-P-1A) inadvertently trips requiring the ATC operator to start CRD-P-1B per ARP H13-P603 A-7 3-8 (CRD CHARGE WATER PRESS LOW). Actions include placing the CRD Flow Controller in Manual, zeroing the output and then starting CRD-P-1B. The controller is then nulled and placed back in Auto and CRD system parameters restored.

Depending on the time required to restore CRD flow, one or more control rod HCU accumulator alarms may come in. If asked, local accumulator pressures will be reported to be 980 psig which is below the alarm setpoint but above the LCO 3.1.5 minimum limit of 940 psig required for operability. No Technical Specification actions will be required.

Event 4

(TRG-4) High Pressure Core Spray (HPCS-P-1) control power fails (fuses blow) due to electrical fault. The BOP operator refers to ARP 601.A1 6-8 (HIGH PRESSURE CORE SPRAY SYSTEM OUT OF SERVICE). If directed to investigate, the HPCS pump control power fuses are reported as blown. Any attempt to replace fuses will result in fuses again blowing.

With both RHR-SYS-B and HPCS inoperable, the CRS refers to Technical Specifications and determines the following additional actions apply:

- LCO 3.5.1 B.1 – Immediately verify by administrative means that RCIC is operable
- LCO 3.5.1 B.2 – Restore HPCS system to operable status within 14 days
- LCO 3.5.1 C.1 – Restore RHR-SYS-B or HPCS system to operable status within 72 hours

Event 5

(TRG-5) A downscale failure of Reactor Recirculation Flow Transmitter 14A (RRC-FT-14A) occurs causing Channel 1 of the Average Power Range Monitor (APRM-CHS-1) to trip. With only one (1) "vote" sent to the 2-out-of-4 voter logic no half-scram or reactor trip signals are generated. The crew takes actions per annunciator 603.A8 3-6 (FLOW REFERENCE OFF NORMAL). The CRS directs the ATC operator to bypass APRM-CHS-1.

With APRM-CHS-1 inoperable (and bypassed), the CRS refers to Technical Specifications and determines that only three (3) APRM channels are required to be operable and that no Technical Specification actions are required.

Event 6

(TRG-6) Non-ADS Safety Relief Valve (SRV) MS-RV-2B inadvertently opens. The crew confirms this by observing at least one of the following: 1) Rise on MS-RV-2B tailpipe temperature on MS-TR-614; 2) Rising Suppression Pool temperature or level; or 3) Reduction in Main Generator output of ~70 MWe. The CRS enters ABN-SRV and directs the ATC operator to reduce reactor power to < 90% using Reactor Recirculation (RRC) flow. The BOP attempts to close the SRV using the control switch. The valve will not close requiring the BOP to remove solenoid fuses per Attachment 7.1. Once fuses are removed the SRV closes. Entry into PPM 5.2.1 (Primary Containment Control) will be required if Suppression Pool level exceeds +2 inches or wetwell temperature exceeds 90°F.

Event 7

(TRG-7) A primary leak from the RRC-P-1B suction line occurs. The crew takes actions to identify and isolate the leak per ABN-LEAK which will not be successful. The leak continues to increase until degrading plant parameters require a manual reactor scram. The crew takes actions per PPM 3.3.1 (Reactor Scram), PPM 5.1.1 (RPV Control), and PPM 5.2.1 (Primary Containment Control). The crew initiates Wetwell sprays when Wetwell pressure reaches 2 psig and initiates Drywell sprays when Wetwell pressure exceeds 12 psig but prior to exceeding the Pressure Suppression Pressure (PSP) limit (PPM 5.2.1 Figure F) and after verifying Drywell parameters are within the Drywell Spray Initiation Limit (DSIL) (PPM 5.2.1 Figure E) and RHR is NOT required for adequate core cooling **(CT #1)**. RHR will be re-aligned from Drywell spray to LPCI injection after emergency depressurization is initiated. Due to a loss of sufficient RPV injection, RPV level continues to lower requiring the crew to emergency depressurize the RPV because sufficient high pressure injections system are not available.

Event 8

Total loss of feedwater injection occurs: Reactor Feedwater Flow Indicating Controller (RFW-FIC-620) output fails low and FWH 6A/6B Bypass Valve (RFW-V-109) fails to open preventing RFW injection into the RPV. RFW-HX-6A & B Discharge to Rx Discharge MOVs (RFW-V-112A & B) fail to open (if attempted) after being initially closed to support feeding with the RFW Flow Control Valves (RFW-FCV-10A/B).

Examiner Note: If the ATC operator fails to close either RFW-V-112A or RFW-V-112B then with specific Examiner direction, Trigger 11 will be entered to cause a trip of all running Condensate Booster pumps to ensure a total loss of feedwater injection occurs which is needed to support Critical Tasks.

Event 9

Reactor Core Isolation Cooling Flow Indicating Controller (RCIC-FIC-600) fails low on RCIC system startup requiring a manual trip of the RCIC turbine.

<u>Event 10</u>

With insufficient high pressure injection sources available, and with RPV level continuing to lower, the CRS enters PPM 5.1.3 (Emergency RPV Depressurization) and initiates emergency depressurization by opening seven (7) Safety Relief Valves (ADS preferred) after RPV water level reaches TAF (-161 inches) and within 10 minutes of level dropping below TAF. **(CT #2)** After ED, and within 10 minutes of RPV pressure lowering to 200 psig, the crew will restore and maintain RPV water level above TAF (-161 inches) using Low Pressure ECCS systems. **(CT #3)** Wetwell and Drywell sprays can be reinitiated per PPM 5.2.1 when not needed for adequate core cooling.

TERMINATION CRITERIA: The scenario will be terminated when Drywell sprays have been initiated, an Emergency Depressurization has been performed and RPV level is being controlled in the prescribed band OR as directed by the Examination Team.

Critical Task Determination

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
CT #1 - Initiate Drywell sprays when Wetwell pressure exceeds 12 psig but prior to exceeding PSP, after verifying Drywell parameters are within DSIL and RHR is NOT required for adequate core cooling.	Primary containment pressures at or above specified limits pose a direct threat to primary containment integrity and the pressure suppression function. (Ref: PPM 13.1.1A (Classifying the Emergency – Technical Bases) Attachment 4.1 section 3)	Procedural direction in PPM 5.2.1 (Primary Containment Control - step P-7) when Wetwell pressure exceeds 12 psig.	The operator will manually open Drywell spray isolation valves.	Valve position will change and Drywell spray flow will increase.
CT #2 - Initiate Emergency Depressurization (ED) by opening seven (7) Safety Relief Valves (ADS preferred) after RPV water level reaches TAF (-161 inches) and within 10 minutes of level dropping below TAF.	Preclude core damage by establishing conditions that allow low pressure ECCS systems to restore water level above TAF (Safety Limit) (Ref: CGS Technical Specifications - 2.1.1.3)	Procedural direction in PPM 5.1.1 (RPV Control - step L-15) when RPV Level cannot be restored and maintained above -186 inches.	The operator will manually open 7 Safety Relief Valves (ADS preferred) to emergency depressurize the RPV.	The valve light indications for each of the 7 Safety Relief Valves will change from Green lit to Red lit when control switch is taken to Open. Reactor pressure will lower in response.
CT #3 - After ED, and within 10 minutes of RPV pressure lowering to 200 psig, restore and maintain RPV water level above TAF (-161 inches) using Low Pressure ECCS systems.	Preclude core damage by establishing conditions that allow low pressure ECCS systems to restore water level above TAF (Safety Limit) (Ref: CGS Technical Specifications - 2.1.1.3)	Procedural direction in PPM 5.1.1 (RPV Control - step L-16) which directs restoring and maintaining RPV level above -186 inches and ultimately above TAF.	All available low pressure ECCS systems are aligned to restore RPV level.	Indication of applicable ECCS system flow. RPV level rises to greater than TAF.

SIMULATOR SETUP

☐ Unload simulator (between each scenario)

☐ Verify in ILC load

☐ Reload simulator

☐ Reset to IC-208 (reset, go to Run, reset again)

☐ Load Scenario 1 Schedule file

☐ Load Scenario 1 Event file (if not loaded automatically)

☐ Validate that there are no unexpected annunciators or parameters out of band

☐ Verify pump running magnets

☐ Flag the following:

- ☐ 601.A2 5-7
- ☐ 840.A5 7-1
- ☐ 820.B1 7-2

☐ Have marked up copy of SOP-RHR-SPC for RHR “B” in Suppression Pool Cooling for the crew at turnover (ensure N/Ad steps are initialed)

SCHEDULE FILE

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EVENT FILE


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<!-- This file contains a Thunder Simulations Event -->

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EVENT No. 1		
Description: RFW-DPT-4A fails downscale (Tech Spec) Event is initiated as directed by the Exam team and is activated using **TRIGGER 1**.		
BOOTH OPERATOR – As briefed or when directed activate TRIGGER 1		
Time	**Position**	**Applicants Actions or Behavior**
	ATC	☐ Acknowledges annunciator 603.A8.3-7 (RPV LEVEL HIGH/LOW ALERT) and informs CRS
		Comment:
		☐ May recommend entry into ABN-LEVEL and ABN-INSTRUMENTATION
		Comment:
Examiner Note: Following steps are from ARP 4.603.A8 3-7 (RPV LEVEL HIGH/LOW ALERT)		
	ATC	☐ 1: Checks RFW-LI-606A, B, C • Recognizes and reports that NR "A" has failed downscale • May select NR "B" on H13-P603, as "A" is unreliable (the system automatically selects "B" for level control since "A" failed)
		Comment:
	CRS	☐ May enter ABN-LEVEL (only required to be entered on actual RPV level change)
		Comment:
Examiner Note: Following step is from ABN-LEVEL		
	CRS	☐ 4.1.2: May direct ATC to select "B" RPV Level channel at H13-P603
		Comment:
	CRS	☐ Enters ABN-INSTRUMENTATION
		Comment:
Examiner Note: Following steps are from ABN- INSTRUMENTATION		
	CRS	☐ 4.3: Directs BOP to check excess flow check valve status indication at H13-P851 (if not already done)
		Comment:

EVENT No. 1 (CONTINUED)		
<u>Examiner Note</u>: Refer to Simulator Guide Attachments 1, 2 or 3 in reference to ABN Attachments 7.4, 7.5 & 7.6, respectively.		
	CRS	☐ 4.5: Refers to Attachment 7.4 (page 16) or Attachment 7.5 (page 20) and determines associated power supply and Tech Spec reference
		Comment:
		☐ 4.6: Refers to Attachment 7.6 (page 22) and determines that detector RFW-DPT-4A feeds level instrument RFW-LI-606A and also notes detector location
	BOP	☐ Checks excess flow check valve status indication at H13-P851
		Comment:
		☐ Validates that the Feedwater Water Level Control system has automatically shifted RPV level control to channel "B"
		Comment:
		☐ Dispatches field operator to investigate RFW-DPT-4A in Reactor Building 522 (NW) at instrument rack P004
		Comment:
BOOTH ROLEPLAY – <u>If sent to investigate status of RFW-DPT-4A</u>, wait 2 minutes then report "Nothing abnormal found with RFW-DPT-4A."		
	CRS	Evaluates Technical Specifications and determines the following action applies: ☐ LCO 3.3.2.2 A.1 – Place affected channel in trip within 7 days
		Comment:

EVENT No. 2		
Description: RWCU NRHX fouling causes high temperature isolation on RWCU-V-4 Event is initiated after CRS makes Tech Spec call (or as directed by the Exam team) and is activated using **TRIGGER 2**.		
BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 2</u>		
Time	**Position**	**Applicants Actions or Behavior**
	BOP/ATC	☐ Acknowledges annunciator 602.A5 6-8 (CLEANUP FLTR INLET TEMP HIGH) and informs CRS
		Comment:
<u>Examiner Note</u>: Following steps are from ARP 4.602.A5 6-8 (CLEANUP FLTR INLET TEMP HIGH)		
	BOP	☐ 1: Checks (and continues to monitor) RWCU NRHX Outlet temperature on RWCU-TI-607 (may be done prior to pulling ARP)
		Comment:
		☐ 3: Refers to SOP-RCC-OPS and verifies proper RCC flow to NRHX (requires field support)
		Comment:
BOOTH ROLEPLAY – <u>If sent to verify proper RCC flow to NRHX</u>, wait 2 minutes then report "RCC flow to NRHX is normal and has not changed during the shift. RCC-V-8 is in the proper throttled position."		
	BOP	☐ 4: Monitors RCC HX Outlet temperature (requires field support)
		Comment:
BOOTH ROLEPLAY – <u>If sent to verify proper RCC HX outlet temperature</u>, wait 1 minute then report "RCC HX outlet temperature is normal."		
	BOP	☐ 6: Verifies RWCU flow is normal
		Comment:
		☐ 7: Dispatches field operators to perform walk-downs and to verify proper RCC and RWCU system alignment
		Comment:
BOOTH ROLEPLAY – <u>If sent to check for any RCC leakage</u>, wait 10 minutes then report "No signs of RCC leakage found."		

EVENT No. 2 (CONTINUED)		
	BOP	☐ 8: If temp approaches 140°F and isolation appears imminent (it will): • Stops RWCU-P-1A • Closes RWCU-V-4 (and may close RWCU-V-1) • Verifies closed RWCU-V-44
		Comment:
		☐ If RWCU automatically isolates (if crew does not respond in time) • Reports RWCU isolation (RWCU-V-4 closed) with failure of RWCU-P-1A to auto trip • Manually trips RWCU-P-1A
		Comment:
	CRS	☐ May establish a Key Plant Parameter to isolate RWCU prior to exceeding 140°F on the NRHX outlet
		Comment:
		☐ Directs isolating RWCU per the ARP prior to exceeding 140°F on the NRHX outlet
		Comment:
		☐ May direct RWCU-V-104 be throttled open (per SOP-RWCU-SHUTDOWN, page 7, step 5.1.9)
		Comment:
	ATC	☐ May aid in monitoring temperature while BOP is working through procedures and communicating with field operators
		Comment:

EVENT No. 3		
Description: CRD-P-1A trips requiring CRD-P-1B to be started Event is initiated after RWCU has been isolated (or as directed by the Exam team) and is activated using **TRIGGER 3**.		
BOOTH OPERATOR – As briefed or when directed activate TRIGGER 3		
Time	**Position**	**Applicants Actions or Behavior**
	ATC	☐ Acknowledges annunciator 603.A7 3-8 (CRD CHARGE WATER PRESS LOW) and recognizes that the running CRD pump tripped and informs CRS
		Comment:
	CRS	☐ Directs starting CRD-P-1B
		Comment:
Examiner Note: Following steps are from ARP 4.603.A7 3-8 (CRD CHARGE WATER PRESS LOW)		
	ATC	☐ 1: Checks CRD-PIS-600 (Charging Water Header Pressure at H13-P603) - will be LT 1300 psig
		Comment:
		☐ 2: Determines if either CRD pump is running (neither pump will be running)
		Comment:
		☐ 3a: Places CRD-FC-600 in manual
		Comment:
		☐ 3b: Reduces CRD-FC-600 output to zero
		Comment:
		☐ 3c: Starts CRD pump 1B
		Comment:
		☐ 3d: Nulls CRD-FC-600
		Comment:
		☐ 3e: Transfers CRD-FC-600 to Auto
		Comment:

EVENT No. 3 (CONTINUED)		
	ATC	☐ 3f: IF necessary, then adjust CRD-V-3 (Drive/Cooling Water Pressure Control) to 255-265 psid on CRD-DPI-602 (Drive HDR/RX ΔP) (may not be necessary)
		Comment:
	BOP	☐ May assist in acknowledging annunciators and monitoring plant parameters while ATC recovers the CRD pump
		Comment:
		☐ Directs field operator to report local control rod accumulator pressures (if directed by CRS)
		Comment:
Examiner Note: Depending on the time required to restore CRD flow, one or more control rod HCU accumulator alarms may come in. If asked, local accumulator pressures will be reported to be 980 psig which is below the alarm setpoint but above the LCO 3.1.5 minimum limit of 940 psig required for operability. No Technical Specification actions will be required. Accumulator alarms will clear soon after CRD pump is started.		
	CRS	☐ May direct control rod HCU accumulator pressures be reported from the field
		Comment:
BOOTH ROLEPLAY – If sent to report control rod HCU accumulator pressures for alarming accumulators, wait 2 minutes then report all accumulator pressures at 980 psig.		
	CRS	☐ Evaluates Technical Specification 3.1.5 (no entry Condition exists)
		Comment:
		☐ Directs CRD-P-1B to be Protected per PPM 1.3.83 (Protected Equipment Program) Attachment 7.1 (based on CRD-P-1A unavailability)
		Comment:

EVENT No. 4

Description: HPCS-P-1 control power failure (Tech Spec)

Event is initiated after CRD-P-1B started and CRD parameters restored (or as directed by the Exam team) and is activated using **TRIGGER 4**.

BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 4</u>

Time	Position	Applicants Actions or Behavior
	BOP	☐ Acknowledges annunciator 601.A1 6-8 (HPCS OUT OF SERVICE) and recognizes a loss of HPCS pump breaker position indication and informs CRS
		Comment:
		☐ Notes that BISI for CB HPCS OUT OF SERV is lit
		Comment:
	ATC	☐ Continues to monitor reactor power, pressure and level
		Comment:
<u>Examiner Note</u>: Following step is from ARP 4.601.A1 6-8 (HPCS OUT OF SERVICE)		
	BOP	☐ 1: Refers to BISI (CB HPCS OUT OF SERV) (ARP Attachment 1 - Page 4) to determine actions required (see below)
		Comment:
<u>Examiner Note</u>: Following steps are from ARP 4.601.A1 6-8 (Attachment 1 – Page 4)		
	BOP	☐ 1: Directs field operator to check status of HPCS Pump breaker (HPCS-CB-P1) and associated breaker control power fuses
		Comment:
BOOTH ROLEPLAY – <u>If sent to check status of the HPCS Pump breaker</u>, wait 2 minutes then report "HPCS Pump breaker is racked in with breaker open. Have loss of local breaker indication."		
BOOTH ROLEPLAY – <u>If sent to check status of the HPCS Pump breaker control power fuses</u>, wait 4 minutes then report "Both the HPCS breaker close and trip fuses are blown."		
	BOP	☐ 2: Refers CRS to Technical Specification 3.5.1
		Comment:
<u>Examiner Note</u>: Following steps are from ARP 4.601.A1 6-8 (HPCS OUT OF SERVICE)		
	CRS	☐ 2: Enter HPCS as Inoperable in the Plant Logging System
		Comment:

EVENT No. 4 (CONTINUED)		
	CRS	☐ 3: Refers to PPM 1.10.1 (Notifications and Reportable Events) to determine reportability requirements
		Comment:
		Evaluates Technical Specifications and determines the following actions apply: ☐ LCO 3.5.1 B.1 – Immediately verify by administrative means that RCIC is operable
		Comment:
		☐ LCO 3.5.1 B.2 – Restore HPCS system to operable status within 14 days
		Comment:
		☐ LCO 3.5.1 C.1 – Restore RHR-SYS-B or HPCS system to operable status within 72 hours
		Comment:
<u>Examiner Note</u>: If HPCS pump control power fuses are replaced they will blow again.		
	CRS	☐ May direct HPCS control power fuses be replaced or removed or request troubleshooting assistance before doing so.
		Comment:
BOOTH ROLEPLAY – <u>If directed to replace the HPCS Pump control power fuses</u>, wait 10 minutes then report "Replaced the trip and close control power fuses for the HPCS Pump. Appears the fuses may have blown again."		
BOOTH ROLEPLAY – <u>If directed to remove the HPCS Pump control power fuses</u>, wait 5 minutes then report "Control power fuses for the HPCS Pump have been removed."		
	CRS	☐ Directs the following systems to be Protected per PPM 1.3.83 (Protected Equipment Program) Attachment 7.1 (based on HPCS unavailability) • RCIC-P-1 • LPCS-P-1 • DG-SYS-A • DG-SYS-B • ADS-SYS-A • ADS-SYS-B • SW-SYS-A • SW-SYS-B
		Comment:

EVENT No. 5		
Description: RRC-FT-14A fails low causing APRM-CHS-1 to trip Event is initiated after CRS makes Tech Spec call (or as directed by the Exam team) and is activated using **TRIGGER 5**.		
BOOTH OPERATOR – As briefed or when directed activate TRIGGER 5		
Time	**Position**	**Applicants Actions or Behavior**
	ATC	☐ Acknowledges annunciator 603.A8 3-6 (FLOW REFERENCE OFF NORMAL) and informs CRS
		Comment:
Examiner Note: Following steps are from ARP 4.603.A8 3-6 (FLOW REFERENCE OFF NORMAL)		
	ATC	☐ 1: Determine which channel is causing the alarm by checking RBM ODA (H13-P603) or RBM chassis (H13-P608) (BOP will have to check P608)
		Comment:
	BOP	☐ Assists ATC with initial diagnosis at H13-P603
		Comment:
		☐ May investigates RBM chassis at H13-P608 (as a backup to H13-P603 indications)
		Comment:
	ATC	☐ 2: If CRS directs, bypasses failed channel (APRM “A”) at H13-P603 – Annunciator clears
		Comment:
		☐ 3: Refers CRS to Technical Specification 3.3.1.1 and LCS 1.3.2.1
		Comment:
	CRS	☐ Directs bypassing APRM “A”
		Comment:
		Evaluates Technical Specification 3.3.1.1 and LCS 1.3.2.1 and determines the minimum number of required APRMs remain operable and that no Technical Specification or LCS actions apply.
		Comment:

EVENT No. 6		
Description: SRV MS-RV-2B inadvertently opens (will close upon fuse removal) Event is initiated after APRM "A" is bypassed and Tech Specs have been evaluated (or as directed by the Exam team) and is activated using **TRIGGER 6**.		
BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 6</u>		
Time	**Position**	**Applicants Actions or Behavior**
	BOP	☐ Acknowledges annunciator 601.A2 5-8 (SRV OPEN) and informs CRS
		Comment:
<u>Examiner Note</u>: Following step is from ARP 4.601.A2 5-8 (SRV OPEN)		
	BOP	☐ 1: Refers CRS to ABN-SRV
		Comment:
	CRS	☐ Enters ABN-SRV and directs subsequent actions
		Comment:
<u>Examiner Note</u>: Following steps are from ABN-SRV		
		<u>NOTE</u>: Division 1 (A) ADS SRV open demand signal is indicated by the SRV red light lit on H13-P628 and H13-P601 vertical section. **<u>NOTE</u>:** Division 2 (B) ADS SRV open demand signal is indicated by the SRV red light lit on H13-P631 and H13-P601 vertical section. **<u>NOTE</u>:** Actual SRV position from the SRV LVDT is indicated on H13-P601, horizontal section.
	CRS	☐ 4.1: May establish a Key Plant Parameter of Suppression Pool temperature of less than 110°F (not expected to reach)
		Comment:
	BOP	☐ 4.2: Verifies SRV MS-RV-2B is open by one or more of the following: • Rising tailpipe temperature (H13-P614) • Rising Suppression Pool temperature or level • Reduction in Main Generator output (approx. 70 MWe)
		Comment:

EVENT No. 6 (CONTINUED)		
Examiner Note: Following three steps are required since reactor power is > 90 percent.		
	BOP	☐ 4.4.1: Places control switch for SRV MS-RV-2B to Open
		Comment:
	ATC	☐ 4.4.2: Reduces reactor power to < 90% using RRC flow
		Comment:
	BOP	☐ 4.4.3: Places control switch for SRV MS-RV-2B to Off
		Comment:
Examiner Note: SRV remains open requiring removal of fuses.		
	CRS	☐ 4.6: Directs removal of SRV fuses for SRV MS-RV-2B per Attachment 7.1
		Comment:
Examiner Note: BOP should remove badge, rings, and conductive materials and don protective eye-wear (ISPM-20 or ISPM-7 for electrical safety).		
Examiner Note: Refer to Simulator Guide Attachments 4 in reference to ABN Attachments 7.1.		
	BOP	☐ May update crew that SRV fuses are going to be pulled for SRV MS-RV-2B
		Comment:
	ATC	☐ Monitors for a change in SRV position status while fuses are pulled
		Comment:
Examiner Note: Applicants are trained to leave fuses on floor just outside the cabinet.		
	BOP	☐ 4.6: Removes fuses (using fusepullers) listed on ABN-SRV (Attachment 7.1) (Fuses BB-F29 and BB-F30 will be removed from Panel H13-P628)
		Comment:
	CRS	☐ May update crew that SRV is closed
		Comment:
		☐ Enters PPM 5.2.1 (Primary Containment Control) if wetwell level exceeds +2 inches (which corresponds to Tech Spec limit of 31 ft 1.75 inches)
		Comment:

EVENT No. 6 (CONTINUED)		
<u>Examiner Note</u>: Already in Suppression Pool cooling.		
	CRS	☐ Enters (or re-enters) PPM 5.2.1 (Primary Containment Control) if wetwell temperature exceeds 90°F
		Comment:
<u>Examiner Note</u>: The only applicable Technical Specifications are those related to high wetwell level or high wetwell temperature coincident with EOP entry, if they should occur. There are no applicable TS actions associated with the faulty non-ADS SRV (tracking only).		
	CRS	4.9: Evaluates Technical Specifications and determines the following actions apply: ☐ SRV MS-RV-2B: NONE
		Comment:
		☐ High wetwell level > 31 feet 1.75 inches: LCO 3.6.2.2 A.1 - Restore Suppression Pool water level to within limits within 2 hours
		Comment:
		☐ High wetwell temperature > 90°F: LCO 3.6.2.1 A.1 – Verify Suppression Pool average temperature is ≤ 110°F once per hour AND Restore Suppression Pool average temperature to ≤ 90°F within 24 hours
		Comment:
		☐ 4.10: May discuss need to perform OSP-CVB/IST-M701 within 12 hours of SRV opening
		Comment:
		☐ 4.11: May discuss need to initiate Condition Report to evaluate reactivity event per PPM 1.3.79
		Comment:

EVENT No. 7		
Description: LOCA from RRC-P-1B suction line requiring manual scram Event is initiated after fuses have been removed for SRV MS-RV-2B and associated Tech Specs evaluated (or as directed by the Exam team) and is activated using **TRIGGER 7**.		
BOOTH OPERATOR – As briefed or when directed activate TRIGGER 7		
Time	**Position**	**Applicants Actions or Behavior**
	BOP	☐ Acknowledges annunciator 601.A3 6-5 (LEAK DETECTION DRYWELL FLOOR DRAIN FLOW HIGH) and observes rising Drywell pressure
		Comment:
		☐ Reports indications of primary leak to CRS
		Comment:
		☐ Pulls up DSIL curve on GDS to check for excessive Drywell pressure for given Drywell temperature (curve slopes to the right)
		Comment:
Examiner Note: Following steps are from ARP 4.601.A3 6-5 (LEAK DETECTION DRYWELL FLOOR DRAIN FLOW HIGH)		
	BOP	☐ 1: May check Drywell Floor Drain flow GE 5 GPM as read on EDR-FRS-623 (already have evidence of significant leak)
		Comment:
		☐ 3: Refers CRS to ABN-LEAKAGE
		Comment:
		☐ 4: Continues to monitor containment parameters due to RCS leakage
		Comment:
		☐ 5: May refer CRS to Technical Specification 3.4.5
		Comment:
	CRS	☐ Enters ABN-LEAKAGE
		Comment:

EVENT No. 7 (CONTINUED)		
Examiner Note: Following steps are from ABN-LEAKAGE		
Examiner Note: ABN assumes a smaller initial leak rate which can be diagnosed over time. Only relevant actions will be performed.		
	BOP	☐ 4.1.3: Monitors Containment radiation monitors at RAD Board 22 and 23 (may not get to this)
		Comment:
		☐ 4.1.4: Monitors Drywell temperature and pressure (in progress)
		Comment:
	CRS	☐ 4.1.9: Directs ROs to investigate source of leak and isolate if possible (unisolable)
		Comment:
Examiner Note: CRS will direct manual scram before automatic high Drywell pressure scram occurs. If time permits RRC flow may be reduced to 74Mlbm/hr before scram inserted.		
	CRS	☐ Updates crew and directs ATC to scram the reactor
		Comment:
Examiner Note: Following steps are Immediate Actions from PPM 3.3.1 (Reactor Scram)		
	ATC	☐ 6.1.1: Places Reactor Mode Switch to Shutdown
		Comment:
		☐ 6.1.2: Monitors reactor power, pressure and level
		Comment:
		☐ 6.1.5: Inserts SRM and IRM monitors (detectors)
		Comment:
		☐ After above three steps ATC makes scram report to CRS: • Mode switch is in Shutdown • APRMs are downscale • RPV pressure is (value and trend) • RPV level is (value and trend) • EOP entry on low RPV level (and possibly high Drywell pressure)
		Comment:

EVENT No. 7 (CONTINUED)		
	CRS	☐ Repeats back scram report
		Comment:
	ATC	☐ 6.1.6: After CRS repeat back, reports all control rods are IN
		Comment:
	CRS	☐ Enters PPM 5.1.1 (RPV Control) on low RPV level (+13 inches)
		Comment:
		☐ Enters PPM 5.2.1 (Primary Containment Control) and re-enters PPM 5.1.1 on high Drywell pressure (1.68 psig)
		Comment:
Examiner Note: **Following steps are Subsequent Actions from PPM 3.3.1 (Reactor Scram)**		
	ATC	☐ 6.2.5.a: Verify Recirc pumps have run back to 15 Hz
		Comment:
		☐ 6.2.6: Range down on IRMs, as necessary, to follow power decrease
		Comment:
	BOP	☐ 6.2.7: Make PA announcement for reactor scram
		Comment:
Examiner Note: **See Event 8 for feedwater actions per SOP-RFW-FCV-QC quick card**		
	ATC	☐ 6.2.8: Transfers level control to RFW-FCV-10A/B per SOP-RFW-FCV-QC
		Comment:
	BOP	☐ 6.2.9: If necessary (with Main Generator load < 50 MWe): • If Main Turbine did not trip – simultaneously depress both Emerg Trip pushbuttons (H13-P820) • If Main Generator did not trip –depress either Unit Emergency Tip pushbutton or Unit Overall Trip pushbutton (H13-P800) • Verify power transfer to Startup Transformer (TR-S)
		Comment:
	CRS	☐ Directs 1.68 psig actuations be verified
		Comment:

EVENT No. 7 (CONTINUED)		
	BOP	☐ Verifies 1.68 psig actuations - Observes: • All ECCS pumps started (except for HPCS) and min flow valves opened • Both service water pumps (SW-P-1A & B) started • EDG-1 & EDG-2 running • GDS status for containment isolation valve closure (no yellowed border NSSSS groups indicated) ☐ Reports actuations verified to CRS
		Comment:
	CRS	☐ Works down the Primary Containment Pressure leg of PPM 5.2.1 (RPV Containment Control) and sets a Key Plant Parameter of 2 psig Wetwell pressure
		Comment:
	BOP	☐ Reports when Wetwell pressure reaches 2 psig
<u>Examiner Note</u>: With RHR System "B" already in Suppression Pool Cooling, CRS should use RHR loop "B" for Wetwell sprays and (later on) RHR loop "A" for Drywell sprays; otherwise, RHR pump runout may occur with Drywell Sprays and Suppression Pool Cooling operating from the same loop.		
	CRS	☐ Directs Wetwell Spray using RHR "B" (preferred) or "A" spray loops
		Comment:
	BOP	☐ Refers to SOP-RHR-SPRAY-WW-QC quick card to initiate Wetwell Sprays: • 2.1.1: Verify RHR-P-2A(B) running • 2.1.2: Verify RHR-V-42A(B) closed (LPCI injection valve) • 2.1.3: Open RHR-V-27A(B) (Suppression Pool Spray valve) • 2.1.4: Before Wetwell Spray drops below 0.0 psig, or when directed by the CRS, then close RHR-V-27A(B)
		Comment:
	CRS	☐ Directs Wetwell Sprays be secured prior to Wetwell pressure reaching 0.0 psig
		Comment:

EVENT No. 7 (CONTINUED)		
	CRS	☐ Works down the Primary Containment Pressure leg of PPM 5.2.1 (RPV Containment Control) and sets Key Plant Parameter of 12 psig in the Wetwell
		Comment:
		☐ Works down the Drywell Temperature leg of PPM 5.2.1 (RPV Containment Control) and sets Key Plant Parameter of 285 °F in the Drywell (not expected to be reached during scenario)
		Comment:
	BOP	☐ Reports Wetwell pressure at 12 psig
		Comment:
CT #1 - Initiate Drywell sprays when Wetwell pressure exceeds 12 psig but prior to exceeding PSP, after verifying Drywell parameters are within DSIL and RHR is NOT required for adequate core cooling.		
	CRS	☐ Directs BOP to verify within DSIL (Drywell Spray Initiation Limit – Fig. E on PPM 5.2.1 (Primary Containment Control)) (May verify themself)
		Comment:
	BOP	☐ Reports Drywell parameters within DSIL
		Comment:
	CRS	☐ Verifies RHR-P-2A not currently needed to ensure Adequate Core Cooling
		Comment:
		☐ Directs RRC pumps be verified off and Drywell Cooling fans be secured
		Comment:
	BOP	☐ Verifies RRC pumps off and secures the Drywell Cooling fans on back panel (bottom row of containment fans with switches that are not in the brown area on the panel) ☐ Reports completion to CRS
		Comment:

EVENT No. 7 (CONTINUED)		
	CRS	**CAUTION** Operate Drywell sprays and Wetwell sprays on opposite loops if possible. DO NOT initiate multiple loops of containment sprays simultaneously. ☐ Directs Drywell Sprays (should be initiated on opposite loop that Wetwell Sprays are on
		Comment:
	BOP	☐ Refers to SOP-RHR-SPRAY-DW-QC quick card: • 2.1.1: Verify RHR-P-2A(B) is running • 2.1.2: Verify RHR-V-42A(B) closed (LPCI injection valve) • 2.1.3: Open the following to spray the Drywell: ▪ RHR-V-17A(B) (Drywell Spray Inboard Isolation) ▪ RHR-V-16A(B) (Drywell Spray Outboard Isolation) • 2.1.4: Before Drywell pressure drops below 0.0 psig, or when directed by the CRS, then close the following: ▪ RHR-V-16A(B) ▪ RHR-V-17A(B)
		Comment:
	CRS	☐ Directs Drywell Sprays be secured before Drywell pressure drops to zero psig
		Comment:
	BOP/ATC	☐ Reports Main Steam Tunnel temperature alarms ☐ When MSIVs close: Updates crew that MSIVs are closed and pressure control is with SRVs at 800 to 1050 psig (or current pressure band)
		Comment:
	CRS	☐ May direct RPV pressure reduction to a band of 500 to 600 psig (but not expected in order to conserve inventory)
		Comment:

EVENT No. 7 (CONTINUED)		
	BOP	☐ Lowers RPV pressure if directed using SOP-DEH-QC (Main Turbine DEH Operations Quick Card): • 2.1.1a: Selects PRESSURE TARGET • 2.1.1b: Enters desired pressure • 2.1.1c: Selects OK • 2.1.1.d: If change in pressure rate is desired: ▪ 1: Selects PRESSURE RATE ▪ 2: Enters desired PRESSURE RATE ▪ 3: Selects OK • 2.1.1.e: Selects GO • 2.1.1.f: Selects YES • 2.1.1.g: Verifies pressure demand and throttle pressure change at the pressure rate.
		Comment:

EVENT No. 8		
Description: RFW-FIC-620 controller failure with RFW-V-109 failing to open and RFW-V-112A & B failing to open once closed Event is activated at the beginning of the scenario and is realized when ability to feed reactor with feedwater system has been lost.		
Time	**Position**	**Applicants Actions or Behavior**
__Examiner Note__: Following steps are from SOP-RFW-FCV-QC (Transfer RPV Level Control to RFW-FCV-10A/10B - Quick Card).		
__Examiner Note__: If the ATC operator fails to close __either__ RFW-V-112A __or__ RFW-V-112B below (i.e. one or both valves remain open) then direct insertion of __Trigger 11__ to cause a trip of all running Condensate Booster pumps to ensure a total loss of feedwater injection occurs which is needed to support Critical Tasks.		
	ATC	☐ 2.1.1: (2-handed operation) Starts closing RFW-V-112A and RFW-V-112B
		Comment:
		☐ 2.1.2: Starts opening RFW-V-118
		Comment:
		☐ 2.1.3: Verifies RFW-V-109 is closed
		Comment:
		☐ 2.1.4: (2-handed operation) Verifies RFW-V-117A and RFW-V-117B open
		Comment:
		☐ 2.1.5: Verifies RFW-LIC-620 is in Manual (V selected for Valve position demand with 0 output)
		Comment:
		☐ 2.1.6: IF Reactor Feed Pump(s) (RFP) are operating, then performs the following: • 2.1.6.a: Verifies RFPs have ramped down in speed • 2.1.6.b: Places RFW-P-1B in MDEM mode • 2.1.6.c: Places RFW-P-1B in MDEM mode • 2.1.6.d: Controls turbine speed as required • 2.1.6.e: If desired, then places RFW-FCV-2A(B) in Manual and slowly open to approximately 80%
		Comment:

EVENT No. 8 (CONTINUED)		
Examiner Note: RFW-HX-6A & B Discharge to Rx Discharge MOVs (RFW-V-112A & B) will fail to open (if attempted) after being closed below.		
	ATC	**CAUTION** Uncontrolled injection may occur if RPV pressure drops below 600 psig with RFW-V-112A and RFW-V-112B NOT FULLY CLOSED. ☐ 2.1.7: Verifies RFW-V-112A and RFW-V-112B are fully closed
		Comment:
		☐ 2.1.8: Verifies RFW-V-118 is fully open
		Comment:
		☐ 2.1.9: IF Reactor Feed Pump(s) (RFP) are operating, then adjusts the running RFP speed to establish ~ 200 psid across RFW-FCV-10A & 10B using either Feedwater touch screen (H13-P840)
		Comment:
Examiner Note: Controller failure will not allow step 2.1.10 below to be performed.		
	ATC	☐ 2.1.10: Adjusts RFW-LIC-620 manual output to control RPV level – Will be unsuccessful
		Comment:
Examiner Note: For step below RFW-V-109 fails to open and RFW-V-118 is already fully open.		
	ATC	☐ 2.1.12: If unable to control RPV level with RFW-FCV-10A/B, then considers throttling RFW-V-109 or RFW-V-118 to control RPV level
		Comment:
		☐ Reports to CRS existing faults with feedwater and the inability to feed
		Comment:

EVENT No. 9

Description: RCIC–FIC-600 fails low on startup requiring manual trip of RCIC turbine

Event is activated at the beginning of the scenario and is realized when RCIC system is started manually or automatically starts on low RPV level (-50 inches)

Time	Position	Applicants Actions or Behavior
Examiner Note: Indications of RCIC controller failure will be the same whether RCIC is started manually below or RCIC started automatically on low RPV level (- 50 inches)		
	CRS	☐ (If not already running) Directs manual start of RCIC for RPV level control
		Comment:
	BOP	☐ Refers to SOP-RCIC-INJECTION-QC quick card: • 2.1.1.a: Verifies the RCIC Manual Initiation Pushbutton in Armed • 2.1.1.b: Depresses and hold the RCIC Manual Initiation pushbutton • 2.1.1.c: When all applicable RCIC valves have repositioned, then releases the RCIC Manual Initiation pushbutton NOTE: When RCIC initiates the following occurs: • RCIC-V-45 (Steam to Turbine) opens. • RCIC-V-46 (Lube Oil Cooler Water Supply) opens. • RCIC-P-2 (Barometric Condsr Vacuum Pump) starts. • RCIC-V-13 (RPV Injection) opens. • RCIC-V-25 and RCIC-V-26 (Steam Line Warmup Drains to Main Condenser) close. • RCIC-V-4 and RCIC-V-5 (Cond Pump Discharge to EDR) close. • SW-P-1B starts (20 second time delay).
		Comment:
		☐ Recognizes RCIC turbine speed oscillating below minimum requirement of 2100 RPM (with no RPV injection flow) and that the RCIC controller (RCIC–FIC-600) output is zero
		Comment:
		☐ Shifts RCIC controller (RCIC–FIC-600) to Manual and presses the right OPEN pushbutton in an attempt to raise controller output (RCIC Turbine speed) – Will be unsuccessful ☐ Reports RCIC controller problem (and inability to inject with RCIC) to CRS
		Comment:

EVENT No. 9 (CONTINUED)		
	CRS	☐ May direct trip of RCIC turbine based on above report
		Comment:
Examiner Note: ATC may trip RCIC turbine based on direction from CRS or after recommending to CRS in which case RCIC ARPs may not be immediately addressed		
	ATC	☐ Acknowledges annunciator 603.A4 1-4 (RCIC TURBINE BEARING OIL PRESSURE LOW) and informs CRS
		Comment:
Examiner Note: Following steps are from ARP 4.603.A4 1-4 (RCIC TURBINE BEARING OIL PRESSURE LOW)		
Examiner Note: In first step below, it is expected that RCIC will still be tripped even if needed for inventory control since using RCIC for inventory control is not currently possible.		
	BOP	NOTE: RCIC-DT-1 RPM must be GE 2100 RPM to verify adequate lube oil pressure/flow (RCIC Turbine). ☐ 1: If not required for inventory control, then trip RCIC-DT-1 manually (RCIC Turbine)
		Comment:
		☐ 2: Verify RCIC-V-46 is closed
		Comment:
	CRS	☐ May inform Security of the unavailability of RCIC system
		Comment:
BOOTH ROLEPLAY – If sent to investigate status of RCIC system locally, wait until RCIC has been tripped, then report "RCIC is not running and nothing abnormal was found."		

<table>
<tr><td colspan="3">EVENT No. 10</td></tr>
<tr><td colspan="3">Description: Initiate Emergency Depressurization (ED) on low RPV level and restore RPV level to above TAF</td></tr>
<tr><th>Time</th><th>Position</th><th>Applicants Actions or Behavior</th></tr>
<tr><td></td><td>CRS</td><td>☐ Works down the level leg of PPM 5.1.1 (RPV Control) and recognizes that CRD and SLC are the only high pressure injection sources available</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ Directs second CRD pump be started to maximize RPV injection with CRD with a RPV level band of –50 inches to +54 inches</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td>ATC</td><td>☐ Direct field operator perform ABN-CRD-MAXFLOW to facilitate starting a second CRD pump</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td colspan="3">BOOTH ROLEPLAY – <u>If sent to perform field actions for ABN-CRD-MAXFLOW</u>, <u>insert Trigger 26</u> and wait 5 minutes, then report “Field actions for ABN-CRD-MAXFLOW are complete.”</td></tr>
<tr><td></td><td>ATC</td><td>☐ Completes MCR actions per ABN-CRD-MAXFLOW:
• 4.8.1: Place CRD-FC-600 in Manual
• 4.8.2: Start the second CRD pump to have both pumps in service
CAUTION
Do not exceed a maximum continuous amps (35 amps), on the CRD pumps.
• 4.8.3: Adjust CRD-FC-600 to throttle open CRD-FCV-2A(2B)
• 4.8.4: Throttle opens CRD-V-3 to maximize flow to the RPV</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ Gives RPV level reports as level continues to lower</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td>CRS</td><td>☐ Directs SLC initiation</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ Directs ADS be inhibited when ADS Timers initiate</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ Expands level band as RPV level drops</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
</table>

EVENT No. 10 (Continued)		
	CRS	☐ Directs BOP to verify containment isolations as RPV level lowers to -50 inches and again at -129 inches
		Comment:
	BOP	☐ Verifies the following containment isolation valves closed at -50 inches (as seen at the Isolation Control System panel or on GDS): • EDR-V-19 / EDR-V-20 • FDR-V-3 / FDR-V-4 • RHR-V-49 / RHR-V-40 • RHR-V-9 / RHR-V-8 • RWCU-V-1 / RWCU-V-4 • RRC-V-19 / RRC-V-20 • RHR-V-60A / RHR-V-75A • RHR-V-60B / RHR-V-75B • TIP isolation valves
	BOP	☐ Verifies the following ADDITIONAL containment isolation valves closed at -129 inches (as seen at the Isolation Control System panel or on GDS): • MS-V-22A / MS-V-28A • MS-V-22B / MS-V-28B • MS-V-22C / MS-V-28C • MS-V-22D / MS-V-28D • MS-V-67A • MS-V-67B • MS-V-67C • MS-V-67D • MS-V-16 • MS-V-19
		Comment:

EVENT No. 10		
	ATC	☐ Initiates SLC as directed - Refers to SOP-SLC-INJECTION-QC quick card: • 2.1: Removes the SLC keylock switch blanks and inserts both keys into the SLC system control switches • 2.2: Initiates SLC injection by performing the following (H13-P603): ▪ Places SLC System “A” control switch to the OPER position ▪ Places SLC System “B” control switch to the OPER position • 2.3: Records the following: ▪ SLC flowrate (~43 gpm for one pump or ~86 gpm for both) ▪ Initial tank level ▪ Circles RWCU-V-4 status (should be closed) • 2.4: Reports one of the following, or similar words, to the CRS as they hand the CRS the procedure: ▪ SLC is injecting normally ▪ SLC is partially injecting ▪ SLC failed to inject ☐ Reports initial tank level of 4800 gallons and that SLC flowrate is 86 gpm
		Comment:
	BOP/ATC	☐ When RPV level drops to -129 inches and the ADS Timers initiate, inhibits ADS
		Comment:
		☐ Reports ADS inhibited to CRS
		Comment:
		☐ Reports RPV level as it transitions from Wide Range to Fuel Zone
		Comment:
		☐ Reports RPV level at TAF and trending down
		Comment:
	CRS	☐ Determines that Emergency Depressurization (ED) is required when RPV level cannot be maintained > -161 inches
		Comment:

EVENT No. 10 (CONTINUED)		
CT #2 - Initiate Emergency Depressurization (ED) by opening seven (7) Safety Relief Valves (ADS preferred) after RPV water level reaches TAF (-161 inches) and within 10 minutes of level dropping below TAF.		
	CRS	☐ Updates crew and exits the pressure leg of PPM 5.1.1 (RPV Control) via override and enters PPM 5.1.3 (Emergency RPV Depressurization)
		Comment:
		☐ Determines that with high Drywell pressure signal sealed in, low pressure ECCS systems will be required to maintain Adequate Core Cooling (and therefore will not be stopped and prevented)
		Comment:
		☐ Determines Wetwell level is above 17 feet
		Comment:
		☐ Directs 7 SRVs be opened (ADS preferred) (ADS SRVs are those with the red stripe on left side of their nameplate)
		Comment:
	BOP	☐ Opens 7 SRVs (ADS preferred) as directed while verifying proper containment response as each is opened and reports completion to CRS
		Comment:
	CRS	☐ Directs Wetwell and Drywell sprays and Suppression Pool Cooling be secured to maximize RPV injection
		Comment:
	BOP	☐ When directed, refers to SOP-RHR-SPRAY-WW-QC quick card to secure Wetwell Sprays: • 2.1.4: Closes RHR-V-27A(B)
		Comment:
		☐ When directed, refers to SOP-RHR-SPRAY-DW-QC quick card to secure Drywell Sprays: • 2.1.4: ▪ Closes RHR-V-16A(B) ▪ Closes RHR-V-17A(B)
		Comment:

EVENT No. 10 (CONTINUED)		
	BOP	☐ When directed secures Suppression Pool Cooling (on RHR "B" loop) by closing RHR-V-24B
		Comment:
CT #3 - After ED, and within 10 minutes of RPV pressure lowering to 200 psig, restore and maintain RPV water level above TAF (-161 inches) using Low Pressure ECCS systems.		
	BOP	☐ Allows ECCS injection valves to automatically open at 470 psig
		Comment:
		☐ Reports RPV injection as it occurs, when level is rising, and again when level is restored above TAF (-161 inches)
		Comment:
	CRS	☐ When below TAF, maximizes RPV injection with all available systems (requiring securing of all Sprays and Suppression Pool Cooling)
		Comment:
		☐ When above TAF, provided enough injection available, directs re-initiation of Wetwell and Drywell sprays and Suppression Pool Cooling with RHR as appropriate (Wetwell Spray initiation if Wetwell pressure reaches 2 psig and Drywell Spray initiation if Wetwell pressure exceeds 12 psig)
		Comment:
	BOP/ATC	☐ Secures injection systems as directed to return RPV level to -50 inches to +54 inches band
		Comment:
	BOP	☐ Reinitiates Wetwell and Drywell Sprays as appropriate using quick cards
		Comment:
		☐ Refers to SOP-RHR-SPRAY-WW-QC quick card to initiate Wetwell Sprays: • 2.1.1: Verify RHR-P-2A(B) running • 2.1.2: Verify RHR-V-42A(B) closed (LPCI injection valve) • 2.1.3: Open RHR-V-27A(B) (Suppression Pool Spray valve) • 2.1.4: Before Wetwell Spray drops below 0.0 psig, or when directed by the CRS, then closes RHR-V-27A(B)
		Comment:

EVENT No. 10 (CONTINUED)		
	CRS	☐ Verifies Drywell parameters within DSIL
		Comment:
		☐ Verifies RHR-P-2A(B) not currently needed to ensure Adequate Core Cooling
		Comment:
		CAUTION Operate Drywell sprays and Wetwell sprays on opposite loops if possible. DO NOT initiate multiple loops of containment sprays simultaneously. ☐ Directs Drywell Sprays (should be initiated on opposite loop that Wetwell Sprays are on
		Comment:
	BOP	☐ Refers to SOP-RHR-SPRAY-DW-QC quick card: • 2.1.1: Verify RHR-P-2A(B) is running • 2.1.2: Verify RHR-V-42A(B) closed (LPCI injection valve) • 2.1.3: Open the following to spray the Drywell: ▪ RHR-V-17A(B) (Drywell Spray Inboard Isolation) ▪ RHR-V-16A(B) (Drywell Spray Outboard Isolation) • 2.1.4: Before Drywell pressure drops below 0.0 psig, or when directed by the CRS, then close the following: ▪ RHR-V-16A(B) ▪ RHR-V-17A(B)
		Comment:
	CRS	☐ Directs Drywell Sprays be secured before Drywell pressure drops to zero psig
		Comment:

TERMINATION CRITERIA: The scenario will be terminated when Drywell sprays have been initiated, an Emergency Depressurization has been performed and RPV level is being controlled in the prescribed band OR as directed by the Examination Team.

<u>POWER SUPPLY VERSUS CONTROL ROOM RPV LEVEL/PRESSURE INSTRUMENTS</u>

Power Supply	Instrument	Tech Specs
E-PP-7AA/1	MS-LI-612 (Indicator power)	N/A
	MS-LR-615 (Recorder)	3.3.3.1.F2b
	MS-PI-9	3.3.3.1.F1
	MS-LR/PR-623A (Recorder)	3.3.3.1.F2a 3.3.3.1.F1 3.3.1.1.F3 3.4.12
E-PP-7AA/2	MS-LR/PR-623A (transmitter)	
E-PP-7AA/4	MS-LR-615 (transmitter)	3.3.3.1.F2b
	RFW-LI-606A (+) RFW-LI-606B (+)	3.3.2.2
	RFW-PI-605 (+)	3.3.3.1.F1 3.3.1.1.F3 3.4.12
	MS-PR-609 (transmitter)	3.3.3.1.F1 3.3.1.1.F3 3.4.12
	RFW-LR-608 (Recorder)	N/A
E-PP-US/5/1	RFW-LI-606A (+) RFW-LI-606B (+)	3.3.2.2
	RFW-PI-605 (+)	3.3.3.1.F1 3.3.1.1.F3 3.4.12
E-PP-8AA/6	MS-LI-612 (transmitter)	N/A
	MS-LI-610	3.3.3.1.F2
E-PP-8AA/8	MS-LR/PR-623B (Transmitter and Recorder)	3.3.3.1.F2a 3.3.3.1.F1 3.3.1.1.F3 3.4.12

(+) Powered via a redundant power supply

Power Supply	Instrument	Function	Tech Specs
E-DP-S1/HPCS/D7	MS-LIS-100A	HPCS, level 8	3.3.5.1.F3c
	MS-LIS-100B		
	MS-LIS-31A	HPCS, level 2	3.3.5.1.F3a
	MS-LIS-31B		
	MS-LIS-31C		
	MS-LIS-31D		
E-PP-7AA/4 or E-PP-US/5/1	RFW-DPT-4A	Turbine trip, level 8	3.3.2.2
E-DISC-DPS11A/3	RFW-DPT-4C		

RFW-DPT-4A	RFW-LI-606A	NR 'A' level	H13-P603	FWLC, RFP/MT L8 TRIP, RRC L4 / L3	PP-7AA & PP-US/5	3.3.2.2 FW/MT L8 TRIP	P004, RB 522 NW
	RFW-LR-608	NR 'A' level	H13-P603			N/A	
RFW-DPT-4B	RFW-LI-606B	NR 'B' level	H13-P603	FWLC, RFP/MT L8 TRIP, RRC L4 / L3	DP-S1-2A	3.3.2.2 FW/MT L8 TRIP	P027, RB 522 SW
	RFW-LR-608	NR 'B' level	H13-P603			N/A	
RFW-DPT-4C	RFW-LI-606C	NR 'C' level	H13-P603	FWLC, RFP/MT L8 TRIP, RRC L4 / L3	DP-S1-1A	3.3.2.2 FW/MT L8 TRIP	P005, RB 522 SE
	RFW-LI-606D	NR 'C' level	H13-P602			N/A	
MS-DPT-32	MS-DPR/FR-613	Core dP/Total Flow	H13-P603	None	PP-8AZ	3.4.2 Jet Pumps	P009, RB 471 NW
MS-PT-5	MS-PI-605	RPV Press	H13-P603	None	PP-7AA	N/A	P004, RB522 NW
MS-LT-26C	MS-LI-604	WR Level	H13-P603	None	PP-8AZ	N/A	P005, RB 522 SE
RFW-DPT-17	RFW-LR-608	UR Level	H13-P603	None	PP-7AA	N/A	P027, RB 522 SW
MS-PT-808	MS-PR/FR-609	RPV Press	H13-P603	None	PP-7AA/US/5	N/A	P004, RB 522 NW
MS-PT-7	MS-PR/FR-609	Turbine Steam Flow	H13-P603	None	PP-7AA/US/5	N/A	IR-10, TB 471 E
RFW-DPT-803A	RFW-FI-603A	MSL FLOW A	H13-P603	None	PP-7AA/US/5	N/A	P015, RB 501 NW
RFW-DPT-803B	RFW-FI-603B	MSL FLOW B	H13-P603	None	PP-7AA/US/5	N/A	P015, RB 501 NW
RFW-DPT-803C	RFW-FI-603C	MSL FLOW C	H13-P603	None	PP-7AA/US/5	N/A	P025, RB 501 SE
RFW-DPT-803D	RFW-FI-603D	MSL FLOW D	H13-P603	None	PP-7AA/US/5	N/A	P025, RB 501 SE
MS-LIS-24A	None	NR Level	None	RPS L3, NS4 Gp 5&6	RPS-PP-C72	3.3.1.1 RPS 3.3.6.1 PC ISOL	P004, RB 522 NW
MS-LIS-24B	None	NR Level	None	RPS L3, NS4 Gp 5&6, RCIC L8	RPS-PP-C72	3.3.1.1 RPS 3.3.5.2 RCIC INST 3.3.6.1 PC ISOL	P026, RB 522 NE

SRV FUSE LIST

SRV	SOLENOID	FUSE	PANEL
MS-RV-1A	C	BB-F35 BB-F36	H13-P628
MS-RV-1B	C	BB-F27 BB-F28	H13-P628
MS-RV-1C	C	BB-F17 BB-F18	H13-P628
MS-RV-1D	C	BB-F37 BB-F38	H13-P628
MS-RV-2A	C	BB-F19 BB-F20	H13-P628
MS-RV-2B	C	BB-F29 BB-F30	H13-P628
MS-RV-2C	C	BB-F25 BB-F26	H13-P628
MS-RV-2D	C	BB-F23 BB-F24	H13-P628
MS-RV-3A	C	BB-F21 BB-F22	H13-P628
MS-RV-3B	C	BB-F33 BB-F34	H13-P628
MS-RV-3C	C	BB-F31 BB-F32	H13-P628
MS-RV-3D	A	BB-F15 BB-F16	H13-P628
	C	BB-F53 BB-F54	H13-P628
	B	AA-F15 AA-F16	H13-P631
	A	EE-F01 EE-F02	E-CP-ARS*
MS-RV-4A	A	BB-F11 BB-F12	H13-P628
	B	AA-F11 AA-F12	H13-P631
	C	BB-F49 BB-F50	H13-P628
	B	CC-F29 CC-F30	C61-P001

TURNOVER

Initial Conditions:

- Columbia is operating at 100% power
- RCIC Operability Test surveillance was just completed to satisfy Post Maintenance Testing (PMT) requirements and has been returned to a Standby status and declared operable
- RHR-SYS-B was placed in Suppression Pool Cooling three (3) hours ago to restore Suppression Pool temperature following the testing and to satisfy RHR-P-2B PMT requirements (see marked up procedure)
- LCO 3.5.1 A.1, LCO 3.6.1.5 A.1, LCO 3.6.2.3 A.1, and RFO 1.6.1.5 A.1 have been entered for RHR-SYS-B being inoperable

Shift Turnover:

- Maintain RHR-P-2B in operation for the next three (3) hours to satisfy pump PMT requirements

ENERGY NORTHWEST

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	COLUMBIA GENERATING STATION SIMULATOR EXAMINATION
LESSON TITLE	Lower RRC Flow to 90% using Flow (enter GV Sequential Mode); CRD-FC-600 Fails High; LPCS-P-2 Trips (TS); MS-PS-23D Fails causing Half Scram (2 Rods Scram but 1 does not Fully Insert – Can Manually Insert)(TS); FPC-P-1B Trip (FPC-P-1A Fails to Auto Start); Trip of E-CB-1/7 with Scram (ATWS) occurring on Auto-Shift to TR-B; Hydraulic ATWS (Lower Level to -140" to -80"); Reduced SLC Injection Flow; RWCU-V-4 Fails to Auto Close; Scram-Reset-Scram not Effective in Inserting Rods (Manual Insertion Permitted)

LENGTH OF LESSON 1.5 Hours

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code	LO001857	Rev. No.	0
JPM PQD Code		Rev. No.	
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave E. Crawford	DATE	12/22/16
REVISED BY		DATE	
VALIDATED BY		DATE	

TECHNICAL REVIEW		DATE	
INSTRUCTIONAL REVIEW		DATE	
APPROVED		DATE	

Operations Training Manager

Facility: Columbia Generating Station	Scenario No.: 2	Op Test No.: 1	
Examiners: ______ ______ ______		Operators: ______ ______ ______	

Initial Conditions:	Columbia is operating at 100% power. Control Rod Drive (CRD) Pump 1B (CRD-P-1B) is out of service for extended Maintenance. CRD-P-1A is Protected.
Turnover:	Lower reactor power to 90% using Reactor Recirculation flow per PPM 3.2.6 (Power Maneuvering) after assuming the shift based on BPA Load Following request. Steps 5.1.1 thru 5.1.6 of PPM 3.2.6 are complete. Proper margin to Pre-Conditioned Status (PCS) exists per PPM 9.3.18. The Reactivity brief has been performed.

Critical Tasks:

CT-1	During ATWS with power > 5%, terminate and prevent injection with exception of SLC, RCIC, and CRD, into the RPV until RPV level is -65 inches to establish a Lowered Level (LL).
CT-2	Maintain RPV level above -186 inches. Short excursions below -186 inches does not constitute failure of CT provided level restored and maintained above -186 inches within 10 minutes of going below -186 inches.

Event No.	Malf.	Event Type*	Event Description
1	N/A	R (ATC) N (BOP)	Lower reactor power with Reactor Recirculation (RRC) flow to 90% for load following per PPM 3.2.6 (which includes placing Main Turbine into Governor Valve Sequential Valve Mode)
2	TRG-2	I (ATC)	CRD Drive Header Flow Control Valve controller (CRD-FC-600) output fails high while in automatic
3	TRG-3	C (BOP,SRO) TS (SRO)	RHR-SYS-A/LPCS Keep Fill Pump (LPCS-P-2) trips (Tech Spec)
4	TRG-4	C (ATC,SRO) TS (SRO)	Failure of MS-PS-23D which causes a half scram on RPS “B” side. Two control rods scram but one does not go full in (must be manually inserted) (Tech Spec)
5	TRG-5	C (BOP)	Ground causes FPC-P-1B to spuriously trip (FPC-P-1A fails to auto start)
6	TRG-6	M (ALL)**	Trip of E-CB-1/7 with transfer of SM-7 to Backup Transformer resulting in reactor trip signal Hydraulic ATWS - Lower RPV Level -80 inches to -140 inches **(CT #1) (CT #2)**
7	N/A	N/A	SLC-P-1A shaft shears when pump starts and SLC-P-1B develops a discharge flow blockage which limits SLC injection flow.
8	N/A	C (ATC)	RWCU-V-4 does not auto close on SLC initiation but can be closed manually.
9	N/A	C (BOP)	Scram/Reset/Scram not effective in inserting control rods - Control rods can be manually driven in

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications

**** Event forms a portion of significant CGS PSA Accident Sequence (TTC044) (Ref: PSA-1-SM-0001 (Rev 7))**

Target Quantitative Attributes	Actual	Description
Malfunctions after EOP entry (1-2)	**3**	Reduced SLC injection capability; RWCU-V-4 fails to auto close; Scram-reset-scram ineffective
Abnormal events (2-4)	**4**	CRD-FC-600 failure; LPCS-P-2 shaft seizure; RPS "B" half scram (2 control rods inadvertently scram); FPC-P-1B trip
Major transients (1-2)	**1**	E-CB-1/7 breaker trip leading to hydraulic ATWS
EOPs entered/requiring substantive actions (1-2)	**1**	PPM 5.1.1 (RPV Control)
EOP contingencies requiring substantive actions (0-2)	**1**	PPM 5.1.2 (RPV Control – ATWS)
EOP based Critical tasks (2-3)	**2**	See Critical Task Determination table

Trigger (TRG-x)	Evaluator Directed	How Triggered	Purpose	Malfunction Numbers
TRG-2	YES	Manually	Event Initiator	CNH-CRD001E; BST-CRD001F
TRG-3	YES	Manually	Event Initiator	PMP-CSS004S
TRG-4	YES	Manually	Event Initiator	BST-RRS067F; MAL-RMC007-3835; MAL-RMC007-1815; MAL-RMC005-1815
TRG-5	YES	Manually	Event Initiator	MOT-FPC002G
TRG-6	YES	Manually	Event Initiator	BKR-EPS003; MAL-CRD007A1; MAL-CRD007A2; MAL-CRD007B1; MAL-CRD007B2
TRG-7		Manually	Field Action	BKR-RHR001
TRG-8		Manually	Field Action	BKR-CSS002
TRG-9		Automatically	Malf Trigger	BST-CRD001F
TRG-10		Automatically	Malf Trigger	MAL-RMC007-1815; MAL-RMC005-1815
			Initial Condition	BST-FPC020F
			Initial Condition	PMP-SLC001B
			Initial Condition	BKR-CRD002
			Initial Condition	PMP-SLC002F
			Initial Condition	MOV-RWU010F

Event 1

The Scenario starts from 100% power with Control Rod Drive (CRD) Pump 1B (CRD-P-1B) out of service for extended maintenance. Once the crew has the shift, the ATC operator lowers reactor power (for load following) using Reactor Recirculation (RRC) flow to 90% per PPM 3.2.6 (Power Maneuvering). The BOP operator takes the Main Turbine out of Governor Valve Optimization mode per SOP-MT-GV/OPTIMIZATION (Section 5.2) prior to the RRC flow reduction.

Event 2

(TRG-2) CRD Drive Header Flow Control Valve controller (CRD-FC-600) output fails high while in automatic which causes 603.A7 5-8 (CRD PUMP SUCTION FLTR D HIGH) annunciator to come in caused by abnormally high system flow. Upon finding the CRD-FC-600 controller output failed high, the ATC operator informs the CRS and shifts the controller to manual and restores CRD system parameters to normal. Annunciator will clear once system parameters restored to normal.

Event 3

(TRG-3) The shaft on RHR-SYS-A/LPCS Keep Fill Pump (LPCS-P-2) seizes causing a trip of the pump. The RHR A PUMP DISCH PRESS HIGH/LOW annunciator alarms shortly after LPCS-P-2 trips. The LPCS PUMP DISCH PRESS HIGH/LOW annunciator will alarm ~13 minutes after LPCS-P-2 trips (unless LPCS pump started before then). Based on system status and ARP direction, the CRS will direct the BOP operator to start the Low Pressure Core Spray (LPCS) Pump (and place into Suppression Pool Mixing per SOP-LPCS-SP) to maintain system availability provided the LPCS PUMP DISCH PRESS HIGH/LOW annunciator is not in alarm. To prevent an inadvertent start of Residual Heat Removal (RHR) Pump 2A (RHR-P-2A) and therefore a potential for water hammer, the CRS will direct control power fuses removed (TRG-7) from the RHR-P-2A starting circuit. If LPCS pump is not started and the LPCS PUMP DISCH PRESS HIGH/LOW annunciator is received, LPCS Pump control power fuses will also be removed (TRG-8). The CRS will refer to ABN-RHR-DEPRESS as time permits to determine system recovery actions.

With RHR-P-2A and LPCS inoperable, the CRS refers to Technical Specifications and Licensee Controlled Specifications and determines the following actions are applicable:

- LCO 3.5.1 A.1 (RHR-SYS-A & LPCS are both tracked as inoperable) - Restore respective subsystem to operable status within 7 days
- LCO 3.5.1 C.1 - Restore either RHR-SYS-A or LPCS subsystem to operable status within 72 hours
- LCO 3.6.1.5 A.1 - Restore RHR-SYS-A Drywell Spray subsystem to operable status within 7 days
- LCO 3.6.2.3 A.1 - Restore RHR-SYS-A Suppression Pool Cooling subsystem to operable status within 7 days
- LCO 3.3.3.2 A.1 – Restore required Function (9.d – RHR-SYS-A Loop Pump) to operable status within 30 days
- RFO 1.6.1.5 A.1 - Restore RHR-SYS-A Suppression Pool Spray subsystem to operable status within 7 days

Note that LCOs 3.4.6, 3.4.9, and 3.6.1.3 are considered but not applicable with the plant in Mode 1.

Event 4

(TRG-4) Main Steam pressure switch 23D (MS-PS-23D) fails high causing Reactor Protection System (RPS) relay K5D (RPS-RLY-K5D) to actuate a RPV Pressure High Trip Scram relay (as evidenced by annunciator 603.A8 2-2 (RPV PRESS HIGH TRIP)). This actuation causes a half scram on the RPS "B" side with all RPS "B" white RPS scram lights de-energized. The ATC operator will determine that two control rods (38-35 and 18-15) inadvertently scrammed during the half scram and that control rod 18-15 only partially inserted. The CRS enters ABN-ROD, section 4.2, for inadvertently scrammed rods. The ATC operator reduces RRC flow to 74 Mlbm/hr at 5% per minute. Following flow reduction, an attempt is made to fully insert control rod 18-15 using the CONTINUOUS INSERT pushbutton (which will be successful). The crew diagnoses the instrument failure and determines the half scram cannot be reset.

The CRS refers to Technical Specifications and determines that TS 3.3.1.1 (RPS Instrumentation) Action A.1 or A.2 requires affected channel or affected trip system, respectively, to be placed in TRIP within 12 hours. In addition, control rod 18-15 is considered inoperable for not fully inserting when inadvertently scrammed. LCO

3.1.3 (Control Rod Operability) Action C.1 requires rod 18-15 to be fully inserted within 3 hours and its associated CRD (HCU) disarmed within four hours.

Event 5

(TRG-5) Bus 81 ground as sensed on MC-8BB which powers Fuel Pool Cooling Pump 1B (FPC-P-1B) causes FPC-P-1B to trip when power fuses blow. With this power loss, the standby Fuel Pooling Cooling pump (FPC-P-1A) will not auto start. ARP 4.627.FPC2.3-1 (CIRCULATION PUMP B DISCHARGE PRESSURE LOW) directs entry into ABN-FPC-LOSS. The BOP operator will manually start FPC-P-1A to re-establish fuel pool cooling. Resetting the Bus 81 ground annunciator (TRG-9) will be successful, if attempted, since ground cleared upon the FPC-P-1B power fuses blowing. Since the status of the FPC-P-1B thermal overloads are unknown at this point the BOP operator may place the FPC-P-1B control switch in the IR-69 position to allow reset of associated overloads.

Event 6

(TRG-6) Trip of CB-1/7 (4160V feed from SM-1 to SM-7) results in an automatic transfer of Division 1 AC safety bus (SM-7) to the Backup Transformer (TR-B). The transient results in a trip of the LPCS Pump (previously started) and a loss of RPS Motor Generator "A" power to RPS "A". With a RPS "B" half scram signal already present, a full scram signal now exists. The ATC operator recognizes a scram should have occurred and that an ATWS condition exists. The ATC operator takes scram actions including pressing all Manual scram pushbuttons and initiating ARI logic. Both trains of SLC are started due to reactor power being > 5%.

The CRS enters PPM 5.1.1 (RPV Control) and transitions into PPM 5.1.2 (RPV Control – ATWS) and directs the BOP operator to inhibit ADS and to take manual control of HPCS. The CRS addresses the level leg first and directs the BOP operator to perform PPM 5.5.6 (Bypassing MSIV Low RPV Level and High Steam Tunnel Temperature interlocks) to allow MSIVs to stay open on subsequent RPV level reduction. PPM 5.5.1 (Overriding ECCS Valve Logic To Allow Throttling ECCS Injection) is also performed. The CRS then directs stopping and preventing all injection into the RPV except for SLC, CRD and RCIC. When level reaches -65 inches, the ATC operator will restart injection into the RPV through the RFW Startup flow control valve to maintain a RPV Level band of -80 to -140 inches. **(CT #1) (CT #2)** The CRS directs an RPV pressure band of 800 to 1050 psig with the Digital Electro-Hydraulic (DEH) system in automatic. If reactor power is above 25%, the capacity of the RFW Start-up flow line will be exceeded and the ATC operator will have to augment flow by opening RFW-V-109 (Bypass valve for Feedwater Heaters 6A and 6B). The BOP operator performs PPM 5.5.11 (Alternate Control Rod Insertions) in an attempt to insert control rods.

This event forms a portion of significant CGS PSA Accident Sequence (TTC044) (Ref: PSA-1-SM-0001 (Rev 7))

Event 7

Standby Liquid Control (SLC) Pump 1A fails due to a sheared shaft and SLC Pump 1B discharge is partially blocked resulting in a reduced SLC injection flow in the RPV at approximately 24 gpm. This injection rate will cause reactor power to drop slowly but not prior to the crew lowering RPV level to -80 to -140 inches. Reactor Water Cleanup Valve 4 (RWCU-V-4) does not auto close on the SLC initiation but will be closed manually.

Event 8

Reactor Water Cleanup Valve 4 (RWCU-V-4) does not auto close on the SLC initiation but will be closed manually.

Event 9

Control rods insertion will be attempted per PPM 5.5.11 (Alternate Control Rod Insertions). Since hydraulic ATWS occurred (no white RPS scram lights lit), the BOP operator will remove two (2) ARI fuses and bypass (via switch) the Scram Discharge Volume (SDV) High Level trip. CRD-P-1A will be found tripped and will have to be restarted before a re-scram is attempted. The Scram – Reset – Scram method of control rod insertion is not effective requiring the BOP operator to bypass the Rod Worth Minimizer (RWM) and manually insert control rods individually using CRD drive pressure.

TERMINATION CRITERIA: The scenario will be terminated when RPV level is being maintained between -80 inches to -140 inches, one attempt at scram-reset-scram has been completed, and manual insertion of control rods has commenced OR as directed by the Examination Team.

Critical Task Determination Table

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
CT #1 - During ATWS with power > 5%, terminate and prevent injection with exception of SLC, RCIC, and CRD, into the RPV until RPV level is -65 inches to establish a Lowered Level (LL).	This is a procedural requirement of PPM 5.1.2 (RPV Control – ATWS). Allowing SLC, RCIC and CRD injection avoids conflicts with other instructions in the EOPs such as injecting SLC and inserting control rods. Stopping other injection sources prevents potential fuel damage due to cold water injection. (Ref: PPM 5.0.10 Rev 21, section 8.3.4.)	Procedural direction by PPM 5.1.2 Step L-6 directs lowering RPV level to < -65 inches by stopping and preventing all injection into RPV except from boron injections systems, RCIC and CRD, defeating interlocks if necessary.	Crew stops and prevents injection with the exception of SLC, RCIC, and CRD.	RPV level and reactor power start lowering.
CT #2 - Maintain RPV level above -186 inches. Short excursions below -186 inches does not constitute failure of CT provided level restored and maintained above -186 inches within 10 minutes of going below -186 inches.	Prevent unnecessary significant challenge to containment or the RPV.	Procedural direction by PPM 5.1.2 Step L-12 directs maintaining RPV level from -140 inches to -80 inches (best practice band) with outside shroud injection systems (Table 5). OI-15 (EOP and EAL Clarifications), Section 4.3.2.b.)	Crew uses Reactor Feedwater system to maintain RPV level above -186 inches. (ED required if level cannot be restored and maintained above -186 inches)	RPV level indication.

SIMULATOR SETUP

☐ Unload simulator (between each scenario)

☐ Verify in ILC load

☐ Reload simulator

☐ Reset to IC-201 (reset, go to Run, reset again)

☐ Load Scenario 2 Schedule file

☐ Load Scenario 2 Event file (if not loaded automatically)

☐ Validate that there are no unexpected annunciators or parameters out of band

☐ Place tagout on CRD-P-1B

☐ Protect CRD-P-1A

☐ Verify pump running magnets

☐ Have marked up copy of PPM 3.2.6 marked up through steps 5.1.6 (ensure N/Ad steps are initialed) for the crew at their pre-brief location (outside the simulator)

SCHEDULE FILE


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EVENT FILE


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<!-- This file contains a Thunder Simulations Event -->

<EVENT>

<TRIGGER id="9" description="Clear CRD suction filter alarm">X03D121A &lt.9 &amp X03I121E &lt 1</TRIGGER>
<TRIGGER id="10" description="Rod 18-15 unstuck">XSRLA04L &gt 0</TRIGGER>

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EVENT No. 1

Description: Lower reactor power with Reactor Recirculation (RRC) flow to 90% for load following per PPM 3.2.6 (which includes placing Main Turbine into Governor Valve Sequential Valve Mode).

Event is initiated by the turnover and starts with PPM 3.2.6 step 5.1.7.

Time	Position	Applicants Actions or Behavior
Examiner Note: Following steps are from PPM 3.2.6 (Power Maneuvering) which was previously completed (marked up) through step 5.1.6.		
	CRS	NOTE: The CRS or Shift Manager may authorize steps to be N/A'd to take into account current plant configuration or conditions, or target power level. ☐ 5.1.7 Records date and time downpower initiated.
		Comment:
		☐ 5.1.8 Directs BOP to enter Sequential Valve Operation per SOP-MT-GV/OPTIMIZATION (Section 5.2).
		Comment:
Examiner Note: Following steps are from SOP-MT-GV/OPTIMIZATION (Section 5.2)		
	BOP	Performs the following to enter Sequential Valve Operation: 5.2.1 If VPL DEMAND is not at 100%, then set VPL DEMAND to 100% as follows (Menu, Main Display): ☐ SELECT VPL TARGET. ☐ ENTER 100%. ☐ SELECT OK. ☐ SELECT GO. ☐ SELECT YES. ☐ VERIFY GO illuminated. ☐ VERIFY VPL DEMAND ramps to VPL TARGET value.
		Comment:

EVENT No. 1 (CONTINUED)		
	BOP	5.2.2 Completes entry into Sequential Valve Mode as follows: ☐ SELECT SEQUENTIAL VALVE MODE. ☐ SELECT YES. ☐ VERIFY GV-1 and GV-4 move to their pre-optimization positions (approximately equal). ☐ VERIFY SEQUENTIAL VALVE MODE is illuminated.
		Comment:
Examiner Note: Following steps are a continuation of PPM 3.2.6 (Power Maneuvering).		
	CRS	☐ 5.1.10 Assigns an individual to track thermal power changes.
		Comment:
Examiner Note: Crew will track change in power as scenario progresses.		
	CRS	☐ 5.1.11 & 5.1.12 If thermal power changes GT 15% in one hour, then notify Chemistry to evaluate the Offgas release rate.
		Comment:
Examiner Note: Main Generator output will not be reduced to 1000 MWe as specified in step 5.1.15 since reactor power reduction is only to 90%.		
	CRS	☐ 5.1.15 Directs ATC to lower power with flow to achieve 90% reactor power at a rate not to exceed 1% per minute.
		Comment:

EVENT No. 1 (CONTINUED)		
Examiner Note: Following steps are from Quick Card SOP-RRC-FLOW-QC.		
Examiner Note: The BOP is expected to act as peer checker for this evolution.		
	ATC	Lowers reactor power using RRC Flow per SOP-RRC-FLOW-QC (Section 2.1): NOTE: Per PPM 1.3.84, the performer verifies and verbalizes to the peer checker the following information: • Whether the controllers are in Auto or Manual • Which controller will be used (Master or Individual) • The direction of the intended change • The current parameter (Hz, % Rx Power, Core Flow, MWe, Loop Flow, etc.) • The target parameter (Hz, % Rx Power, Core Flow, MWe, Loop Flow, etc.) • The button the performer intends to use to change RRC pump frequency
Examiner Note: Sufficient margin to fuel-preconditioning limits exist as specified in turnover.		
	ATC	☐ 2.1.1 Informs CRS to monitor fuel-preconditioning limits (per 9.3.18) while changing reactor power.
		Comment:
		☐ 2.1.2 Verifies both RRC individual flow controllers are in Auto and then lowers RRC flow using RRC-M/A-R675 (Master Control) Lower pushbutton, as necessary, to achieve a ≤ 1% per minute power change until 90% power is achieved.
		Comment:
		☐ 2.1.3 Verifies total core flow is LT 105%.
		Comment:
		☐ 2.1.4 Verifies RRC loop A and B is LT 57.5 Mlb/hr.
		Comment:
		☐ 2.1.5 Notifies the CRS when the change in Reactor power is complete.
		Comment:

Event No. 2

Description: CRD Drive Header Valve controller (CRD-FC-600) output fails high while in automatic.

Event is initiated after CRS gets the report that the power reduction is complete (or as directed by the Exam team) and is activated using **TRIGGER 2**.

BOOTH OPERATOR – As briefed or when directed activate TRIGGER 2

Time	Position	Applicants Actions or Behavior
	ATC	Responds to 'CRD PUMP SUCTION FLTR ΔP HIGH' alarm (P603.A7 5-8).
		Comment:
		☐ Observes CRD Cooling Header flow at ~70 gpm and Drive Header/Reactor D/P at ~350 psid and informs the CRS before referring to ARP.
		Comment:
Examiner Note: Steps below to take manual control are authorized per PPM 1.3.1 (Operating Policies, Programs and Practices) step 4.6.4.		
Examiner Note: Steps below may be performed without a procedure as permitted by OI-9 (Operations Standards and Expectations) section 16.3.1.		
	ATC	☐ Observes Flow Control Valve (CRD-V-2B) full open.
		Comment:
		☐ Observes CRD Flow Controller (CRD-FC-600) red arrow upscale and the signal is near 100% and informs the CRS.
		Comment:
		☐ Places CRD-FC-600 controller in manual.
		Comment:
		☐ Depresses the close pushbutton to restore CRD Cooling Header flow to ~62 GPM and Drive Header D/P to ~265 psid.
		Comment:
		☐ Observes CRD-V-2B dual indication and the red arrow on CRD-FC-600 returning to the 'green band'.
		Comment:

Event No. 2 (CONTINUED)		
Examiner Note: Following step is from ARP P603.A7 5-8 (CRD Pump Suction Filter D/P HIGH). Only step 1 applies since controller failure is causing the alarm due to excessive flow.		
Examiner Note: BOP may perform below step while ATC performs manipulations.		
	BOP	☐ 1: Checks CRD-dPIS-15 (CRD Pump Suction Filter Differential Pressure) (CRD-IR-1A).
		Comment:
BOOTH ROLEPLAY – If sent to check suction filter D/P, wait 1 minute then report D/P at 9 psid (if suction filter annunciator locked in) or 5 psid (if suction filter annunciator cleared).		
BOOTH ROLEPLAY – If sent to investigate, wait 5 minutes then report "Nothing abnormal found with CRD system".		
	CRS	☐ Contacts Work Control for assistance in troubleshooting controller failure.
		Comment:

Event No. 3

Description: RHR-SYS-A/LPCS Keep Fill Pump (LPCS-P-2) trip (Tech Spec)

Event is initiated after CRS gets the report that CRD parameters have been returned to normal (or as directed by the Exam team) and is activated using **TRIGGER 3**.

BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 3</u>

Time	Position	Applicants Actions or Behavior
<u>Examiner Note</u>: RHR 'A' discharge low pressure alarm comes in shortly after LPCS-P-2 (Keep Fill) pump shaft seizes. Pump continues to run for several seconds before tripping on over current.		
	BOP	Responds to 'RHR A PUMP DISCH PRESS HIGH/LOW' alarm (P601.A4 3-1).
		Comment:
		☐ Observes RHR Loop 'A' discharge pressure at ~20 psig (Low) and informs the CRS before referring to ARP.
		Comment:
<u>Examiner Note</u>: Below alarms/indications come in when the keep fill pump breaker trips open.		
<u>Examiner Note</u>: Below Out Of Service alarms along with the illuminated BYPASS AND INOPERABLE STATUS PANEL (BISI) for LPCS-P-2 Power Loss/OL is used to determine the required ARP actions. RHR 'A' and LPCS BISIs both light (and require the same ARP actions) since they have the Keep Fill pump in common. Either ARP may be used.		
	BOP	Several seconds later responds to the 'RHR A OUT OF SERVICE' and 'LPCS OUT OF SERVICE' alarms (P601.A4 6-1 & P601.A3 6-3, respectively) and associated BISIs caused by LPCS-P-2 (keep fill pump) power loss/overload.
		Comment:
		☐ Observes panel indication lost for LPCS-P-2 (power loss due to breaker trip) and informs CRS before referring to ARP.
		Comment:
<u>Examiner Note</u>: CRS may give priority to starting LPCS pump to maintain its availability before other ARP actions are performed. RHR 'A' pump should not be started.		
<u>Examiner Note</u>: LPCS low pressure alarm comes in ~13 min after keep fill pump shaft seizes. CRS has sufficient time to direct LPCS pump started before LPCS discharge low pressure alarm is received. If crew does not start the LPCS Pump then its control power fuses should be removed following receipt of the LPCS discharge low pressure alarm (P601.A3 5-3).		

BOOTH OPERATOR – If directed to remove control power fuses for <u>LPCS Pump</u>, wait 3 minutes then <u>ACTIVATE TRIGGER 7</u>. Report "LPCS Pump control power fuses have been removed."

BOOTH OPERATOR – If asked, pre-start checks for LPCS and RHR Pump "A" are complete.

Event No. 3 (CONTINUED)

<u>Examiner Note</u>: Following step is from ARP 4.601.A4 6-1 for RHR 'A' Out of Service (or ARP 4.601.A3 6-3 for LPCS Out of Service). Either will direct actions for LPCS-P-2 PWR LOSS/OL.

	BOP	☐ 1. Requests permission from CRS to start LPCS-P-1 per SOP-LPCS-SP (LPCS Suppression Pool Mixing) to maintain operability.
		Comment:

<u>Examiner Note</u>: Following steps (to start LPCS-P-1) are from SOP-LPCS-SP (LPCS Suppression Pool Mixing) section 5.1.

<u>Examiner Note</u>: It is expected the CRS will allow an auto start of Service Water Pump 'A'.

	BOP	☐ 5.1.2 Informs CRS to ENTER LPCS-SYS-1 as inoperable, but available, in the Plant Logging System.
		Comment:
		<u>CAUTION</u> To minimize cavitation and increased pump hydraulic loads/vibrations, minimize operating with LPCS-FCV-11 (Minimum Flow) as its only discharge path. {C-9448} <u>NOTE</u>: H13-P601.A3-5.1, ADS LPCS/RHR A PUMP RUNNING PERMISIVE alarm is an expected alarm when LPCS-P-1 starts. <u>NOTE</u>: SW-P-1A may be allowed to auto start following LPCS-P-1 start.
		☐ 5.1.3 Starts LPCS-P-1 (should make plant announcement before starting).
		Comment:
		☐ 5.1.4 Verifies LPCS-FCV-11 opens during low flow conditions (approximately 800 gpm) (Minimum Flow Bypass).
		Comment:
		☐ 5.1.5 Throttles open LPCS-V-12 for approximately 6400 gpm (Test Bypass to Suppression Pool).
		Comment:

Event No. 3 (CONTINUED)		
	BOP	☐ 5.1.6 Verifies LPCS-FCV-11 closes (approximately 800 gpm).
		Comment:
		☐ 5.1.7 Verifies SW-P-1A running.
		Comment:
		☐ 5.1.8 Notifies HP that radiological conditions may have changed.
		Comment:
		☐ 5.1.9 Monitors Suppression Pool temperatures.
		Comment:
<u>Examiner Note</u>: Following step is a continuation of ARP for RHR 'A' (or LPCS) Out of Service (loss of Keep Fill pump)		
	BOP	☐ 2. Refers to ARP 4.601.A4 3-1 (RHR A PUMP DISCH PRESS HIGH/LOW).
		Comment:
<u>Examiner Note</u>: Following steps are from ARP 4.601.A4 3-1 (RHR A PUMP DISCH PRESS HIGH/LOW.		
	BOP	☐ 1. Checks RHR Loop 'A' pressure at the following: • RHR-PI-612A (H13-P601) • RHR-PIS-22A (H22-P018, RB 501) • TDAS pt. X155
		Comment:
		☐ 4.a IF not operating RHR per the EOPs, then inhibits RHR-P-2A start by pulling its control power fuses.
		Comment:
BOOTH OPERATOR – If directed to report RHR Loop 'A' discharge pressure on instrument rack H22-P018 in RB 501, wait 2 minutes then report "Instrument rack H22-P018 pressure indicates ________ psig" (refer to soft panel and report to nearest 5 psig increment).		
BOOTH OPERATOR – If directed to remove control power fuses for <u>RHR Pump 'A'</u>, wait 3 minutes then ACTIVATE <u>TRIGGER 8</u>. Report "RHR Pump 2A control power fuses have been removed."		

Event No. 3 (CONTINUED)		
	BOP	☐ 4.b Checks operation of LPCS-P-2 (Water Leg Pump).
		Comment:
BOOTH ROLEPLAY – If sent to investigate status of LPCS-P-2 locally at the pump, wait 2 minutes then report "LPCS-P-2 is warm to the touch and not running."		
		☐ 4.c Verifies the following valves are closed: • RHR-V-16A (Upper Drywell Spray) • RHR-V-17A (Upper Drywell Spray) • RHR-V-24A (Test Line Isolation) • RHR-V-27A (Suppression Pool Spray) • RHR-V-42A (LPCI Isolation)
		Comment:
<u>Examiner Note</u>: CRS may refer to below procedure but no verifiable actions will be performed.		
	CRS	☐ 4.d Refers to ABN-RHR-DEPRESS (Starting RHR Loop A Following Depressurization) due to loss of the Keep Fill system.
		Comment:
<u>Examiner Note</u>: Of the Technical Specification referenced below in the ARP, only LCO 3.5.1, 3.6.1.5 and 3.6.2.3 apply. Other LCOs apply which are not listed in the ARP. See end of this event for all applicable CRS Technical Specification actions.		
	CRS	☐ 5. Refers CRS to Technical Specifications 3.4.6, 3.4.9, 3.5.1, 3.6.1.5, 3.6.2.3, and 3.6.1.3 and Licensee Controlled Specifications 1.3.4.6.
<u>Examiner Note</u>: Following step is a continuation of ARP for RHR 'A' (or LPCS) Out of Service (loss of Keep Fill pump)		
	BOP	☐ 3. Checks the status of the breaker, control power fuses, or thermal overloads for LPCS-P-2 at LPCS-42-7B6B.
		Comment:
BOOTH ROLEPLAY – If sent to investigate status of LPCS-P-2 at the breaker, wait 2 minutes then report "The breaker at LPCS-42-7B6B was found tripped. There is a mild acrid odor near the breaker." (NO FIRE)		
	BOP	☐ 4. Refers CRS to Technical Specifications 3.5.1, 3.4.9, 3.6.1.5 and 3.6.2.3.
		Comment:

Event No. 3 (CONTINUED)		
	CRS	Evaluates Technical Specifications and determines the following Required Actions apply:
		☐ LCO 3.5.1 A.1 (RHR-SYS-A & LPCS are both tracked as inoperable) - Restore respective subsystem to operable status within 7 days
		Comment:
		☐ LCO 3.5.1 C.1 - Restore either RHR-SYS-A or LPCS subsystem to operable status within 72 hours
		Comment:
		☐ LCO 3.6.1.5 A.1 - Restore RHR-SYS-A Drywell Spray subsystem to operable status within 7 days
		Comment:
		☐ LCO 3.6.2.3 A.1 - Restore RHR-SYS-A Suppression Pool Cooling subsystem to operable status within 7 days
		Comment:
		☐ LCO 3.3.3.2 A.1 – Restore required Function (9.d – RHR-SYS-A Loop Pump) to operable status within 30 days
		Comment:
		Evaluates Licensee Controlled Specifications (LCS) and determines the following Required Action applies:
		☐ RFO 1.6.1.5 A.1 - Restore RHR-SYS-A Suppression Pool Spray subsystem to operable status within 7 days
		Comment:
Examiner Note: LCOs 3.4.6, 3.4.9, and 3.6.1.3 are considered but not applicable.		
	CRS	☐ Direct postings for Protected Equipment to include RHR B, RHR C, HPCS, HPCS SW, DG2, DG3, and SW-B
		Comment:

Event No. 4

Description: Failure of MS-PS-23D which causes a half scram on RPS “B” side. Two control rods scram but one does not go full in (must be manually inserted) (Tech Spec)

Event is initiated after LPCS has been placed into Suppression Pool Mixing and the required Tech Spec Actions entered (or as directed by the Exam team) and is activated using **TRIGGER 4**.

BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 4</u>

Time	Position	Applicants Actions or Behavior
<u>Examiner Note</u>: The PRV High Pressure Trip causes the half scram on RPS ‘B’.		
	ATC	☐ Responds to ‘RPV PRESS HIGH TRIP’ (P603.A8 2-2) and ‘2 SCRAM SYSTEM B’ (P603.A8 3-4) alarms and informs CRS.
		Comment:
		☐ Validates that a half scram occurred on RPS ‘B’ (all white RPS ‘B’ scram lights de-energized) and informs the CRS.
		Comment:
<u>Examiner Note</u>: The Rod Accumulator Trouble results from the two rods which scrammed on the half scram.		
	ATC	☐ Responds to ‘ROD ACCUMULATOR TROUBLE’ (P603.A7 6-7) alarm.
		Comment:
		☐ Scans the full core display (or observes RWM screen) for drifting and/or scrammed control rods.
		Comment:
		☐ Recognizes two control rods have blue SCRAM lights lit and flashing ACCUM lights and informs the CRS.
		Comment:
		☐ Selects control rod 38-35 and observes it full in.
		Comment:
		☐ Selects control rod 18-15 and observes it partially inserted.
		Comment:
		☐ Acknowledges Rod Accumulator Trouble alarm from P603 to allow any subsequent Rod Accumulator Trouble inputs to activate alarm.
		Comment:

Event No. 4 (CONTINUED)		
	CRS	☐ Refers to Technical Specification 3.1.5 in response to rod 18-15 which failed to fully insert on scram.
		Comment:
Examiner Note: Following steps are from ARP 4.603.A8 3-4 (2 SCRAM SYSTEM B).		
	ATC	☐ 2.a. Checks the Full Core Display for individual control rods that may have scrammed (may have been previously performed).
		Comment:
	CRS	☐ 2.b. Enters ABN-ROD (Control Rod Faults).
		Comment:
		☐ 2.c. Stops all maintenance or surveillance testing that has the potential for generating a trip on the unaffected RPS channel (A).
		Comment:
Examiner Note: Failed pressure switch (MS-PS-23D) which failed in the TRIP condition caused the half scram which cannot be bypassed (without maintenance support). The half scram cannot be immediately reset.		
	CRS	☐ 4. Refers to Technical Specification 3.3.1.1 for failed RPS instrument.
		Comment:
Examiner Note: Following steps are from ABN-ROD (Control Rod Faults) section 4.2 (note that there are no Immediate Actions that are currently applicable per section 3.2).		
	ATC	☐ 4.2.1 Reduce core flow to 74 Mlbm/hr at 5% per minute (core flow is > 80 Mlbm/hr (on MS-FR-613 at H13-P603)).
		Comment:
	CRS	☐ 4.2.2 If thermal power changes GT 15% in one hour, then notify Chemistry to evaluate the Offgas release rate.
		Comment:
	ATC	☐ 4.2.4.a. Selects the affected control rod(s) and verifies position (may have been previously performed).
		Comment:

Event No. 4 (CONTINUED)		
<u>Examiner Note</u>: Control rod 18-15 is the partially inserted rod.		
	ATC	☐ 4.2.4.b.1) Selects control rod 18-15 and depresses the CONTINUOUS INSERT Pushbutton at H13-P603.
		Comment:
		☐ 4.2.4.b.2) Drives control rod 18-15 to its FULL IN position.
		Comment:
		☐ 4.2.4.b.3) Releases the CONTINUOUS INSERT Pushbutton.
		Comment:
		☐ 4.2.4.b.4) Verifies control rod 18-15 remains in the FULL IN position.
		Comment:
		☐ 4.2.4.c. If necessary, reset the rod accumulator trouble annunciator using the accumulator trouble acknowledge pushbutton (H13-P603).
		Comment:
		☐ 4.2.4.d. If necessary, reset the control rod drift annunciator using the rod drift reset pushbutton (H13-P603).
		Comment:
	CRS	☐ 4.2.4.e. Refers to Technical Specifications (Reactivity).
		Comment:
		☐ 4.2.4.f. Initiates (or directs) a MON run to verify acceptable thermal limits and preconditioning.
		Comment:
<u>Examiner Note</u>: Following steps are from ARP 4.603.A8 2-2 (RPV PRESS HIGH TRIP). Step 2.c. cannot be performed (RPS 'B' will not reset).		
	BOP	☐ 2.a. Determines cause for half scram by investigating backpanel area and observing that RPS relay (RPS-RLY-K5D) has dropped out.
		Comment:
BOOTH ROLEPLAY – If sent to investigate MS-PS-23D and/or B, wait 2 minutes then report "Nothing appears abnormal with MS-PS-23D(B)".		

Event No. 4 (CONTINUED)		
Examiner Note: CRS may also declare rod Control rod 38-35 inoperable based on not knowing reason for rod scram.		
	CRS	Evaluates Technical Specifications and determines the following Required Actions apply:
		☐ LCO 3.1.3 C.1 – Fully insert control rod 18-15 within 3 hours.
		Comment:
		☐ LCO 3.5.1 C.2 – Disarm CRD for control rod 18-15 within 4 hours.
		Comment:
		☐ LCO 3.3.1.1 A.1 – Place High Pressure trip channel in TRIP **–OR–** LCO 3.3.1.1 A.2 – Place RPS 'B' trip system in TRIP
		Comment:

Event No. 5

Description: Ground causes FPC-P-1B to spuriously trip (FPC-P-1A fails to auto start).

Event is initiated after control rod 18-15 is fully inserted and required Tech Spec Actions entered (or as directed by the Exam team) and is activated using **TRIGGER 5**.

BOOTH OPERATOR – As briefed or when directed activate TRIGGER 5

Time	Position	Applicants Actions or Behavior
Examiner Note: 'FPC BOARD FPC-2 TROUBLE' is an alarm informing the BOP that there is an alarm on backpanel H13-P627 (Fuel Pool Cooling Div 2 panel).		
	BOP	☐ Responds to 'BUS 81 GROUND' (P800.C5 3-5) and 'FPC BOARD FPC-2 TROUBLE' (P851-S2) alarms and informs CRS.
		Comment:
Examiner Note: Below Out Of Service alarm along with the illuminated BYPASS AND INOPERABLE STATUS PANEL (BISI) for Fuel Pool Cooling Pump 1B Loss is used to determine the required ARP actions.		
	BOP	Responds to 'FPC DIV 2 OUT OF SERVICE' (P627.FPC2 4-1) alarm and identifies BISI (FPC-P-1B PWR LOSS) as cause. Informs CRS.
		Comment:
Examiner Note: Following steps are from ARP 4.627.FPC2 4-1 (FPC DIV 2 OUT OF SERVICE).		
Examiner Note: FPC-P-1B power fuses blew which requires a manual start of FPC-P-1A.		
	BOP	NOTE: If the power or control fuses have blown, then FPC-P-1A must be manually started from H13-P626.
		☐ Manually starts FPC-P-2A and inform CRS.
		Comment:
	CRS	☐ Enters ABN-FPC-LOSS on entry condition (unplanned loss of FPC).
		Comment:
Examiner Note: Following steps are from ABN-FPC-LOSS section 4.1. CRS may only direct steps 4.1.1 and 4.1.2.a be performed based on ground fault on FPC-P-1B.		
	BOP	☐ 4.1.1 Monitor Spent Fuel Pool level and temperature as directed.
		Comment:
		☐ 4.1.2.a. Place FPC-P-1B control switch in the IR-71(69) position.
		Comment:

Event No. 5 (CONTINUED)		
<u>Examiner Note</u>: Following steps are from ARP 4.800.C5 3-5 (BUS 81 GROUND).		
<u>Examiner Note</u>: Ground will be reported to be on Bus E-MC-8BB.		
	BOP	☐ 1. Directs area operator to investigate ground location on the SL-81 Ground Fault Indication Panel.
		Comment:
<u>Examiner Note</u>: Alarm in MCR will clear (once locally reset) since power fuses (upon blowing) removed the ground for FPC-P-1B which is powered from E-MC-8BB.		
<u>Examiner Note</u>: Although step 3 below directs exit of ARP, CRS may still perform steps 7. & 8.		
	BOP	☐ 2. & 3. Directs area operator to attempt to reset ground alarm locally (ground alarm relay resets).
		Comment:
	CRS	☐ 7. Maintains grounded circuit de-energized by not replacing fuses for FPC-P-1B until troubleshooting plan developed.
		Comment:
		☐ 8. Directs Work Request be generated for repair of grounded circuit.
BOOTH ROLEPLAY – <u>If sent to investigate ground location</u>, wait 2 minutes then report "SL-81 ground appears to be on MC-8BB."		
BOOTH OPERATOR – <u>If directed to attempt to reset ground alarm locally</u>, wait 1 minutes then ACTIVATE <u>TRIGGER 9</u>. Report ground indication on MC-8BB is cleared."		

Event No. 6		
Description: Trip of E-CB-1/7 with transfer of SM-7 to Backup Transformer results in reactor trip signal. Event is initiated when crew actions for loss of Fuel Pool cooling are complete (or as directed by the Exam team) and is activated using **TRIGGER 6**.		
BOOTH OPERATOR – As briefed or when directed activate TRIGGER 6		
Time	**Position**	**Applicants Actions or Behavior**
	BOP	☐ Acknowledges annunciator 800.C3 6-1 (BKR 1/7 TRIP) and informs CRS
		Comment:
		☐ Reports that Bus SM-7 momentarily lost power and automatically transferred to the Backup Transformer
		Comment:
	ATC	☐ Reports half scram on RPS "A" with failure to scram (half scram on RPS "B" already exists)
		Comment:
Examiner Note: Following steps are Immediate Actions from PPM 3.3.1 (Reactor Scram)		
	ATC	☐ 6.1.1: Places Reactor Mode Switch to Shutdown
		Comment:
		☐ 6.1.2: Monitors reactor power, pressure and level
		Comment:
		☐ 6.1.3: (2 handed operation) Since APRMs are not downscale the following is performed: • 6.1.3.a: Depresses the Manual Scram pushbuttons • 6.1.3.b: Initiates ARI
		Comment:
		☐ 6.1.4: Recognizes that reactor power is > 5% and informs the CRS (See Event 7 for SLC actions)
		Comment:
	CRS	☐ Updates crew on EOP entry into PPM 5.1.1, RPV Control, and directs/verifies that the Mode Switch has been placed in SHUTDOWN
		Comment:

Event No. 6 (CONTINUED)		
	CRS	☐ Updates crew and exits PPM 5.1.1 (RPV Control) and transitions to PPM 5.1.2 (RPV Control – ATWS)
		Comment:
		☐ Directs BOP to: • Inhibit ADS and take manual control of HPCS • Verify actuations for +13” and -50” as they occur • Directs pressure control with bypass valves in Auto
		Comment:
	BOP	☐ Takes both ADS control switches to the INHIBIT position and acknowledges associated alarms (P601.A3 6-1 ADS DIV 1 OUT OF SERVICE and P601.A2 6-8 ADS DIV 2 OUT OF SERVICE)
		Comment:
		☐ Arms and Depresses the HPCS system initiation pushbutton while holding the control switch for HPCS-P-1 to STOP
		Comment:
		☐ Takes the control switch for HPCS-V-4 to close when it gets fully opened
		Comment:
		☐ Reports to CRS that ADS is inhibited and manual control of HPCS has been established
		Comment:
	CRS	Directs PPM 5.5.6 be performed (Bypassing the MSIV Isolation Interlocks on High Tunnel Temperature and low RPV level)
		Comment:
	BOP	☐ Goes to EOP drawer and gets PPM 5.5.6 procedure and equipment bag containing two keys
		Comment:
		☐ **Performs PPM 5.5.6:** • **At H13-P609 places MS-RMS-S84 to BYPASS** • **At H13-P611 places MS-RMS-S85 to BYPASS** ☐ **Updates crew upon completion**
		Comment:

Event No. 6 (CONTINUED)		
	BOP	☐ Recognizes and reports EOP entry conditions due to Drywell pressure, Drywell temperature and Wetwell level (as they occur)
		Comment:
	CRS	☐ Updates crew and enters PPM 5.2.1 (Secondary Containment Control) ☐ Establishes a key parameter: Wetwell pressure of 2 psig ☐ May establish a key parameter of Drywell temperature at 285°F
		Comment:
	BOP	☐ Reports when Wetwell pressure reaches 2 psig
		Comment:
	CRS	☐ Directs RCIC-V-1 closed (if Main Turbine online)
		Comment:
	BOP	☐ If directed, closes RCIC-V-1
		Comment:
	CRS	☐ Directs performance of PPM 5.5.1 (Overriding ECCS Valve Logic to Allow Throttling RPV Injection)
		Comment:
	BOP	☐ Goes to EOP drawer and pulls PPM 5.5.1 procedure and equipment bag containing 5 keys and performs PPM 5.5.1: • HPCS – Override HPCS-V-4 (HPCS RPV injection valve) automatic logic by placing HPCS-RMS-S25 in the OVERRIDE position (H13-P625) • LPCS - Override LPCS-V-5 (LPCS RPV injection valve) automatic logic by placing LPCS-RMS-S21 in the OVERRIDE position (H13-P629) • RHR Loop A - Override RHR-V-42A (RHR RPV injection valve) automatic logic by placing RHR-RMS-S105 in the OVERRIDE position (H13-P629) • RHR Loop B - Override RHR-V-42B (RHR RPV injection valve) automatic logic by placing RHR-RMS-S106 in the OVERRIDE position (H13-P618) • RHR Loop C - Override RHR-V-42C (RHR RPV injection valve) automatic logic by placing RHR-RMS-S107 in the OVERRIDE position (H13-P618) ☐ Updates crew to completion of PPM 5.5.1, and that the ECCS injection valves are closed and throttleable
		Comment:

<table>
<tr><td colspan="3">Event No. 6 (CONTINUED)</td></tr>
<tr><td colspan="3">CT #1 - During ATWS with power > 5%, terminate and prevent injection with exception of SLC, RCIC, and CRD, into the RPV until RPV level is -65 inches to establish a Lowered Level (LL).</td></tr>
<tr><td rowspan="4"></td><td rowspan="2">CRS</td><td>☐ Directs the ATC to:
• Stop and prevent condensate and feedwater
• Lower level to a band less than –65 inches but greater than –186 inches (preferred band is –80 inches to –140 inches)
• Commence RPV injection at -65 inches</td></tr>
<tr><td>Comment:</td></tr>
<tr><td rowspan="2">ATC</td><td>☐ Aligns the Feed and Condensate system per SOP-RFW-FCV-QC quick card as follows:
• 2.1.1: Starts closing RFW-V-112A and RFW-V-112B
• 2.1.2: Starts opening RFW-V-118
• 2.1.3: Verifies RFW-V-109 is closed
• 2.1.4: Verifies RFW-V-117A and RFW-V-117B open
• 2.1.5: Verifies RFW-LIC-620 is in manual (V selected for Valve position demand) with 0 output
☐ 2.1.6: If Reactor Feed Pumps are operating then perform the following:
• b. Places RFW-P-1B in MDEM mode
• c. Places RFW-P-1A in MDEM mode
• d. Controls Turbine speed as required
• e. If desired, then places RFW-FCV-2A (B) in manual and slowly open to approximately 80%
☐ 2.1.7: Verifies RFW-V-112A and RFW-V-112B are fully closed
☐ 2.1.8: Verifies RFW-V-118 is fully open
☐ 2.1.9: If Reactor Feed Pumps are operating, then adjusts the running RFP speed to establish ~ 200 psid across RFW-FCV-10A & 10B using either Feedwater touch screen (H13-P840)
☐ 2.1.10: Adjusts RFW-LIC-620 manual output to control RPV level</td></tr>
<tr><td>Comment:</td></tr>
</table>

Event No. 6 (CONTINUED)		
CT #2 - Maintain RPV level above -186 inches. Short excursions below -186 inches does not constitute failure of CT provided level restored and maintained above -186 inches within 10 minutes of going below -186 inches.		
	ATC	☐ Reports EOP entry on low RPV water level at +13" ☐ Reports Reactor Power as it drops due to lowering level ☐ Maintains RPV level between -65 inches and –186 inches as directed (-80 inches to -140 inches is the preferred band) ☐ Does not commence feeding until RPV level drops below -65 inches
		Comment:
	CRS	☐ Directs PPM 5.5.11, ALTERNATE Control Rod Insertions, be performed to insert control rods (see Event 9)
		Comment:
	BOP	☐ Reports trip of LPCS pump (started during Event 3)
		Comment:

<table>
<tr><td colspan="3">Event No. 7</td></tr>
<tr><td colspan="3">Description: SLC-P-1A shaft shears when pump starts and SLC-P-1B develops a discharge flow blockage which limits SLC injection flow
Event is activated at the beginning of the scenario and is realized when SLC system is started.</td></tr>
<tr><th>Time</th><th>Position</th><th>Applicants Actions or Behavior</th></tr>
<tr><td></td><td>ATC</td><td>When it is recognized that depressing the manual scram pushbuttons and initiating ARI has not inserted the control rods, refers to SOP-SLC-INJECTION-QC quick card and performs the following:
☐ 2.1: Removes the SLC keylock switch blanks and insert both keys into the SLC System control switches</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ 2.2: Initiates SLC injection by performing the following (H13-P603):
• Places SLC System A control switch to the OPER position
• Places SLC System B control switch to the OPER position</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ 2.3: Records the following:
• SLC Flow rate (~43 gpm for one pump, or 86 gpm for both pumps)
▪ Will record reduced flowrate of ~24 gpm
• Initial SLC tank level
• Circle RWCU-V-4 status (should be closed but is open)</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ Reports to CRS that SLC is injecting at a reduced flowrate</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ Directs field operator to investigate problems with SLC</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td colspan="3">BOOTH ROLEPLAY – <u>If directed to investigate SLC</u>, wait 3 minutes and report “It appears that SLC Pump “A” has a broken shaft and that there is a flow restriction with SLC train ‘B’.”</td></tr>
</table>

Event No. 8		
Description: RWCU-V-4 does not auto close on SLC initiation but can be closed manually Event is activated at the beginning of the scenario and is realized when SLC system is started and RWCU-V-4 does not automatically close.		
Time	**Position**	**Applicants Actions or Behavior**
	ATC	☐ After starting both SLC pumps, recognizes that RWCU-V-4 did not automatically close ☐ Takes manual action to close RWCU-V-4 (Successful) ☐ Reports issue with RWCU-V-4 to CRS with action taken
		Comment:

Event No. 9		
Description: Scram/Reset/Scram not effective in inserting control rods - Control rods can be manually driven in Event is activated at the beginning of the scenario and is realized when Scram/Reset/Scram proves inneffective		
Time	**Position**	**Applicants Actions or Behavior**
<u>Examiner Note</u>: Refer to Simulator Guide Attachment 1 in reference to PPM 5.5.11.		
	BOP	☐ Goes to EOP drawer and pulls procedure for PPM 5.5.11 and equipment bag to perform PPM 5.5.11: ☐ Performs PPM 5.5.11: • Determines that no RPS scram lights are lit and: ▪ Removes one TB1 ARI fuse (P650 F01, F02, F03 or F04) ▪ Removes one TB2 ARI fuse (P650 F01, F02, F03 or F04) ☐ Observes that some or all blue scram valve lights are lit and determines Tab B should be performed: • Places the SDV HIGH LEVEL TRIP control switch to BYPASS • Ensures both CRD pumps are running – may direct ABN-CRD MAXFLOW be performed • Determines the scram cannot be reset • Overrides RPS trip signals per Attachment 6.1: ▪ At H13-P611 - Installs a jumper between RPS-RLY-K9B terminal stud 2 and RPS-RLY-K12F terminal stud 4 ▪ At H13-P611 - Installs a jumper between RPS-RLY-K9D terminal stud 2 and RPS-RLY-K12H terminal stud 4 ▪ At H13-P609 - Installs a jumper between RPS-RLY-K9A terminal stud 2 and RPS-RLY-K12E terminal stud 4 ▪ At H13-P609 - Installs a jumper between RPS-RLY-K9C terminal stud 2 and RPS-RLY-K12G terminal stud 4
		Comment:
BOOTH ROLEPLAY – <u>If directed to perform ABN-CRD-MAXFLOW</u>, wait 2 minutes and activate <u>Trigger 26</u>. Report completion when valves are fully opened.		

Event No. 9 (CONTINUED)		
	BOP	☐ Continues with Tab B operator actions: • Resets the scram by depressing reset pushbuttons • Determines that CRD drive header pressure can be established • Places the RWM bypass switch to bypass on H13-P603 • Manually starts to drive control rods by starting at 10-43 and inserting every other rod in every other row • Informs CRS having success driving control rods in • When the Scram Discharge Volume has been drained for more than 2 minutes initiates a manual scram by depressing the four red manual scram pushbuttons. If all rods did not insert, continues scram/reset/scram per Tab B and raises SDV drain time by 2 minutes • Determines no control rod motion do to Scram/Reset/Scram and requests drain time extension
		Comment:

TERMINATION CRITERIA: The scenario will be terminated when RPV level is being maintained between -80 inches to -140 inches, one attempt at scram-reset-scram has been completed, and manual insertion of control rods has commenced OR as directed by the Examination Team.

Any control rod not fully inserted

The following may be entered at any time based on fault, with CRS permission,

C – Scram Individual Control Rods
D – Vent Scram Air Header
E – Vent CR Over Piston Volumes

Any white RPS SCRAM light lit

YES

REMOVE applicable divisional RPS fuses, based on lit white RPS scram lights, as necessary to insert a full scram.:

PANEL	FUSE	EPN (contractor)	Trip System/ Group
P609	LL-F13	C72A-F18A	A1
P609	LL-F14	C72A-F18E	A2
P609	BB-F12	C72A-F18C	A3
P609	BB-F13	C72A-F18G	A4
P611	LL-F13	C72A-F18B	B1
P611	MM-F21	C72A-F18F	B2
P611	BB-F12	C72A-F18D	B3
P611	AA-F20	C72A-F18H	B4

IF SDV Vent and Drain Valves don't close,
THEN **REMOVE** SDV VENT AND DRAIN VALVE fuses, if required:

PANEL	FUSE	EPN (contractor)	SDV PILOT SOLENOIDS
P609	MM-F20	C72A-F17A	CRD-SPV-9A/182A
P611	MM-F20	C72A-F17B	CRD-SPV-9B/182B

All Rods IN

YES

INFORM CRS

INSTALL the following fuses removed above:

- RPS SCRAM fuses
- SDV VENT AND DRAIN VALVE fuses

NO

Perform concurrently

B **C** **E**

NO

REMOVE one TB1 ARI fuse:

PANEL	FUSE
P650	F01
P650	F02
P650	F03
P650	F04

REMOVE one TB2 ARI fuse:

PANEL	FUSE
P650	F01
P650	F02
P650	F03
P650	F04

Some or All Blue SCRAM valve lights lit

NO

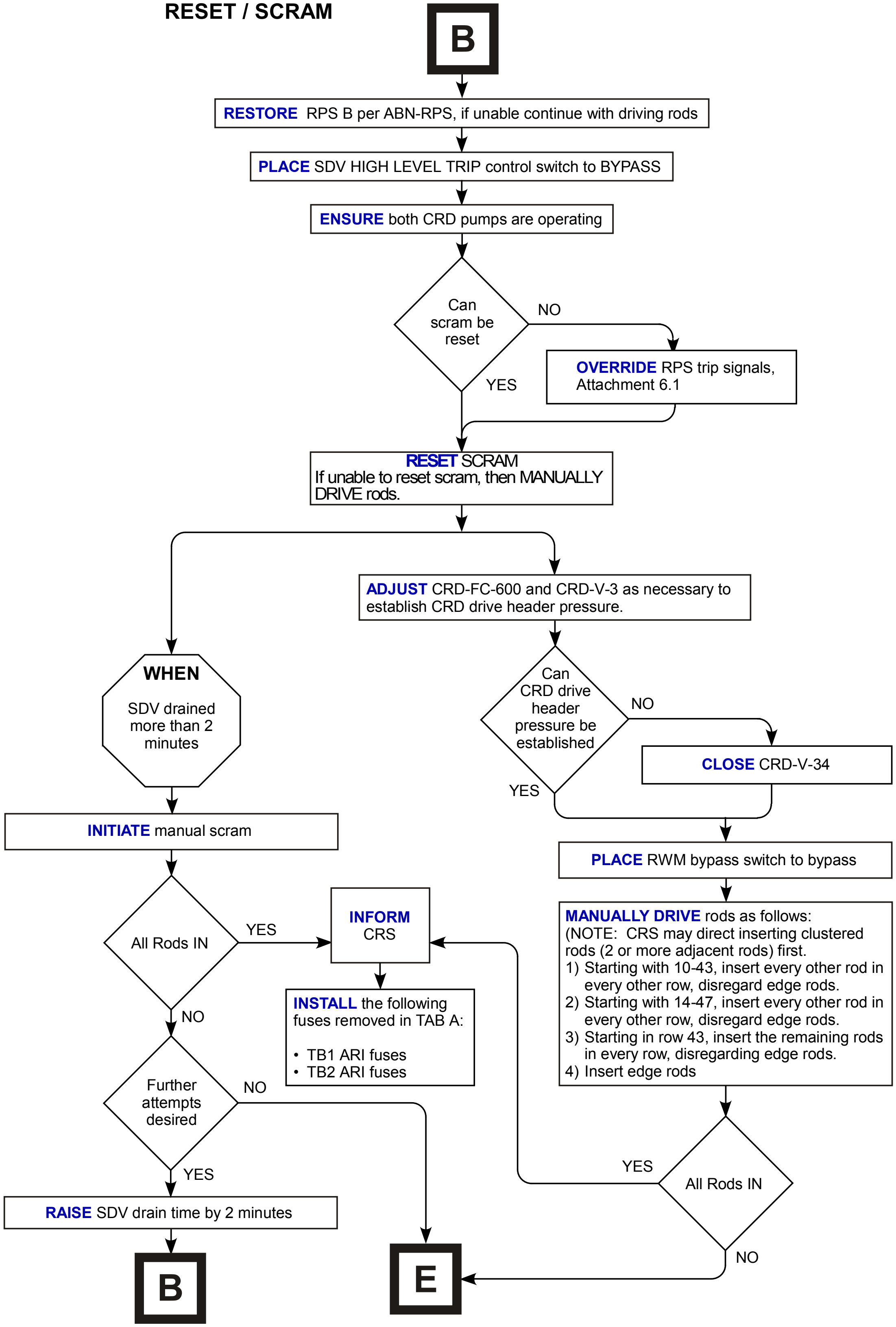
D

YES

B

PPM 5.5.11 ALTERNATE ROD INSERTION (Attachment 6.1)

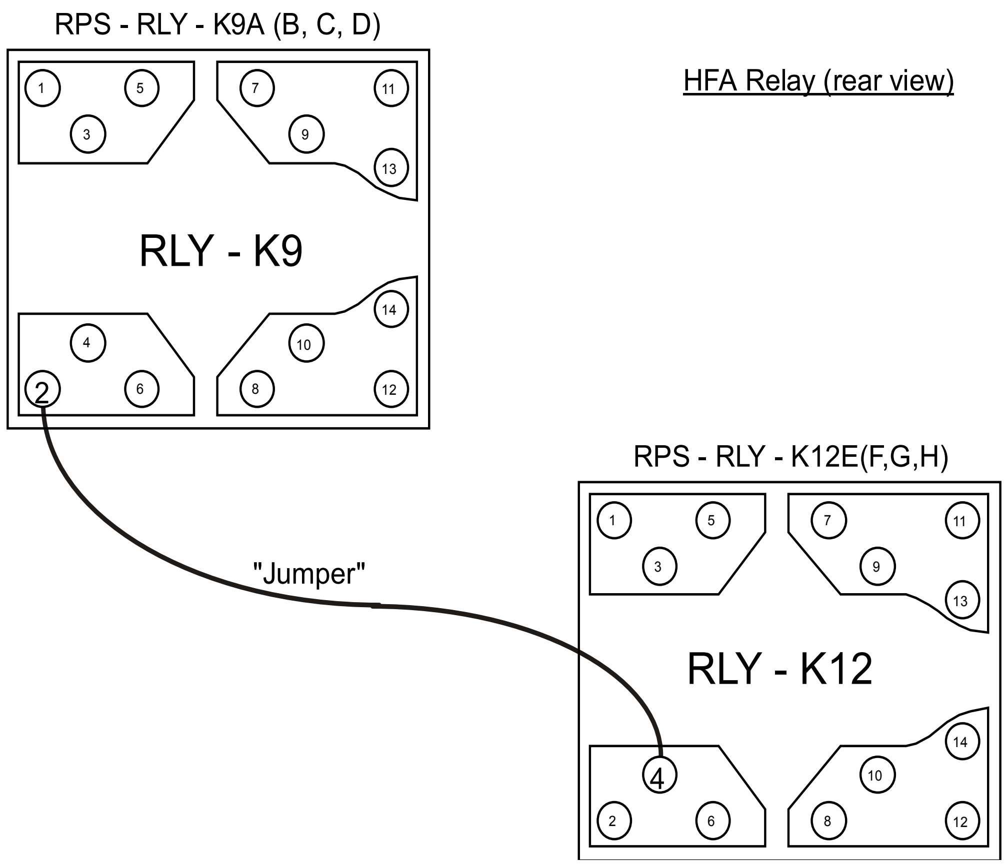
RESET / SCRAM



PPM 5.5.11 ALTERNATE ROD INSERTION
(Attachment 6.1)

Overriding RPS Trips

- At H13-P611:
  - **INSTALL** a jumper between **RPS-RLY-K9B**, terminal **stud 2**, and **RPS-RLY-K12F**, terminal **stud 4**.
  - **INSTALL** a jumper between **RPS-RLY-K9D**, terminal **stud 2**, and **RPS-RLY-K12H**, terminal **stud 4**.
- At H13-P609:
  - **INSTALL** a jumper between **RPS-RLY-K9A**, terminal **stud 2**, and **RPS-RLY-K12E**, terminal **stud 4**.
  - **INSTALL** a jumper between **RPS-RLY-K9C**, terminal **stud 2**, and **RPS-RLY-K12G**, terminal **stud 4**.



Initial Conditions:

- Columbia is operating at 100% power
- CRD-P-1B is out of service for extended Maintenance
- CRD-P-1A is Protected

Shift Turnover:

- Lower power to 90% using Reactor Recirculation flow per PPM 3.2.6 (Power Maneuvering) after assuming the shift based on BPA Load Following request
- Steps 5.1.1 thru 5.1.6 of PPM 3.2.6 are complete
- Proper margin to Pre-Conditioned Status (PCS) exists per PPM 9.3.18
- The Reactivity brief has been performed

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	COLUMBIA GENERATING STATION SIMULATOR EXAMINATION
LESSON TITLE	Place RHR-SYS-A in SP Cooling (LPCS/RHR "A" ADS Permissive fails to annunciate) (Tech Spec); Rod (26-19) drifts out. Once inserted, control rod to drift out again (Tech Spec); SW-P-1A trips which requires RHR-P-2A to be secured; RFP "B" vibrations rise requiring RRC Flow reduction and manual trip of RFP "B"; OBE causes steam leak in RCIC Pump Room with Failure of RCIC-V-8 and RCIC-V-63 to fully close; Manual scram inserted; Steam leak develops in the Main Steam Tunnel; MS-V-22A and MS-V-28A through D fail to automatically close (MS-V-28A through D can be closed manually but does not isolate leak); Emergency Depressurization required on two Max Safes

LENGTH OF LESSON 1.5 Hours

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code	LO001858	Rev. No.	0
JPM PQD Code		Rev. No.	
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave E. Crawford	DATE	12/22/16
REVISED BY		DATE	
VALIDATED BY		DATE	
TECHNICAL REVIEW		DATE	
INSTRUCTIONAL REVIEW		DATE	
APPROVED		DATE	

Facility:	Columbia Generating Station	Scenario No.:	3	Op Test No.:	1
Examiners:			Operators:		

Initial Conditions:	Columbia is operating at 85% power due to economic dispatch. Safety Relief Valve 2C (MS-RV-2C) is known to be leaking. Suppression Pool high temperature alarms (601.A11.1-3 and 601.A12.1-3) have just annunciated. Reactor Closed Cooling (RCC) Pump 1B is tagged out for planned maintenance. RCC-P-1A and RCC-P-1C are protected.
Turnover:	After shift turnover place Residual Heat Removal Pump 2A (RHR-P-2A) in Suppression Pool Cooling and allow Standby Service Water Pump 1A (SW-P-1A) to auto start. The pre-evolution brief has been completed and operators are stationed near both pumps.

Critical Tasks:

CT-1	With reactor at power and with primary system discharging into secondary containment, manually scram reactor before any area exceeds its maximum safe operating temperature.
CT-2	With a primary system discharging into secondary containment and area temperature exceeding maximum safe operating level in more than one area, initiate Emergency Depressurization (ED) by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of second MSOT being exceeded. Note: If the crew properly elects to invoke the "EMERG DEPRESS is anticipated" override in ppm 5.1.1 (RPV Control) and in doing so, the second maximum safe operating level is not exceeded, this Critical Task is considered to be met.

Event No.	Malf.	Event Type*	Event Description
1	N/A	N (BOP) TS (SRO)	Place RHR-SYS-A in Suppression Pool Cooling (LPCS/RHR "A" ADS Permissive fails to annunciate during pump start) (Tech Spec) **
2	TRG-2	C (ATC,SRO) TS (SRO)	Control rod (26-19) drifts out. Once inserted, releasing the continuous insert pushbutton allows the control rod to drift out again, requiring the control rod to be isolated (Tech Spec)
3	TRG-3	C (BOP,SRO) TS (SRO)	Standby Service Water Pump 1A (SW-P-1A) trips which requires Residual Heat Removal Pump 2A (RHR-P-2A) (currently in Suppression Pool Cooling) to be manually secured (Tech Spec)
4	TRG-4	C (ATC,SRO)	Reactor Feed Pump (RFP) "B" vibrations rise requiring RRC Flow reduction and manual trip of the "B" RFP
5	TRG-5	M (ALL)	Operating Bases Earthquake causes a steam leak in the RCIC Pump Room with Failure of RCIC-V-8 and RCIC-V-63 to fully close (preventing RCIC leak isolation). Manual scram inserted before first secondary containment max safe operating temperature is reached **(CT #1)**
6	N/A	M (ALL)	Steam leak develops in the Main Steam Tunnel
7	N/A	C (BOP)	MS-V-22A and MS-V-28A through D fail to automatically close (MS-V-28A through D can be closed manually but does not isolate leak)
8	N/A	---	Emergency Depressurization (PPM 5.1.3) is performed when two areas exceed their max safe operating temperature **(CT #2)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications

**** Ref: Columbia OE (AR-00049685 – Root Cause Analysis of RHR-PS-19A Isolation Mispositioning Event)**

Target Quantitative Attributes	Actual	Description
Malfunctions after EOP entry (1-2)	**1**	Several MSIVs fail to automatically close and one cannot be closed
Abnormal events (2-4)	**3**	ADS Permissive fails on RHR pump "A" start; Rod 26-19 drifts out; RFB "B" high vibrations
Major transients (1-2)	**2**	RCIC steam leak requiring scram; Main steam line break
EOPs entered/requiring substantive actions (1-2)	**2**	PPM 5.1.1 (RPV Control); PPM 5.3.1 (Secondary Containment Control)
EOP contingencies requiring substantive actions (0-2)	**1**	PPM 5.1.3 (Emergency RPV Depressurization)
EOP based Critical tasks (2-3)	**2**	See Critical Task Determination table

Trigger (TRG-x)	Evaluator Directed	How Triggered	Purpose	Malfunction Numbers
TRG-2	YES	Manually	Event Initiator	MAL-RMC004-2619
TRG-3	YES	Manually	Event Initiator	BKR-SSW001
TRG-4	YES	Manually	Event Initiator	ANN-840A1G05; MAL-FPT005B
TRG-5	YES	Manually	Event Initiator	MAL-RWB001; MAL-RCI004
TRG-6		Manually	Event Initiator	MAL-RMC004-2619
TRG-7		Manually	Field Action	ANN-840A1G05
TRG-8		Automatically	Malf Trigger	MAL-RRS006A; MAL-RCI004
TRG-9		Automatically	Malf Trigger	MAL-RRS006A
			Initial Condition	BST-RHR014F
			Initial Condition	AOV-RRS003F
			Initial Condition	MOV-RCI012F
			Initial Condition	MOV-RCI016F
			Initial Condition	RLY-NSF097F
			Initial Condition	BKR-RCC002

SCENARIO 3 SUMMARY

Event 1

As part of the turnover, and with annunciators for Suppression Pool high temperature in alarm (601.A11 1-3 and 601.A12 1-3)), the BOP operator will place Residual Heat Removal Loop “A” (RHR-SYS-A) into Suppression Pool Cooling mode per SOP-RHR-SPC (Suppression Pool Cooling/Spray/Discharge /Mixing). Standby Service Water Pump (SW-P-1A) will be allowed to auto start as permitted by procedure.

The CRS declares RHR-SYS-A as inoperable but available and refers to Technical Specifications and the Licensee Controlled Specifications and determines that the following applies:

- LCO 3.5.1 Action A.1 which requires restoring RHR-SYS-A to operable status within 7 days
- LCO 3.6.1.5 Action A.1 which requires restoring RHR-SYS-A drywell spray subsystem to operable status within 7 days
- LCO 3.6.2.3 Action A.1 which requires restoring RHR-SYS-A suppression pool cooling subsystem to operable status within 7 days
- RFO 1.6.1.5 Action A.1 which requires restoring RHR-SYS-A suppression pool spray subsystem to operable status within 7 days

During RHR-P-2A pump start for entering Suppression Pool cooling mode, an isolated pressure switch (RHR-PS-19A) prevents the LPCS/RHR “A” ADS Permissive alarm from annunciating on P601. The CRS refers to Technical Specifications and determines that LCO 3.3.5.1 (Emergency Core Cooling System (ECCS) Instrumentation) Action A.1 applies which directs entry into the Condition referenced in Table 3.3.5.1-1 for the channel (Function 4.e) immediately (Condition G). ACTION G.2 directs restoring channel to operable status within 8 days.

Previous Columbia OE (Ref: AR-00049685 – Root Cause Analysis of RHR-PS-19A Isolation Mispositioning Event dated 4/1/2007) involved isolation of same pressure switch which was not discovered until RHR-P-2A was started and the ADS Permissive annunciator did not come in as expected.

Event 2

(TRG-2) Control rod 26-19 drifts out of the core. The ATC operator recognizes the rod drift and takes Immediate Actions to fully insert the control rod using the Continuous Insert pushbutton. The CRS enters ABN-ROD. When the Insert pushbutton is released, the control rod begins again to drift out of the core. The ATC operator re-inserts the control rod full-in (and keeps the Continuous Inset pushbutton pressed) while the crew takes action to isolate the HCU for control rod 26-19 (TRG-6). The CRS declares control rod 26-19 inoperable. The CRS refers to Technical Specifications and determines that LCO 3.1.3 (Control Rod Operability) Action C.1 applies which requires rod 26-19 to be fully inserted within 3 hours and Action C.2 which requires associated CRD (HCU) disarmed within four hours.

Event 3

(TRG-3) Standby Service Water Pump 1A (SW-P-1A) trips on motor winding overcurrent which requires Residual Heat Removal Pump 2A (RHR-P-2A) (currently in Suppression Pool Cooling) to be manually secured per ABN-SW. Standby Service Water System “A” (SW-SYS-A) not being available requires that the DG1 Diesel Engine Mode Selector be placed MAINT (Maintenance) effectively making DG1 inoperable.

The CRS declares SW-SYS-A and DG1 inoperable and refers to Technical Specifications and determines that the following applies:

- LCO 3.7.1 Action B.1 which requires restoring SW-SYS-A to operable status within 72 hours
- LCO 3.8.1 Action B.1 which requires performing SR 3.8.1.1 for operable offsite circuits (OSP-ELEC-W101 (Offsite Station Power Alignment Check)) within 1 hour and every 8 hours thereafter
- LCO 3.8.1 Action B.2 which requires declaring required feature(s) supported by DG 1, inoperable when the redundant required feature(s) are inoperable within 4 hours of DG1 going inoperable concurrent with the inoperability of the redundant required feature(s)
- LCO 3.8.1 Action B.3.1 which requires determining operable DGs are not inoperable due to common cause failure within 24 hours **- OR -** LCO 3.8.1 Action B.3.2 which requires performance of SR 3.8.1.2 for operable DGs within 24 hours (if not performed in the past 24 hours)
- LCO 3.8.1 Action B.4.1 which requires restoring DG1 to operable status within 72 hours of DG1 becoming inoperable AND within 6 days of failure to meet LCO (the 72 hours is more restrictive in this case) **- OR -** LCO 3.8.1 Action B.4.2.1 which requires establishing risk management actions for the alternate AC sources within 72 hours AND LCO 3.8.1 Action B.4.2.2 which requires DG1 to be restored to operable status within 14 days after being declared inoperable but in no case longer than 17 days from failure to meet LCO

Evaluator note: Although several Technical Specification actions are involved, the CRS will only have to refer to LCO 3.7.1 Condition B and LCO 3.8.1 Condition B to find them.

Event 4

(TRG-4) Vibrations start to rise above the ALERT setpoint on Reactor Feed Pump (RFP) "B" as indicated by annunciator P840.A1.7-5 (Turbine B Vibration Trouble) and validated on (local) vibration instrument RFW-VBI-1B/XS/T1BXY (Turbine Radial Inboard Bearing Vibration). Feed pump bias is adjusted to minimize load on RFP "B" in an attempt to reduce vibration (which is unsuccessful). Vibration level will exceed the DANGER setpoint requiring Reactor Recirculation flow to be incrementally reduced in 1% to 5% step changes while monitoring vibration level. Vibration level remains above the DANGER setpoint even after Reactor Recirculation (RRC) flow has been reduced to 74 Mlbm/hr. RFP "B" is manually tripped per ARP direction. The CRS may direct tripping of RFP "B" before the flow reduction is complete if equipment damage is a concern. Following the trip, the high vibration annunciator will clear if crew attempts a local reset (TRG-7). As RPV level lowers due to the feed pump trip, both Reactor Recirculation (RRC) Pumps will runback to 30 Hz causing reactor power to stabilize at a lower level of ~68% power.

Event 5

(TRG-5) An earthquake (OBE) causes annunciator 851.S-1 5-1 (Operating Basis Earthquake Exceeded) to alarm. ABN-EARTHQUAKE is entered. Concurrently, a steam leak in the RCIC Pump Room develops resulting in RCIC Equipment Area high temperature alarms. PPM 5.3.1 (Secondary Containment Control) and ABN-HELB (Line Break) are entered on Reactor Building (RB) area high temperature. Crew attempts to isolate steam leak as directed by PPM 5.3.1 (Secondary Containment Control). Control Room notifies plant personnel of safety hazard and directs evacuation of affected areas. Neither RCIC-V-63 (RCIC Steam Supply Inboard Isolation) nor RCIC-V-8 (RCIC Turbine Steam Supply Isolation) will automatically close. Manual attempts to shut RCIC-V-63 and RCIC-V-8 are unsuccessful.

CRS enters PPM 5.1.1 (RPV Control) and directs a manual reactor scram before reaching the max safe operating temperature for the RCIC Pump room **(CT #1)**. All control rods fully insert. The CRS may direct a reactor pressure reduction to 500 to 600 psig to reduce leak rate.

Event 6

Three (3) minutes after the scram, Main Steam Line "A" piping ruptures causing an unisolable steam leak. The CRS re-enters PPM 5.3.1 (Secondary Containment Control) based on a second unisolable steam leak in Secondary Containment resulting in high Main Steam Tunnel temperature.

Event 7

Following the Main Steam Line "A" rupture, the outboard MSIVs fail to AUTO close due to failure of a logic relay but can be manually closed. MSIV 22A (MS-V-22A) fails to AUTO close due to mechanical failure. Inability to manually close MS-V-22A results in an unisolable leak into secondary containment.

Event 8

The CRS directs entry into PPM 5.1.3 (Emergency RPV Depressurization) once Main Steam Tunnel Temperature exceeds its max safe operating value of 330°F based on two secondary containment areas greater than max safe operating value. With a primary system discharging into secondary containment and area temperature exceeding maximum safe operating level in more than one area, Emergency Depressurization (ED) is initiated by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of second MSOT being exceeded. **(CT #2)** RPV level will be restored using Condensate Booster Pumps following Emergency Depressurization.

TERMINATION CRITERIA: The scenario will be terminated when an Emergency Depressurization has been performed and RPV level is being controlled in the prescribed band OR as directed by the Examination Team.

Critical Task Determination

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
CT #1 - With reactor at power and with primary system discharging into secondary containment, manually scram reactor before any area exceeds its maximum safe operating temperature.	If secondary containment temperature exceeds its maximum safe operating value, adequate core cooling, containment integrity, safety of personnel, or continued operability of equipment required to perform EOP flowchart actions can no longer be assured. (Ref: PPM 5.0.10 Rev 21, section 8.9.3 k.1))	Procedural direction by PPM 5.3.1 (EOP for Secondary Containment Control) Step SC-14 directs entering PPM 5.1.1 (which requires placing Reactor Mode Switch in Shutdown) before any area exceeds its maximum safe operating temperature.	The operator will manually scram reactor by placing Reactor Mode Switch in Shutdown.	All control rods will fully insert.
CT #2 - With a primary system discharging into secondary containment and area temperature exceeding maximum safe operating level in more than one area, initiate Emergency Depressurization (ED) by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of second MSOT being exceeded. Note: If the crew properly elects to invoke the “EMERG DEPRESS is anticipated” override in ppm 5.1.1 (RPV Control) and in doing so, the second maximum safe operating level is not exceeded, this Critical Task is considered to be met.	The criteria of "2 or more areas" identifies the increase in parameter trend as a wide spread problem which may pose a direct and immediate threat to secondary containment integrity, equipment located in the secondary containment, continued safe operation of the plant, and personnel both on and off site. (Ref: PPM 5.0.10 Rev 21, section 8.9.3 k.3))	Procedural direction by PPM 5.3.1 (EOP for Secondary Containment Control) Step SC-15 directs Emergency Depressurizing reactor when a primary system (RCIC) is discharging into secondary containment and two or more area temperatures are exceeding their maximum safe operating level.	The operator will manually open 7 Safety Relief Valves (ADS preferred) to emergency depressurize the RPV.	The valve light indications for each of the 7 Safety Relief Valves will change from Green lit to Red lit when control switch is taken to Open. Reactor pressure will lower in response.

SIMULATOR SETUP

☐ Unload simulator (between each scenario)

☐ Verify in ILC load

☐ Reload simulator

☐ Reset to IC-204 (reset, go to Run, reset again)

☐ Load Scenario 3 Schedule file

☐ Load Scenario 3 Event file (if not loaded automatically)

☐ Validate that there are no unexpected annunciators or parameters out of band

☐ Verify pump running magnets

☐ Verify keys REMOVED from RCIC-V-8 AND RCIC-V-64

☐ Flag the following:

- ☐ 601.A11 1-3
- ☐ 601.A12 1-3

☐ Place tagout on RCC-P-1B

☐ Protect the following:

- ☐ RCC-P-1A and RCC-P-1C

☐ Have marked up copy of SOP-RHR-SPC for RHR “A” in Suppression Pool Cooling (with N/Ad steps initialed) for the crew at their pre-brief location (outside the simulator)

☐ EQ machine tested at correct volume for OBE event (hardware volume knob at 100% with Windows volume at 85%)

SCHEDULE FILE

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EVENT FILE

<!-- This file contains a Thunder Simulations Event -->
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</EVENT>

EVENT No. 1		
Description: Place RHR-SYS-A in Suppression Pool Cooling (LPCS/RHR “A” ADS Permissive fails to annunciate during pump start) (Tech Spec) Event is initiated by the CRS as part of the shift turnover.		
Time	**Position**	**Applicants Actions or Behavior**
Examiner Note: Below evolution was pre-briefed by the crew before entering the simulator. Steps 5.1.1 through 5.1.3 were previously completed.		
	CRS	☐ Directs BOP to place RHR-SYS-A into Suppression Pool Cooling mode using SOP-RHR-SPC (section 5.1 starting with step 5.1.4)
		Comment:
Examiner Note: Following steps are from SOP-RHR-SPC (starting with step 5.1.4)		
	CRS	☐ 5.1.4: If RHR-SYS-A is required to be operable, then enter RHR-SYS-A as inoperable, but available, in the Plant Logging System (see below)
		Comment:
		Evaluates Technical Specifications and the LCS and determines the following actions apply: ☐ LCO 3.5.1 Action A.1 which requires restoring RHR-SYS-A to operable status within 7 days
		Comment:
		☐ LCO 3.6.1.5 Action A.1 which requires restoring RHR-SYS-A drywell spray subsystem to operable status within 7 days
		Comment:
		☐ LCO 3.6.2.3 Action A.1 which requires restoring RHR-SYS-A suppression pool cooling subsystem to operable status within 7 days
		Comment:
		☐ RFO 1.6.1.5 Action A.1 which requires restoring RHR-SYS-A suppression pool spray subsystem to operable status within 7 days
		Comment:

EVENT No. 1 (CONTINUED)		
Examiner Note: Annunciator 601.A3 5-1 (ADS LPCS/RHR A Pump Permissive) will fail to alarm when RHR-P-2A started. May take crew a minute or so to validate proper pump starting response.		
	BOP	**CAUTION** To minimize cavitation and elevated pump hydraulic loads/vibrations, minimize operating with RHR-FCV-64A (Minimum Flow) as its only discharge path. {C-9448} NOTE: If H13-P601.A4-3.1, RHR A PUMP DISCH PRESS HIGH/LOW, is in alarm, RHR-P-2A may be started for EOP related activities. NOTE: H13-P601.A3-5.1, ADS LPCS/RHR A PUMP RUNNING PERMISSIVE alarm is an expected alarm when RHR-P-2A starts. ☐ 5.1.5: Starts RHR-P-2A (and verifies proper pump starting indications) • Breaker closed red indication above pump control switch • Pump current spikes then returns to normal • Verifies annunciator 601.A3 5-1 (ADS LPCS/RHR A Pump Permissive) alarms ▪ Notes alarm does not come in and informs the CRS
		Comment:
Examiner Note: With RHR pump running on min flow, it is expected the CRS will direct BOP to continue evolution while referring to Technical Specifications.		
	CRS	☐ Acknowledges report and directs BOP to continue evolution
		Comment:
	BOP	☐ 5.1.6: Verifies RHR-FCV-64A opens during low flow conditions (approximately 800 gpm) (Minimum Flow Bypass) (H13-P601)
		Comment:

EVENT No. 1 (CONTINUED)		
		CAUTION RHR-V-24A should be opened just enough to achieve the desired flow, to minimize the amount of time required to realign following an auto initiation signal and the amount of drain down following a LOP/LOCA. Restrict RHR-V-24A to approximately 20 seconds open (7000 gpm). {C-8793} NOTE: Minimize the amount of time spent in Suppression Pool Cooling. NOTE: If required due to plant conditions, RHR-V-48A may be closed concurrently with opening RHR-V-24A. ☐ 5.1.7: (2-handed operation) Throttles open RHR-V-24A to between 2500 and 7000 gpm, as determined by the CRS (Suppression Pool Cooling/Test Return) (H13-P601)
		Comment:
		☐ 5.1.8: Verifies RHR-FCV-64A closes (approximately 800 gpm)
		Comment:
		☐ 5.1.9: Verifies SW-P-1A running
		Comment:
		☐ 5.1.10: If maximum cooling is desired, then closes RHR-V-48A (RHR-HX-1A Shell Side Bypass) (H13-P601)
		Comment:
		☐ 5.1.11: If minimum cooling is desired, then performs the following: • 5.1.11.a: Throttles open RHR-V-48A (RHR-HX-1A Shell Side Bypass) (H13-P601) • 5.1.11.b: Throttles closed RHR-V-3A (RHR-HX-1A Outlet) (H13-P601)
		Comment:
		☐ 5.1.12: Maintains Suppression Pool temperature between 55°F and 90°F
		Comment:
		☐ 5.1.13: Notifies HP that radiological conditions may have changed
		Comment:

EVENT No. 1 (CONTINUED)

	BOP	☐ Refers to ARP 601.A3 5-1 (ADS LPCS/RHR A Pump Permissive)
		Comment:

<u>Examiner Note</u>: Following step is from ARP 4.601.A3 5-1 (ADS LPCS/RHR A Pump Permissive)

<u>Examiner Note</u>: Refer to the following:

5-1 WINDOW	SOURCE	AUTOMATIC ACTIONS
ADS LPCS/RHR A PUMP RUNNING PERMISSIVE	RHR A Discharge Pressure GE 125 psig (RHR-PS-19A) or (RHR-PS-16A) or LPCS-P-1 Discharge Pressure GE 144 psig (LPCS-PS-1) or (LPCS-PS-9)	None

The SOURCE (as shown) on the ARP page insinuates that RHR-PS-19A OR RHR-PS-16A is needed to the cause the alarm while in actuality, both are needed to cause the alarm. In this case, RHR-PS-19A will be found to be isolated (prior CGS OE) thereby preventing the alarm.

In any case, the CRS should refer to the applicable Technical Specification.

	BOP	☐ 1. BOP refers CRS to Technical Specification 3.3.5.1
		Comment:
	CRS/BOP	☐ Dispatches operator or calls Work Week Manager to investigate the status of RHR pressure switches (RHR-PS-16A and 19A)
		Comment:

BOOTH NOTE: If directed to investigate both pressure switches at once then, wait 2 minutes and make both reports at once.

BOOTH ROLEPLAY – <u>If directed to investigate anything abnormal with RHR-PS-16A</u>, wait 2 minutes then report "Nothing abnormal found with RHR-PS-16A."

BOOTH ROLEPLAY – <u>If directed to investigate anything abnormal with RHR-PS-19A</u>, wait 2 minutes then report "RHR-PS-16A was found isolated."

	CRS	Evaluates Technical Specification 3.3.5.1 and determines the following action applies: ☐ LCO 3.3.5.1 Action G.2 – Restore channel (RHR-PS-19A) to operable status within 8 days
		Comment:

<table>
<tr><td colspan="3">EVENT No. 2</td></tr>
<tr><td colspan="3">Description: Control rod (26-19) drifts out. Once inserted, releasing the continuous insert pushbutton allows the control rod to drift out again, requiring the control rod to be isolated (Tech Spec)

Event is initiated after RHR “A” is in Suppression Pool Cooling and associated Tech Spec call made (or as directed by the Exam team) and is activated using TRIGGER 2.</td></tr>
<tr><td colspan="3">BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 2</u></td></tr>
<tr><td>Time</td><td>Position</td><td>Applicants Actions or Behavior</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">BOP</td><td>☐ Responds to H13-P603, peer checks what rod is drifting, and acknowledges and resets the ROD DRIFT alarm (603.A7 5-7)</td></tr>
<tr><td>Comment:</td></tr>
<tr><td colspan="3"><u>Examiner Note</u>: Following Immediate Action steps are from ABN-ROD (section 3.1)</td></tr>
<tr><td rowspan="4"></td><td rowspan="4">ATC</td><td><u>NOTE</u>: The definition of a drifting control rod is any control rod that triple notches (moves two or more notches beyond its intended position) following a withdraw or Insert signal (directional control valve failure or stuck collet), or any rod that moves at least one notch from its original position with no Withdraw or Insert signal applied. {AR-226687}

☐ 3.1.2: Selects the drifting control rod (26-19)</td></tr>
<tr><td>Comment:</td></tr>
<tr><td>☐ 3.1.3: Performs the following:
• 3.1.3.a: Depresses the Continuous Insert pushbutton
• 3.1.3.b: Drives the control rod to its FULL IN position

<u>NOTE</u>: If the control rod drifts back out when the CONTINUOUS INSERT pushbutton is released, then the CONTINUOUS INSERT pushbutton will need to be held depressed until the control rod can be isolated.

• 3.1.3.c: Releases the Continuous Insert pushbutton
• 3.1.3.d: If the control starts to drift back out, then performs the following:
  ▪ 3.1.3.d.1): Depresses and Holds the Continuous Insert pushbutton
  ▪ 3.1.3.d.2): Informs CRS that control rod 26-19 needs to be isolated at its HCU</td></tr>
<tr><td>Comment:</td></tr>
</table>

EVENT No. 2 (CONTINUED)		
	CRS	☐ Enters ABN-ROD
		Comment:
	BOP	☐ Directs field operator to hydraulically isolate control rod 26-19 per ABN-ROD step 4.1.2.a
		Comment:
BOOTH ROLEPLAY – <u>If directed to hydraulically isolate control rod 26-19</u>, wait 2 minutes then insert <u>Trigger 1</u>, report "Control rod 26-19 hydraulically isolated per ABN-ROD, step 4.1.2.a."		
<u>Examiner Note</u>: Following Subsequent Action steps are from ABN-ROD (section 4.1)		
	ATC	☐ 4.1.2.b: Once report received control rod 26-19 hydraulically isolated, releases the Continuous Insert pushbutton
		Comment:
		☐ 4.1.3: Resets the Control Rod Drift annunciator using ROD DRIFT RESET pushbutton on H13-P603 (may be already reset by BOP)
		Comment:
	CRS	☐ 4.1.5: Notifies the SNE
		Comment:
		☐ 4.1.6: Initiates (or direcs) a MON Run to verify acceptible thermal limits and preconditioning
		Comment:
		☐ 4.1.7: Determines if the problem is generic in nature (CRS will call SNEs and station management to make this determination)
		Comment:
		☐ 4.1.8: Refers to Technical Specification 3.1.3 (see next page)
		Comment:
		☐ 4.1.9 & 4.1.10: Performed by calling for help external to the Main Control Room (Event 3 may occur prior to the CRS making these notifications).
		Comment:

EVENT No. 2 (CONTINUED)		
<u>Examiner Note</u>: Management expectation is to declare the control rod INOP (even though it is not considered INOP per Technical Specifications).		
	CRS	Evaluates Technical Specifications and determines the following actions apply: ☐ LCO 3.1.3 C.1 – Insert control rod 26-19 within 3 hours
		Comment:
		☐ LCO 3.1.3 C.2 – Disarm control rod 26-19 HCU within 4 hours
		Comment:

EVENT No. 3

Description: Standby Service Water Pump 1A (SW-P-1A) trips which requires RHR Pump 2A (RHR-P-2A) (currently in Suppression Pool Cooling) to be manually secured (Tech Spec)

Event is initiated after control rod 26-19 HCU has been isolated and associated Tech Spec call made (or as directed by the Exam team) and is activated using **TRIGGER 3**.

BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 3</u>

<u>Examiner Note</u>: This event starts with several BISIs (Bypass and Inoperable Status Indicators) common with SW-P-1A to illuminate which causes several annunciators to alarm. The main annunciator the BOP should pursue is at H13-P840 (840.A5 2-2 (SW Pump A Motor OL/ Gnd))

Time	Position	Applicants Actions or Behavior
	BOP	☐ Amongst all annunciators in alarm, recognizes that a trip of Service Water Pump 1A has occurred
		Comment:
		☐ Silences lower priority annunciators and refers to ARP 840.A5 2-2 (SW Pump A Motor OL/ Gnd)
		Comment:

<u>Examiner Note</u>: Following steps are from ARP 840.A5 2-2 (SW Pump A Motor OL/ Gnd)

Time	Position	Applicants Actions or Behavior
	BOP	☐ 1: If SW-P-1A tripped then perform the following:
		• 1.d: Refers CRS to ABN-SW • 1.e: Informs CRS the DG1 Diesel Engine Mode Selector needs to be placed in MAINT (effectively make DG inoperable) • 1.f: Informs CRS to complete OSP-ELEC-W101 within 1 hour
		Comment:
		☐ 4: Refers CRS to Technical Specification 3.7.1
		Comment:
	CRS	☐ Enters ABN-SW
		Comment:
		☐ Directs DG1 Diesel Engine Mode Selector to be placed in MAINT
		Comment:

BOOTH ROLEPLAY – <u>If directed to place DG 1 Diesel Engine Mode Selector in MAINT</u>, wait 2 minutes then insert <u>Trigger 8</u>, report "DG 1 Diesel Engine Mode Selector is in MAINT."

BOOTH ROLEPLAY – If directed to investigate why SW-P-1A tripped, wait 5 minutes then report "SW-P-2A is very hot to the touch. Its breaker was found tripped."

<table>
<tr><td colspan="3">EVENT No. 3 (CONTINUED)</td></tr>
<tr><td colspan="3"><u>Examiner Note</u>: Following steps are from ABN-SW (section 4.2)</td></tr>
<tr><td></td><td>CRS</td><td>☐ 4.2.1: Places DG1 in MAINT (may have been previously performed)</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td colspan="3"><u>Examiner Note</u>: When CRS discusses need to complete OSP-ELEC-W101 (Offsite Station Power Alignment Check) inform them that it will be performed by another RO.</td></tr>
<tr><td></td><td>CRS</td><td>☐ 4.2.3: Directs OSP-ELEC-W101 completed within 1 hour of DG1 being declared inoperable</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td>BOP</td><td>☐ 4.2.5: IF SW “A” flow is lost (non LOCA), and Adequate Core Cooling and Containment Integrity is assured, then secures the following operating pump:
• RHR-P-2A</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td colspan="3"><u>Examiner Note</u>: CRS may direct the BOP to exit the Suppression Pool Cooling lineup on RHR Loop “A”.</td></tr>
<tr><td colspan="3"><u>Examiner Note</u>: Following steps are from SOP-RHR-SPC (section 5.2)</td></tr>
<tr><td></td><td>BOP</td><td>☐ 5.2.1: Notifies HP that the actions to stop Suppression Pool Cooling may potentially change radiological conditions.</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>☐ 5.2.2: Verifies RHR-V-3A open</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td>NOTE: RHR-V-24A may be closed concurrently with opening RHR-V-48A.

☐ (Two handed operation) 5.2.3: Verifies RHR-V-24A open</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
<tr><td></td><td></td><td><u>CAUTION</u>
To minimize cavitation and elevated pump hydraulic loads/vibrations, minimize operating with RHR-FCV-64A (Minimum Flow) as its only discharge path. {C-9448}

☐ (Two handed operation) 5.2.4: Closes RHR-V-24A</td></tr>
<tr><td></td><td></td><td>Comment:</td></tr>
</table>

EVENT No. 3 (CONTINUED)		
	BOP	☐ 5.2.5: Stops RHR-P-2A (may already be stopped)
		Comment:
		☐ 5.2.6: Verifies RHR-V-64A closed
		Comment:
<u>Examiner Note</u>: Crew will not have time to complete step below.		
	BOP	☐ 5.2.7: Verifies RHR Loop "A" is in Standby Status per SOP-RHR-STBY
		Comment:
<u>Examiner Note</u>: Continuing steps from ABN-SW (section 4.2)		
	CRS	☐ 4.2.12: Enters SW-SYS-A and DG-SYS-A as inoperable in the Plant Logging System (see below)
		Comment:
		Evaluates Technical Specifications and the LCS and determines the following actions apply: ☐ LCO 3.7.1 Action B.1 which requires restoring SW-SYS-A to operable status within 72 hours
		Comment:
		☐ LCO 3.8.1 Action B.1 which requires performing SR 3.8.1.1 for operable offsite circuits (OSP-ELEC-W101 (Offsite Station Power Alignment Check)) within 1 hour and every 8 hours thereafter (discussed earlier)
		Comment:
		☐ LCO 3.8.1 Action B.2 which requires declaring required feature(s) supported by DG 1, inoperable when the redundant required feature(s) are inoperable within 4 hours of DG1 going inoperable concurrent with the inoperability of the redundant required feature(s)
		Comment:
		☐ LCO 3.8.1 Action B.3.1 which requires determining operable DGs are not inoperable due to common cause failure within 24 hours **– OR -** ☐ LCO 3.8.1 Action B.3.2 which requires performance of SR 3.8.1.2 for operable DGs within 24 hours (if not performed in the past 24 hours)
		Comment:
<u>Examiner Note</u>: Technical Specification entries continued on next page.		

EVENT No. 3 (CONTINUED)		
	CRS	☐ LCO 3.8.1 Action B.4.1 which requires restoring DG1 to operable status within 72 hours of DG1 becoming inoperable AND within 6 days of failure to meet LCO (the 72 hours is more restrictive in this case) **- OR -** ☐ LCO 3.8.1 Action B.4.2.1 which requires establishing risk management actions for the alternate AC sources within 72 hours AND LCO 3.8.1 Action B.4.2.2 which requires DG1 to be restored to operable status within 14 days after being declared inoperable but in no case longer than 17 days from failure to meet LCO
		Comment:
		☐ Directs the following systems to be Protected per PPM 1.3.83 (Protected Equipment Program) Attachment 7.1 (based on SW Pump "A" and DG1 unavailability) • DG-SYS-B • SW-SYS-B • HPCS (P-1, DG, & SW) • RHR-SYS-B • RHR-SYS-C • E-TR-S • E-TR-B • ADS-SYS-B • H13-P800 Bd. C Control and Indication areas
		Comment:

EVENT No. 4

Description: Reactor Feed Pump (RFP) "B" vibrations rise requiring RRC Flow reduction and manual trip of the "B" RFP

Event is initiated after RHR Pump "A" is secured and associated Tech Spec call made (or as directed by the Exam team) and is activated using **TRIGGER 4**.

BOOTH OPERATOR – As briefed or when directed activate TRIGGER 4

Time	Position	Applicants Actions or Behavior
	ATC	☐ Acknowledges annunciator 804.A1 7-5 (TURB B VIB TROUBLE) and informs CRS
		Comment:

Examiner Note: Vibration levels for RFP "B" Turbine Radial Inboard Bearing (see ARP page below) are considered at the ALERT setpoint when it reaches 3 mls and at the DANGER setpoint when it reaches 4.5 mls.

SOURCES	ALERT SETPOINT	DANGER SETPOINT
RFW-VBI-XE/P1B - Pump Axial Thrust Displacement (second NOTE)	± 15 mls	± 18 mls
RFW-VBI-1B/XS/P0BXY - Pump Radial Outboard Bearing Vibration	3 mls	4.5 mls
RFW-VBI-1B/XS/P1BXY - Pump Radial Inboard Bearing Vibration (see NOTE)	3 mls	4.5 mls
RFW-VBI-XE/T1B - Turbine Axial Thrust Displacement (first NOTE)	± 12 mls	± 15 mls
RFW-VBI-1B/XS/T1BXY - Turbine Radial Inboard Bearing Vibration	3 mls	4.5 mls
RFW-VBI-1B/XS/T01BXY - Turbine Radial Outboard Bearing Vibration	3 mls	4.5 mls
RFW-VBI-1B/XS/TE - Turbine Eccentricity	4 mls	6 mls

Examiner Note: Following steps are from ARP 804.A1 7-5 (TURB B VIB TROUBLE)

Time	Position	Applicants Actions or Behavior
	BOP	☐ 1: Directs field operator to investigate source of the vibration using RFW-VMP-1 on TB 441 Elev
		Comment:

BOOTH ROLEPLAY – If sent to investigate high vibrations on vibration panel, wait 2 minutes then report "RFP "B" Turbine Radial Inboard Bearing reads 3.1 mls up slow. All other bearing vibration levels are normal."

BOOTH ROLEPLAY – If sent to investigate high vibrations locally at turbine, wait 2 minutes then report "RFP "B" Turbine sounds slightly different than what I'm used to hearing."

Time	Position	Applicants Actions or Behavior
	BOP	☐ 2: Verifies reported vibration is above is above the applicable alarm setpoint (3 mls)
		Comment:

EVENT No. 4 (CONTINUED)		
<u>**Examiner Note**</u>**: Bearing vibration will continue to rise above the DANGER level (4.5 mls) even after ARP step 4 is completed below.**		
	CRS	☐ Directs BRO to adjust lead Feed Pump bias to minimize load on RFP "B" (as described below)
	BOP	<u>NOTE</u>: A maximum delta RPM of 350 RPM between the RFTs, not to exceed a flow rate of 19,000 gpm and 4900 RPM on the lead RFT. ☐ 4: If any value is above the ALERT setpoint, but below the DANGER setpoint, then adjust the lead Feed Pump bias to minimize load on the affected Reactor Feedwater Pump/Turbine ("B") as follows: • Raise RFW-P-1A Speed using RFT-COMP-1or RFT-COMP-2 (Pump Control Screen) • Lower RFW-P-1B Speed using RFT-COMP-1or RFT-COMP-2 (Pump Control Screen) • Verify feed pump speed controllers are stable and not hunting
		Comment:
		☐ Directs field operator to report current vibrations on the RFP "B" Turbine Radial Inboard Bearing
		Comment:
BOOTH ROLEPLAY – <u>**If directed to report current vibrations on vibration panel BEFORE BIAS ADJUSTMENT MADE**</u>**, then report "RFP "B" Turbine Radial Inboard Bearing reads** <u>**3.6 mls**</u> **up slow.**		
BOOTH ROLEPLAY – <u>**If directed to report current vibrations on vibration panel AFTER BIAS ADJUSTMENT MADE**</u>**, then report "RFP "B" Turbine Radial Inboard Bearing reads** <u>**4.7 mls**</u> **up slow."**		
BOOTH ROLEPLAY – <u>**If directed to report current vibrations on any other bearing**</u> **report "All other bearing vibration levels are normal."**		
BOOTH ROLEPLAY – If directed to report when bearing vibration level reaches the DANGER setpoint of 4.5 mls then only report <u>**AFTER BIAS ADJUSTMENT MADE**</u>**, that the "RFP "B" Turbine Radial Inboard Bearing reads** <u>**4.5 mls**</u> **up slow."**		
	ATC	☐ 5: If any indicated value is sustained at or above the DANGER setpoint following feed pump load reduction via bias adjustment, then reduce Reactor Power with Reactor Recirculation flow incrementally, within the capacity of one Reactor Feed Pump, to reduce vibrations (Consider 1-5% step changes in Reactor Power while monitoring vibrations)
		Comment:
	SRO	☐ Directs ATC to reduce reactor power with RRC flow using (1-5%) step changes while monitoring bearing vibrations
		Comment:

EVENT No. 4 (CONTINUED)		
<u>Examiner Note</u>: Intent is to report bearing vibration level above the DANGER (4.5 mls) setpoint throughout the flow reduction. Vibration level will continue to trend up slowly but once power has been reduced approximately 5%, a call will come in from the field that the "B" RFP is vibrating excessively and should be tripped immediately.		
<u>Examiner Note</u>: For credit (as written) the ATC operator has to be the one to trip the "B" RFP		
	CRS	☐ 6: If any indicated value is sustained at or above the DANGER setpoint following feed pump load reduction via bias adjustment, then reduce Reactor Power with Reactor Recirculation flow incrementally, within the capacity of one Reactor Feed Pump, to reduce vibrations (Consider 1-5% step changes in Reactor Power while monitoring vibrations) ☐ CRS directs power reduction
		Comment:
	ATC	Reduces reactor power with RRC flow as follows: ☐ Notes reactor power and/or Main Generator output (MWe) ☐ Refers to SOP-RRC-FLOW-QC quick card and performs the following per section 2.1 (Reactor Power change with RRC Flow controllers in Auto): • 2.1.1: Monitors fuel pre-conditioning limits (per PPM 9.3.18) while changing reactor power • 2.1.2: Lowers RRC flow using RTC-M/A-R675 (Master controller) as necessary (below sub-steps are good practice steps) ▪ Observes lowering frequency on both RRC pumps ▪ Verifies reactor power lowers and RFPs respond to maintain RPV level • 2.1.3: Verifies total core flow is less than 105% • 2.1.4: Verifies RRC Loop A and B is less than 57.5 Mlbm/hr • 2.1.5: Notifies CRS when change in power is complete
		Comment:
	BOP	☐ May peer check ATC reactivity manipulation ☐ Maintains communication with field operator to monitor vibration levels
		Comment:
BOOTH ROLEPLAY – <u>If directed to report current vibrations during power reduction</u>, then report "RFP "B" Turbine Radial Inboard Bearing reads <u>5.2 mls</u> up slow."		
BOOTH ROLEPLAY – <u>Once reactor power has been lowered approximately 5%</u>, make the following report (make it sound urgent): "The "B" RFP is vibrating excessively and should be tripped immediately."		

EVENT No. 4 (CONTINUED)

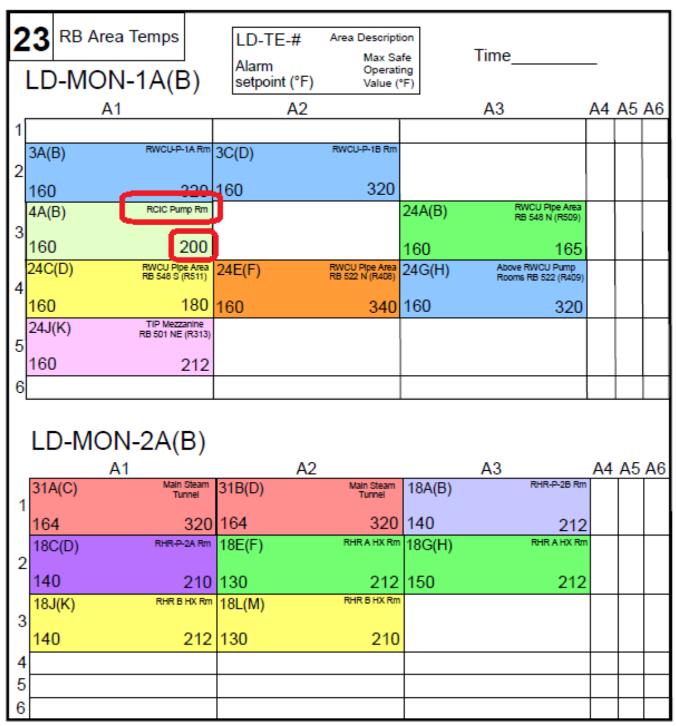
	CRS	☐ Directs tripping RFW-P-1B per step 6 of ARP (840.A1 7-5) or out of concerns for equipment safety
		Comment:
	ATC	☐ Trips the "B" Feed Turbine
		Comment:
		☐ Monitors for RRC Runback to 30Hz (both pumps)
		Comment:
		☐ Verifies RFP "A" responds properly to transient in controlling RPV level
		Comment:
		☐ When plant stabilizes, provides reactor power, pressure and level to CRS
		Comment:
	BOP	☐ Make plant announcement concerning reactor power and RFP status
		Comment:
		☐ Follows up with ARP 840.A1 1-5 (TURB B TRIP) (as time permits) • 1: Verifies proper RRC Runback occurred • 2: Verifies MS-V-172B closed (RFW-P-1B High Press Stop Valve) • 3: Verifies BS-V-60B closed (RFW-P-1B Low Press Stop Supply) NOTE: The following occurs after turbine 1st stage pressure reaches LT 10 psig. • 4: Verifies the following open: ▪ BS-V-44B (BS-V-60B Body Drain) ▪ BS-V-45B (RFW-DT-1B Stage Drain) ▪ MS-V-142B (RFW-P-1B HP Stop Above Seat Drain) NOTE: 30 seconds after MS-V-172B and BS-V-60B close, the following will occur. • 5: Verifies RFW-FCV-2B is closed (Pump Minimum Flow) • 6: When RFW-DT-1B slows to less than 1 rpm, and lube oil is available, then place RFW-DT-1B Turning Gear Control to Auto Engage
		Comment:

EVENT No. 4 (CONTINUED)		
	BOP	☐ May direct field operator to reset vibration panel alarms (to clear MCR annunciator)
		Comment:
BOOTH ROLEPLAY – If directed to reset local vibration panel alarm, then activate TRG-7 (MCR annunciator will clear)		

EVENT No. 5		
Description: Operating Bases Earthquake causes a steam leak in the RCIC Pump Room with Failure of RCIC-V-8 and RCIC-V-63 to fully close (preventing RCIC leak isolation). Manual scram inserted before first secondary containment max safe operating temperature is reached. Event is initiated after the “B” RFP has been tripped and the plant is stabilized (or as directed by the Exam team) and is activated using **TRIGGER 5**.		
BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 5</u>		
<u>Examiner Note</u>: First annunciator (601.A3 5-7 (LEAK DET RCIC EQUIP AREA DT HIGH)) indicative of RCIC steam leak does occur not until about 3 minutes after the OBE.		
<u>Examiner Note</u>: RCIC maximum safe operating temperature (1st Max Safe) will not be reached for at least the next 15 minutes.		
Time	**Position**	**Applicants Actions or Behavior**
	BOP	☐ Acknowledges annunciator 851.S1 5-1 (OPERATING BASIS EARTHQUAKE EXCEEDED) and informs CRS
		Comment:
<u>Examiner Note</u>: Following steps are from ARP 4.851.S1 5-1 (OPERATING BASIS EARTHQUAKE EXCEEDED)		
	BOP	☐ 1: Identifies alarm on H13-P823 (Board L) (BOP “goes to the back” to check Board “L” indications) – Reports all red and all amber shock lights illuminated (indication of seismic strength) ☐ 2: Refers CRS to ABN-EARTHQUAKE
		Comment:
	CRS	☐ Enters ABN-EARTHQUAKE
		Comment:
<u>Examiner Note</u>: Following steps are from ABN-EARTHQUAKE (due to higher plant priorities only certain actions will be listed here – Crew may not get to all of them)		
	CRS	☐ 4.2: Verify adequate systems are available for safe shutdown and cooldown of reactor (will verify equipment operability against turnover sheet)
		Comment:
		☐ 4.4: Discusses need to initiate controlled reactor shutdown per PPM 3.2.1
		Comment:
	BOP	☐ 4.7: Makes announcement per ABN-EARTHQUAKE step 4.7
		Comment:

EVENT No. 5 (CONTINUED)		
	BOP	☐ 4.8: Directs SAS (Secondary Alarm Station) to repeat above announcement on the Alternate Security/ Area Wide and Security radio channels
		Comment:
BOOTH ROLEPLAY – <u>If directed to repeat announcement as SAS</u>, then repeat back direction (BOP does this by talking over the chain to the Booth Operator or calling the Booth)		
	CRS	☐ 4.10: Directs crew to check for any indications of RCS leakage or any other equipment issues
		Comment:
	BOP	☐ 4.11: Directs field operator to check the Spent Fuel Pool for damage
		Comment:
BOOTH ROLEPLAY – <u>If directed to check Spent Fuel Pool for damage</u>, wait 3 minutes then report "There are no signs of damage to the Spend Fuel Pool."		
	ATC	☐ Actively monitors reactor power, pressure and level for abnormalities
		Comment:
		☐ 4.1.14 Checks neutron monitoring system for proper operation and changes
		Comment:
	CRS	☐ 4.1.15: Directs initial plant inspection
		Comment:
<u>Examiner Note</u>: RCIC steam leak starts. Annunciator 601.A3 5-7 (LEAK DET RCIC EQUIP AREA DT HIGH) comes in first quickly followed by annunciators 601.A3 1-4 & 601.A2 1-2 (LEAK DET RCIC EQUIP AREA TEMP HI-HI). BOP should address the higher priority alarms.		
	BOP	☐ Acknowledges annunciators 601.A3 1-4 / 601.A-2 1-2 (Leak Detection RCIC Equip Area Hi-Hi) and informs CRS
		Comment:
<u>Examiner Note</u>: Following steps from ARPs 601.A3 1-4 / 601.A2 1-2 (Leak Detection RCIC Equip Area Hi-Hi)		
	BOP	☐ 1: Identifies alarming point(s) on LD-MON-1A on H13-P632
		Comment:
		☐ 2: Compares alarming point(s) on LD-MON-1B on H13-P642
		Comment:

EVENT No. 5 (CONTINUED)		
	BOP	☐ 3: Informs CRS of alarming points and trend (RCIC Pump Room DT > 50°F) (which is a PPM 5.3.1 (Secondary Containment Control) entry condition)
		Comment:
	CRS	☐ Enters PPM 5.3.1 (Secondary Containment Control) on RCIC Pump Room DT > 50°F (Table 22)
		Comment:
	BOP	☐ 4 & 5: Determines the status of the following RCIC components: • RCIC-V-63 (should be closed but remains intermediate) • RCIC-V-76 closed (already closed) • RCIC-V-8 (should be closed but remains intermediate) • RCIC Turbine (should be tripped and is tripped) ☐ Reports to CRS that RCIC-V-63 and RC-V-8 did not fully close (indicate intermediate) and that RCIC did not isolate
		Comment:
		☐ 6: May direct field operator to SAFELY investigate possible steam leak in the RCIC Pump Room (before becoming too large)
		Comment:
BOOTH ROLEPLAY – <u>If directed to investigate RCIC Pump Room leak</u>, wait 2 minutes then report "The RCIC Pump Room appears unsafe to enter based on high temperature and humidity."		
	BOP	☐ 8 & 10: Refers CRS to ABN-HELB and to Technical Specification 3.3.6.1
		Comment:
<u>Examiner Note</u>: Following steps are from ABN-HELB (Line Break) (section 4.2)		
	CRS	☐ 4.2.1: Directs evacuation of all non-emergency personnel from the Reactor Building This will be directed to the BOP operator who will refer to the blue sheets and PA binder by the PA speaker
		Comment:
	BOP	☐ Makes evacuation announcement as directed
		Comment:

EVENT No. 5 (CONTINUED)		
	CRS	☐ Directs the BOP to obtain the keys for RCIC-V-8 and RC-V-63 and attempt to manually shut them (May also be directed from 5.3.1, SC-9, below)
		Comment:
	BOP	☐ With keys in hand, inserts one key into keylock switch for RCIC-V-63 and takes it to close ☐ Inserts second key into keylock switch for RCIC-V-8 and takes it to close ☐ Reports to CRS that RCIC could not be manually isolated (RCIC-V-63 and RCIC-V-8 did not close)
		Comment:
	CRS	☐ Requests assistance in getting RCIC-V-8 closed (more accessible than RCIC-V-63) although any attempt will be unsuccessful
		Comment:
BOOTH ROLEPLAY – If directed to close RCIC-V-8 locally, wait 20 minutes then report "I'm here with maintenance. We could not close RCIC-V-8. It appears mechanically bound."		
	CRS	☐ Establishes a Key Plant Parameter for RCIC Pump Room temperature below the Max Safe value of 200°F (see below) 
		Comment:

EVENT No. 5 (CONTINUED)		
	BOP	☐ Trends RCIC Pump Room temperature as Key Plant Parameter and notifies CRS when value reached
		Comment:
CT #1 - With reactor at power and with primary system discharging into secondary containment, manually scram reactor before any area exceeds its maximum safe operating temperature.		
	CRS	☐ When notified Key Plant Parameter has been reaced, updates the crew on plant conditions then enters PPM 5.1.1 (RPV Control)
		Comment:
		☐ Directs ATC to scram the reactor
		Comment:
<u>Examiner Note</u>: Following steps are Immediate Actions from PPM 3.3.1 (Reactor Scram)		
	ATC	☐ 6.1.1: Places Reactor Mode Switch to Shutdown
		Comment:
		☐ 6.1.2: Monitors reactor power, pressure and level
		Comment:
		☐ 6.1.5: Inserts SRM and IRM monitors (detectors)
		Comment:
		☐ After above three steps ATC makes scram report to CRS: • Mode switch is in Shutdown • APRMs are downscale • RPV pressure is (value and trend) • RPV level is (value and trend) • EOP entry on low RPV level (and possibly high Drywell pressure)
		Comment:
	CRS	☐ Repeats back scram report
		Comment:
	ATC	☐ 6.1.6: After CRS repeat back, reports all control rods are IN
		Comment:

EVENT No. 5 (CONTINUED)		
	CRS	☐ Enters PPM 5.1.1 (RPV Control) on low RPV level (+13 inches)
		Comment:
	CRS	☐ Directs BOP to verify containment isolations occurred at +13 inches
		Comment:
	BOP	☐ Verifies +13 inch containment isolation valves closed on the Isolation Control panel: • RHR-V-8, RHR-V-9 • RHR-V-40, RHR-V-49 • RHR-V-60A, RHR-V-60B • RHR-V-75A, RHR-V-75B
		Comment:
<u>Examiner Note</u>: Following steps are Subsequent Actions from PPM 3.3.1 (Reactor Scram)		
	ATC	☐ 6.2.5.a: Verify Recirc pumps have run back to 15 Hz
		Comment:
		☐ 6.2.6: Range down on IRMs, as necessary, to follow power decrease
		Comment:
	BOP	☐ 6.2.7: Make PA announcement for reactor scram
		Comment:
	ATC	☐ 6.2.8: Transfers level control to RFW-FCV-10A/B per SOP-RFW-FCV-QC quick card
		Comment:
	BOP	☐ 6.2.9: If necessary (with Main Generator load < 50 MWe): • If Main Turbine did not trip – simultaneously depress both Emerg Trip pushbuttons (H13-P820) • If Main Generator did not trip –depress either Unit Emergency Tip pushbutton or Unit Overall Trip pushbutton (H13-P800) • Verify power transfer to Startup Transformer (TR-S)
		Comment:

EVENT No. 5 (CONTINUED)		
Examiner Note: **Following steps are from SOP-RFW-FCV-QC (Transfer RPV Level Control to RFW-FCV-10A/10B - Quick Card).**		
	ATC	☐ 2.1.1: (2-handed operation) Starts closing RFW-V-112A and RFW-V-112B
		Comment:
		☐ 2.1.2: Starts opening RFW-V-118
		Comment:
		☐ 2.1.3: Verifies RFW-V-109 is closed
		Comment:
		☐ 2.1.4: (2-handed operation) Verifies RFW-V-117A and RFW-V-117B open
		Comment:
		☐ 2.1.5: Verifies RFW-LIC-620 is in Manual (V selected for Valve position demand with 0 output)
		Comment:
		☐ 2.1.6: IF Reactor Feed Pump(s) (RFP) are operating, then performs the following: • 2.1.6.a: Verifies RFPs have ramped down in speed • 2.1.6.b: Places RFW-P-1B in MDEM mode • 2.1.6.c: Places RFW-P-1B in MDEM mode • 2.1.6.d: Controls turbine speed as required • 2.1.6.e: If desired, then places RFW-FCV-2A(B) in Manual and slowly open to approximately 80%
		Comment:
		CAUTION Uncontrolled injection may occur if RPV pressure drops below 600 psig with RFW-V-112A and RFW-V-112B NOT FULLY CLOSED. ☐ 2.1.7: Verifies RFW-V-112A and RFW-V-112B are fully closed
		Comment:
		☐ 2.1.8: Verifies RFW-V-118 is fully open
		Comment:

EVENT No. 5 (CONTINUED)		
	ATC	☐ 2.1.9: IF Reactor Feed Pump(s) (RFP) are operating, then adjusts the running RFP speed to establish ~ 200 psid across RFW-FCV-10A & 10B using either Feedwater touch screen (H13-P840)
		Comment:
		☐ 2.1.10: Adjusts RFW-LIC-620 manual output to control RPV level
		Comment:
		☐ 2.1.12: If unable to control RPV level with RFW-FCV-10A/B, then considers throttling RFW-V-109 or RFW-V-118 to control RPV level
		Comment:
	CRS	☐ Directs BOP to maintain RPV pressure band from 800 to 1050 psig using DEH in automatic (may direct BOP to establish a new pressure band of 500-600 psig with DEH in automatic to reduce the driving head of the leak into secondary containment)
		Comment:
	BOP	☐ Lowers RPV pressure if directed using SOP-DEH-QC (Main Turbine DEH Operations Quick Card): • 2.1.1a: Selects PRESSURE TARGET • 2.1.1b: Enters desired pressure • 2.1.1c: Selects OK • 2.1.1.d: If change in pressure rate is desired: ▪ 1: Selects PRESSURE RATE ▪ 2: Enters desired PRESSURE RATE ▪ 3: Selects OK • 2.1.1.e: Selects GO • 2.1.1.f: Selects YES • 2.1.1.g: Verifies pressure demand and throttle pressure change at the pressure rate.
		Comment:

EVENT No. 6		
Description: Steam leak develops in the Main Steam Tunnel Event is activated at the beginning of the scenario and is realized 3 minutes after the Reactor Mode Switch is taken to Shutdown.		
Examiner Note: First annunciator (601.A3 3-8 (LEAK DET MSL TUNNEL DT HIGH)) indicative of a Main Steam Line break does not occur until about 6 minutes after the scram.		
Examiner Note: Annunciator 601.A3 3-8 (LEAK DET MSL TUNNEL DT HIGH) comes in first quickly followed by annunciators 601.A3 1-7 & 601.A2 3-1 (LEAK DET MSL TUNNEL TEMP HIGH). BOP should address the higher priority alarms.		
	BOP	☐ Acknowledges annunciators 601.A3 1-7 / 601.A2 3-1 (LEAK DET MSL TUNNEL TEMP HIGH) and informs CRS
		Comment:
Examiner Note: Following steps from ARPs 601.A3 1-7 / 601.A2 3-1 (LEAK DET MSL TUNNEL TEMP HIGH)		
	BOP	☐ 1: Identifies alarming point(s) on LD-MON-2A on H13-P632
		Comment:
		☐ 2: Compares alarming point(s) to temperatures on LD-MON-2B on H13-P642 and recognizes steam leak appears to be on MSL "A"
		Comment:
		☐ 3: Informs CRS of alarming points and trend on MSL "A" (MSL Tunnel > 80°F) (which is a PPM 5.3.1 (Secondary Containment Control) entry condition)
		Comment:
	CRS	☐ Re-enters PPM 5.3.1 (Secondary Containment Control) on MSL Tunnel DT > 80°F (Table 22)
		Comment:
	BOP	☐ 4 & 5: Determines the status of the NSSSS Group 1 isolation which should have occurred – See Event 7 (next page)
		Comment:

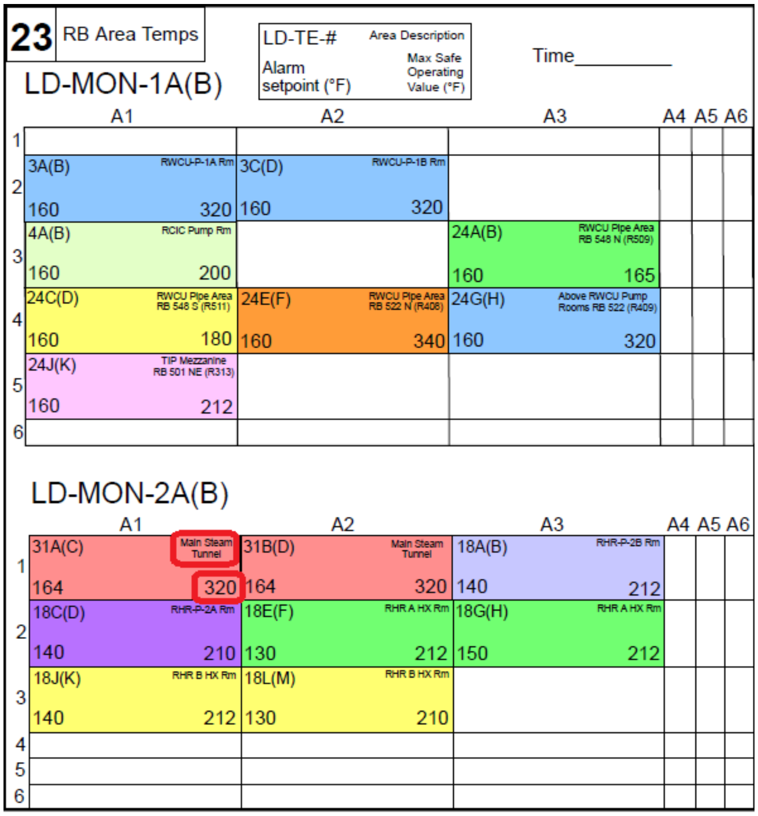
EVENT No. 7		
Description: MS-V-22A and MS-V-28A through D fail to automatically close (MS-V-28A through D can be closed manually but does not isolate leak) Event is activated at the beginning of the scenario and is realized when the MSIVs do not close as expected.		
	BOP	☐ Recognizes that MS-V-22A and MS-V-28A through D failed to automatically close based on Group 1 isolation signal
		Comment:
		☐ Attempts to close MS-V-22A and MS-V-28A through D and notes that all valves closed except for MS-V-22A
		Comment:
		☐ Informs CRS of the failure of MS-V-22A and MS-V-28A through D to auto close and that after manual close attempt all valves closed with exception of MS-V-22A
		Comment:
		☐ Takes MSIV switches for those MSIVs that automatically shut to the Closed position
		Comment:
		☐ Informs crew that pressure control is with SRVs (using previously provided band)
		Comment:
		☐ Reports that Main Steam Tunnel temperature continues to rise
		Comment:

EVENT No. 8

Description: Emergency Depressurization (PPM 5.1.3) is performed when two areas exceed their max safe operating temperature

CRS

☐ Establishes a Key Plant Parameter for Main Steam Tunnel temperature of 320 °F (Max Safe value) (see below)



Comment:

BOP

☐ Trends MSL Tunnel temperature as Key Plant Parameter and notifies CRS when value reached

Comment:

CRS

☐ Directs second operator verify max safe temperature in two areas has been exceeded

Comment:

ATC

☐ Verifies max safe temperature in two areas has been exceeded

Comment:

EVENT No. 8 (CONTINUED)

CT #2 - With a primary system discharging into secondary containment and area temperature exceeding maximum safe operating level in more than one area, initiate Emergency Depressurization (ED) by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of second MSOT being exceeded.

Note: If the crew properly elects to invoke the "EMERG DEPRESS is anticipated" override in ppm 5.1.1 (RPV Control) and in doing so, the second maximum safe operating level is not exceeded, this Critical Task is considered to be met.

	CRS	☐ When verified Key Plant Parameter has been reached, updates the crew on plant conditions, exits the pressure leg of PPM 5.1.1 (RPV Control) via override then enters PPM 5.3.1 (Emergency RPV Depressurization)
		Comment:
		☐ Determines a high Drywell pressure signal is not sealed in
		Comment:
		☐ Determines Wetwell level is > 17 feet
		Comment:
		☐ Directs 7 SRVs be opened (ADS preferred) (ADS SRVs are those with the red stripe on left side of their nameplate)
		Comment:
	BOP	☐ Opens 7 SRVs (ADS preferred) as directed while verifying proper containment response as each is opened and reports completion to CRS
		Comment:
	CRS	☐ Directs pumps not required for Adequate Core Cooling be stopped from injecting
		Comment:
		☐ Directs RPV level band of -50 to +54 inches
		Comment:
	ATC	☐ Maintains RPV level as required to maintain RPV level band
		Comment:

TERMINATION CRITERIA: The scenario will be terminated when an Emergency Depressurization has been performed and RPV level is being controlled in the prescribed band OR as directed by the Examination Team.

TURNOVER

Initial Conditions:

- Columbia is operating at 85% power due to economic dispatch
- Safety Relief Valve 2C (MS-RV-2C) is known to be leaking
- Suppression Pool high temperature alarms (601.A11.1-3 and 601.A12.1-3) have just annunciated
- Reactor Closed Cooling (RCC) Pump 1B is tagged out for planned maintenance
- RCC-P-1A and RCC-P-1C are protected

Shift Turnover:

- After shift turnover place RHR-P-2A in Suppression Pool Cooling and allow SW-P-1A to auto start per SOP-RHR-SPC (section 5.1) – Steps 5.1.1 through 5.1.3 are complete
- The pre-evolution brief has been completed and operators are stationed near both pumps
- Maintain RHR-P-2B in operation for the next three (3) hours to satisfy pump PMT requirements

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	COLUMBIA GENERATING STATION SIMULATOR EXAMINATION
LESSON TITLE	Withdraw Control Rods during Startup; REA-FN-1B Trip requiring PPM 5.3.1 Entry and SGTS Start (TS); IRM "A" Upscale Failure with Half Scram; Loss of SL-11 (Re-energized from Alternate Source); RCIC-P-1 Coupling Found Broken; RHR-P-2B Suction Rupture (Lowering WW Level); SW-V-29 Fails to Auto Open; FDR-V-607 Fails to Close; Manual Scram on Low WW Level (Mode Switch Failure – Scram Pushbuttons Successful); ED performed on Low WW Level (One ADS Valve Fails to Open)

LENGTH OF LESSON 1.5 Hours

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code	LO001859	Rev. No.	0
JPM PQD Code		Rev. No.	
Exam PQD Code		Rev. No.	

DIVISION TITLE	Nuclear Training		
DEPARTMENT	Operations Training		
PREPARED BY	Dave E. Crawford	DATE	12/22/16
REVISED BY		DATE	
VALIDATED BY		DATE	

TECHNICAL REVIEW		DATE	
INSTRUCTIONAL REVIEW		DATE	
APPROVED	Operations Training Manager	DATE	

Facility:	Columbia Generating Station	Scenario No.:	4	Op Test No.:	1
Examiners:			Operators:		

Initial Conditions:	The reactor is in Mode 2 during reactor startup. Reactor is critical at 3% power with RPV pressure at approximately 300 psig. Reactor Building Exhaust Fan 1A (REA-FN-1A) is out of service for extended maintenance.
Turnover:	Withdraw control rods as required to establish and maintain Bypass Valves approximately 20% open. Continuous rod withdrawal permitted.

Critical Tasks:

CT-1	Manually scram the reactor before wetwell level drops below 19 feet 2 inches.
CT-2	When wetwell level cannot be maintained above 19 feet 2 inches, initiate emergency depressurization by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of wetwell level lowering to 19 feet 2 inches.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (ATC)	Withdraw control rods as required to establish and maintain the bypass valves approximately 20% open
2	TRG-2	C (BOP,SRO) TS (SRO)	Trip of REA-FN-1B results in a high reactor building pressure and entry into PPM 5.3.1 (EOP - Secondary Containment Control) (Tech Spec)
3	TRG-3	I (ATC,SRO)	IRM “A” fails upscale resulting in a half scram
4	TRG-4	C (BOP,SRO)	Differential current lockout of transformer (TR-1/11) results in a loss of SL-11 which requires bus to be re-energized from alternate source
5	N/A	C (ATC**,SRO) TS (SRO)	RCIC-P-1 coupling discovered broken (Tech Spec)
6	TRG-6	M (ALL)	Failure of the RHR-P-2A suction line results in lowering wetwell level
			FDR-V-607 fails to auto close due to a failed level switch (which allows flooding to continue into RCIC Pump Room). Cannot be closed manually
7	N/A	C (BOP)	SW-V-29 fails to auto open when HPCS-P-2 is started for wetwell makeup
8	N/A	C (ATC)	Reactor mode switch fails to scram reactor, requiring use of manual scram pushbuttons to scram reactor prior to wetwell level lowering to 19 feet 2 inches **(CT #1)**
9	N/A	---	Prior to wetwell level going below 19 feet 2 inches, the crew determines that wetwell level cannot be maintained ≥ 19 feet 2 inches and initiates RPV Emergency Depressurization (ED) with 7 SRVs opened **(CT #2)**
		C (BOP)	One ADS SRV (MS-RV-4D) fails to open requiring manually opening one non-ADS SRV **(CT #2)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Technical Specifications

** Normally assigned to BOP. NRC Evaluator will have to direct CRS to use ATC.

Target Quantitative Attributes	Actual	Description
Malfunctions after EOP entry (1-2)	**3**	SW-V-29 fails to auto open; Mode switch failure; ADS SRV fails to open
Abnormal events (2-4)	**3**	Fan REA-FN-1B trip; IRM "A" trip with half scram; Loss of SL-11
Major transients (1-2)	**2**	Primary containment failure; Manual scram
EOPs entered/requiring substantive actions (1-2)	**3**	PPM 5.1.1 (RPV Control); PPM 5.2.1 (Primary Containment Control); PPM 5.3.1 (Secondary Containment Control);
EOP contingencies requiring substantive actions (0-2)	**1**	PPM 5.1.3 (Emergency RPV Depressurization)
EOP-based Critical Tasks (2-3)	**2**	See Critical Task Determination table

Trigger (TRG-x)	Evaluator Directed	How Triggered	Purpose	Malfunction Numbers
TRG-2	YES	Manually	Event Initiator	PMP-SCN010S
TRG-3	YES	Manually	Event Initiator	MAL-NIS002A
TRG-4	YES	Manually	Event Initiator	ANN-800C3A02; BKR-EPS001; BKR-EPS004
TRG-6	YES	Manually	Event Initiator	MAL-RHR001; XMT-PCN006A; XMT-PCN007A; XMT-PCN003A; XMT-PCN004A
TRG-7		Manually	Event Initiator	BKR-RHR001
			Initial Condition	BKR-SCN001
			Initial Condition	MOV-SSW009F
			Initial Condition	MOV-RHR029F
			Initial Condition	SRV-RRS016C
			Initial Condition	AOV-SCN014F
			Initial Condition	OVR-RPS001A

SCENARIO 4 SUMMARY

Event 1

With reactor power at ~3% and reactor pressure at ~300 psig, the ATC operator withdraws control rods to restore and maintain Main Turbine Bypass Valves (BPVs) approximately 20% open as directed by PPM 3.1.2 (Startup Flowchart), Attachment 7.3, step Q32.

Event 2

(TRG-2) Trip of Reactor Building Exhaust Fan 1B (REA-FN-1B) results in a high Reactor Building pressure and entry into PPM 5.3.1 (EOP - Secondary Containment Control). Secondary containment becomes inoperable. ARP 4.812.R2 9-1 (REACTOR BUILDING EXHAUST FAN B TRIP) directs starting REA-FN-1A which cannot be started (out-of-service). Subsequent ARP direction requires the BOP operator to isolate Reactor Building HVAC and starting the Standby Gas Treatment system to return Reactor Building pressure to within the TS limit (≥ 0.25 inch of vacuum water gauge). The CRS refers to Technical Specifications and determines that TS 3.6.4.1 (Secondary Containment), Action A.1 applies which requires restoring secondary containment to operable status within 4 hours.

Event 3

(TRG-3) IRM "A" fails upscale resulting in an IRM upscale trip and Neutron Monitor System trip annunciators and a half scram. Per the ARP and when directed by the CRS, the ATC operator bypasses IRM "A" and resets the half-scram. The CRS refers to Technical Specifications 3.3.1.1 (RPS Instrumentation) and determines that the minimum number of IRM instruments required remains operable and that no TS actions are required.

Event 4

(TRG-4) Differential current lockout of transformer (TR-1/11) supplying 480V Bus SL-11 occurs which de-energizes the bus. After accessing what caused the lockout, and when directed, the BOP operator repowers SL-11 from SL-21 using the Quick Card (SOP-ELEC-480V-OPS-QC).

Event 5

Call comes into the Control Room reporting RCIC turbine coupling to the RCIC pump was found broken. CRS will direct the RCIC turbine to be tripped. The CRS refers to Technical Specifications and determines that TS 3.5.3 (RCIC System), Action A.1 applies which immediately requires verifying that HPCS is operable by administrative means AND Action A.2 which requires restoring RCIC system to operable status within 14 days.

Event 6

(TRG-6) A break on the Residual Heat Removal Pump 2A (RHR-P-2A) suction line causes wetwell level to lower. ABN-FLOODING is entered. When attempting to close the RHR-P-2A Motor-Operated suction valve (RHR-V-4A), the valve fails open. The CRS enters PPM 5.2.1 (EOP - Primary Containment Control) on Suppression Pool low level. Crew should direct removal of control power fuses (TRG-7) for RHR-P-2A as time permits.

FDR-V-607, the cross-connect valve between the RHR-SYS-A and Reactor Core Isolation Cooling (RCIC) rooms fails to auto close due to a failed level switch (which allows flooding to continue into RCIC Pump Room). The valve cannot be manually closed. The CRS re-enters PPM 5.3.1 (EOP - Secondary Containment Control) due high RHR-SYS-A and RCIC room levels. The leak from the Suppression Pool is not considered a "Primary System discharging into Secondary Containment" and therefore a controlled reactor shutdown is required for high RCIC room water level (6 inches above floor).

Event 7

The crew takes actions to restore wetwell level using the High Pressure Core Spray (HPCS) pump (HPCS-P-1) per PPM 5.5.23 (Emergency Suppression Pool Makeup). During this lineup, the HPCS Standby Service Water Pump (HPCS-P-2) discharge valve (SW-V-29) fails to auto open when HPCS-P-2 is started, requiring the BOP operator to manually open the valve. HPCS is ineffective is restoring Suppression Pool level.

Event 8

The CRS enters PPM 5.1.1 (EOP - RPV Control) and directs manually scramming the reactor prior to wetwell level reaching 19 feet 2 inches. **(CT #1)** The reactor will not scram when the mode switch is taken to SHUTDOWN. The ATC operator identifies the failure to scram and takes actions per PPM 3.3.1 (Reactor Scram) to scram the reactor. The Manual Scram Pushbuttons are effective in inserting all control rods.

Event 9

Prior to wetwell level going below 19 feet 2 inches, the CRS determines that wetwell level cannot be maintained ≥ 19 feet 2 inches and directs Emergency Depressurization (ED) per PPM 5.1.3 by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of wetwell level lowering to 19 feet 2 inches. **(CT #2)**

One Automatic Depressurization System (ADS) Safety Relief Valve (MS-RV-4D) fails to open during the ED requiring the BOP operator to manually open a non-ADS SRV. **(CT #2)**

TERMINATION CRITERIA: The scenario will be terminated when emergency depressurization has commenced (7 SRVs open) and RPV level is being controlled in the prescribed band OR as directed by the Examination Team.

Critical Task	Safety Significance	Cueing	Measurable Performance Indicators	Performance Feedback
CT #1 – Manually scram the reactor before wetwell level drops below 19 feet 2 inches.	Ensures reactor is scrammed and shutdown before requirement to Emergency Depressurize (ED) is reached. If ED is anticipated (see PPM 5.1.1 P-1 override), dumping steam to main condenser via Main Turbine bypass valves may be used to reduce reactor pressure before the requirement to ED occurs. ED would still be performed if required by EOPs. (Ref: PPM 5.0.10 Rev 21, 8.8.2 f))	Procedural direction by PPM 5.2.1 (EOP for Primary Containment Control) Step L-5 directs entering PPM 5.1.1 (which requires placing Reactor Mode Switch in Shutdown) once it is determined that wetwell level cannot be maintained above 19 feet 2 inches.	The operator will manually scram reactor by placing Reactor Mode Switch in Shutdown (and follow up with all Manual Scram pushbuttons when RMS fails to scram the reactor).	All control rods fully insert.
CT #2 - When wetwell level cannot be maintained above 19 feet 2 inches, initiate emergency depressurization by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of wetwell level lowering to 19 feet 2 inches. .	Suppression of pressure from blowdown (Emergency Depressurization) through the downcomers cannot be assured for water levels below 19 feet 2 inches. (Ref: PPM 5.0.10 Rev 21, 7.12.3)	Procedural direction by PPM 5.2.1 (EOP for Primary Containment Control) Step L-6 directs Emergency Depressurizing reactor when Wetwell water level cannot be maintained above 19 feet 2 inches.	The operator will manually open 7 Safety Relief Valves (ADS preferred) to emergency depressurize the RPV.	The valve light indications for each of the 7 Safety Relief Valves will change from Green lit to Red lit when control switch is taken to Open. Reactor pressure will lower in response.

SIMULATOR SETUP

- Unload simulator (between each scenario)
- Verify in ILC load
- Ensure Startup Sequence batch file loaded
- Reload simulator
- Reset to IC-202 (reset, go to Run, reset again)
- Load Scenario 4 Schedule file
- Load Scenario 4 Event file (if not loaded automatically)
- Validate that there are no unexpected annunciators or parameters out of band
- Verify pump running magnets
- Ensure proper Startup Sequence shows at H13-P603
- Place tagout on REA-FN-1A
- Have marked up copy of the following for crew (with N/Ad steps initialed) for the crew at their pre-brief location (outside the simulator):
    - PPM 3.1.2 (Reactor Startup)
    - Rod Pull Sheets
    - SOP-CR-MOVEMENT
    - Large Startup Flowchart
    - ABN-ROD

SCHEDULE FILE

<!-- This file contains a Thunder Simulations Schedule -->

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<DESCRIPTION></DESCRIPTION>
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<DESCRIPTION>FDR-V-607 RCIC FLOOR DR - FDR SUMP-R1 INLT</DESCRIPTION>
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<ACTION>Insert override OVR-RPS001A to OFF</ACTION>
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<ITEM row = 14>
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<EVENT>4</EVENT>
<ACTION>Insert malfunction BKR-EPS004 after 10 to TRIP on event 4</ACTION>
<DESCRIPTION>CB-11/1 BUS 11 FDR</DESCRIPTION>
</ITEM>

<ITEM row = 15>
<TIME>1</TIME>
<EVENT>6</EVENT>
<ACTION>Insert malfunction MAL-RHR001 to 8400.00000 in 180 on event 6</ACTION>
<DESCRIPTION>LINE BREAK AT RHR-P-2A SUCTION</DESCRIPTION>
</ITEM>

<ITEM row = 16>
<TIME>1</TIME>
<EVENT>6</EVENT>
<ACTION>Insert malfunction XMT-PCN006A after 180 to 16.00000 in 900 on event 6</ACTION>
<DESCRIPTION>CMS-LT-6A FIXED OUTPUT WETWELL WIDE RNG LEVEL DIV 1</DESCRIPTION>
</ITEM>

<ITEM row = 17>
<TIME>1</TIME>
<EVENT>6</EVENT>
<ACTION>Insert malfunction XMT-PCN007A after 180 to 16.50000 in 900 on event 6</ACTION>
<DESCRIPTION>CMS-LT-6B FIXED OUTPUT WETWELL WIDE RNG LEVEL DIV 2</DESCRIPTION>
</ITEM>

<ITEM row = 18>
<TIME>1</TIME>
<EVENT>6</EVENT>
<ACTION>Insert malfunction XMT-PCN003A after 120 to -25 in 240 on event 6</ACTION>
<DESCRIPTION>CMS-LT-1 FIXED OUTPUT SUPP CHAMBER LEVEL</DESCRIPTION>
</ITEM>

<ITEM row = 19>
<TIME>1</TIME>
<EVENT>6</EVENT>
<ACTION>Insert malfunction XMT-PCN004A after 120 to -25 in 240 on event 6</ACTION>
<DESCRIPTION>CMS-LT-2 FIXED OUTPUT SUPP POOL LEVEL</DESCRIPTION>
</ITEM>

<ITEM row = 20>
<TIME>1</TIME>
<EVENT>7</EVENT>
<ACTION>Insert malfunction BKR-RHR001 to FA_CTRL_FUS on event 7</ACTION>
<DESCRIPTION>CB-RHR-P-2A RHR-P-2A MOTOR SUPPLY BREAKER</DESCRIPTION>
</ITEM>

</SCHEDULE>

EVENT No. 1		
Description: Withdraw control rods as required to establish and maintain the bypass valves approximately 20% open Event is initiated by Turnover.		
BOOTH OPERATOR – As briefed or when directed activate TRIGGER 1		
Time	**Position**	**Applicants Actions or Behavior**
	CRS	☐ Directs ATC to Directs ATC to withdraw control rods to maintain the BPVs approximately 20% open (per startup flowchart step Q32)
		Comment:
	ATC	☐ References the Startup Rod Withdrawal sequence sheets to identify next rod to withdrawal
		Comment:
	BOP	☐ May peer check ATC during manipulations
		Comment:
	ATC	☐ Withdraws rod as follows: • Selects control rod • Uses continuous withdraw up to 2 notches prior to final position (unless withdrawing to notch 48) • Single notch withdraws the final 2 notches
		Comment:
	BOP	☐ Periodically reports Bypass Valve position to ATC
		Comment:
	ATC	☐ Reports to CRS when Bypass Valves are approximately 20% open
		Comment:

EVENT No. 2

Description: Trip of REA-FN-1B results in a high reactor building pressure and entry into PPM 5.3.1 (EOP - Secondary Containment Control) (Tech Spec)

Event is initiated after rod withdrawal has opened Bypass Valves approximately 20% open (or as directed by the Exam team) and is activated using **TRIGGER 2**.

BOOTH OPERATOR – As briefed or when directed activate TRIGGER 2

Time	Position	Applicants Actions or Behavior
	BOP	☐ Acknowledges annunciator 812.R2 9-1 (RX BLDG EXH FAN B TRIP)
		Comment:
		☐ Determines that fan REA-FN-1B has tripped
		Comment:
		☐ Reports annunciator and status of fan REA-FN-1B to the CRS
		Comment:
Examiner Note: **Following steps are from ARP 812.R2 9-1 (RX BLDG EXH FAN B TRIP)**		
	BOP	☐ 1: Verifies REA-FN-1B tripped (may have been previously completed)
		Comment:
		☐ 2: Notes that REA-FN-1A cannot be started (undergoing maintenance) and informs CRS that a Standby Gas Treatment train will have to be started
		Comment:
	CRS	☐ 3.a: Directs BOP to start either Standby Gas Treatment train 1A or 1B per the SOP-SGT-START-DIV1(2)-QC (Standby Gas Treatment Start – Quick Card)
		Comment:
		☐ Calls for assistance in getting REA-FN-1A or REA-FN-1B back
		Comment:
	BOP/ATC	☐ Acknowledges annunciator 602.A5 2-8 (SEC PRESS DP HIGH) when it comes in and informs CRS
		Comment:

EVENT No. 2 (CONTINUED)		
Examiner Note: Following steps are from ARP 602.A5 2-8 (SEC PRESS DP HIGH)		
	BOP/ATC	☐ 1 & 2: Checks REA-DPR-1A(B) for RB Pressure (already known to be near zero) and refer to CRS to ppm 3.8.1 (Secondary Containment Control)
		Comment:
		☐ 3: Refers CRS to Technical Specification 6.3.4.1
		Comment:
		☐ Refers to annunciator 812.R1 7-3 (SEC PRESS CONTR "A" ΔP HIGH/LOW) and 812.R2 7-1 (SEC PRESS CONTR "B" ΔP HIGH/LOW) and notes they are expected for the plant condition (no RB HVAC)
		Comment:
	CRS	☐ Enters ppm 3.8.1 (Secondary Containment Control) on low RB differential pressure
		Comment:
		Evaluates Technical Specifications and determines the following action applies: ☐ LCO 6.3.4.1 A.1 – Restore secondary containment to operable status within 4 hours
		Comment:
Examiner Note: Following steps are from SOP-SGT-START-DIV1-QC (Standby Gas Treatment Start – Quick Card) assuming Div 1 is started (Div 2 is similar)		
	BOP	NOTE: The non-running fans should be placed to PTL first. ☐ 3.1.1: (2 handed operation) Places the following fans to PTL (Pull to Lock) • ROA-FN-1A • ROA-FN-1B • REA-FN-1A • REA-FN-1B
		Comment:

EVENT No. 2 (CONTINUED)		
	BOP	☐ 3.1.2: Closes the following valves: • ROA-V-1 • ROA-V-2 • REA-V-1 • REA-V-2
		Comment:
		☐ 3.1.3: Momentarily turns SGT-FN-1A1 fan control switch from Auto to PTL SYS.START
		Comment:
		☐ 3.1.4: Verifies the following items: • Main Heaters energize as indicated by the Main Heater ON light and A1 amp meters • SGT-V-5A1 opens (Exhaust to Stack) • SGT-FN-1A1 starts (within 10 seconds)
		Comment:
<u>Examiner Note</u>: Following are steps from ARP 812.R2 9-1 (RX BLDG EXH FAN B TRIP)		
	BOP	☐ 3.b: Notifies Chemistry to monitor Reactor Building ventilation per ODCM 6.1.2.1 and LCS 1.3.3.1 ☐ 3.c: Refers CRS to ODCM 6.1.2.1 and LCS 1.3.3.1
		Comment:
		☐ 4: Refers CRS to ABN-HVAC (no actionable items)
		Comment:
	BOP	☐ Monitors secondary containment D/P with a Standby Gas Treatment train running and informs CRS when secondary containment D/P has been restored
		Comment:
	CRS	☐ Validates restoration of secondary containment integrity - exits LCO 3.6.4.1 ☐ Evaluates exiting of PPM 5.3.1 (Secondary Containment Control)
		Comment:

EVENT No. 3

Description: IRM "A" fails upscale resulting in a half scram

Event is initiated after secondary containment D/P has been restored with a Standby Gas Treatment train running (or as directed by the Exam team) and is activated using **TRIGGER 3**.

BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 3</u>

Time	Position	Applicants Actions or Behavior
	ATC	☐ Acknowledges annunciators 603.A7 1-5 (IRM ACEG UPSCL TRIP OR INOP) and 603.A7 3-4 (½ SCRAM SYSTEM A)
		Comment:
		☐ Checks for control rod motion
		Comment:
		☐ Reports to CRS that a half scram occurred (RPS "A" white RPS scram lights de-energized) due to IRM upscale and that no rod motion has occurred
		Comment:
	BOP	☐ Makes PA announcement "Half Scram system 'A'. Stop all maintenance and surveillance testing on RPS system B."
		Comment:
	CRS	☐ Calls Work Week Manager or Operations Management for assistance
		Comment:

<u>Examiner Note</u>: Following are steps from ARP 603.A7 3-4 (½ SCRAM SYSTEM A)

Time	Position	Applicants Actions or Behavior
	ATC	☐ 2.a: Checks for scrammed rods (may have already been performed)
		Comment:
	BOP	☐ 2.c: Make announcement to stop work (may have already been made)
		Comment:
	CRS	☐ 2.d: Directs Bypassing IRM "A" ☐ Reports when IRM Upscale or INOP annunciator clears
		Comment:
	ATC	☐ Positions IRM Bypass Switch to bypass IRM "A"
		Comment:

EVENT No. 3 (CONTINUED)		
	CRS	☐ Directs ATC to reset the half scram
		Comment:
	ATC	☐ 3: Resets half scram by doing the following: • 3.a: Depresses RPS-RMS-S5A (RPS Logic A1/B1 Reset pushbutton) (H13-P603). • 3.b: Depresses RPS-RMS-S5B (RPS Logic A2/B2 Reset Pushbutton) (H13-P603) • 3.c: Verifies the Scram group solenoid lights for Groups 1, 2, 3 and 4 are illuminated (H13-P609 & H13-P603) • 3.d: Verifies the Backup Scram System lights have extinguished (H13-P603)
		Comment:
		☐ 4: Refers the CRS to Technical Specification 3.3.1.1 and LCS 1.3.2.1
		Comment:
	CRS	☐ Evaluates Technical Specification 3.3.1.1 and LCS 1.3.2.1 and determines that the minimum number of channels required for IRM operability exists and that no T.S. action statements need be entered
		Comment:

EVENT No. 4

Description: Differential current lockout of transformer (TR-1/11) results in a loss of SL-11 which requires bus to be re-energized from alternate source

Event is initiated after IRM "A" has been bypassed and a Tech Spec evaluation has been made (or as directed by the Exam team) and is activated using **TRIGGER 4**.

BOOTH OPERATOR – <u>As briefed or when directed</u> activate <u>TRIGGER 4</u>

	BOP	☐ Acknowledges annunciator 800.C3 1-2 (XFMR TR-1/11 DIFF LOCKOUT) and notes 480 VAC Bus SL-11 has de-energized – Reports annunciator and bus status to CRS
	CRS	☐ Enters ABN-ELEC-SM1/SM7
		Comment:
		Comment:

<u>Examiner Note</u>: Following are steps from ARP 800.C3 1-2 (XFMR TR-1/11 DIFF LOCKOUT)

	BOP	☐ 1: Verifies that both CB-1/11 & CB 11/1 feeder breakers tripped open (as expected based on alarm) but that CB 21/11 did not close
		Comment:
	CRS	☐ 3: Requests plant assistance for cause of transformer lockout
		Comment:

<u>Examiner Note</u>: Following are steps from ABN-ELEC-SM1/SM7 (section 4.7)

	BOP	☐ 4.7.1: Verifies DEH-P-1B is running
		Comment:
		<u>NOTE</u>: <u>IF</u> E-SL-11 is not re-powered, <u>THEN</u> RFW-V-118 cannot be opened and RFW-V-112A cannot be closed to support a RFW-FCV-10 lineup, if required due to Reactor Scram. ☐ 4.7.3: Verifies SL-11 lockout is reset
		Comment:
	CRS	☐ 4.7.4: When the E-SL-11 problems have been corrected, then restore SL-11 to service per SOP-ELEC-480V-OPS-QC (there are not issues with SL-11 itself)

EVENT No. 4 (CONTINUED)		
	CRS	☐ 4.7.5: When SL-11 is returned to service then restore SL-11 loads to service per SOP-ELEC-SM1-MAINT (the CRS will make note of this)
		Comment:
	BOP	☐ 4: Determines that normal source to Bus SL-11 unavailable but energizes SL-11 using SOP-ELEC-480V-OPS-QC quick card
		Comment:
<u>Examiner Note</u>: Following are steps from SOP-ELEC-480V-OPS-QC quick card (section 2.4)		
	BOP	☐ 2.4.1: Verifies CB-21/2 closed
		Comment:
		☐ 2.4.2: Verifies CB-11/1 green light illuminated and green flag displayed
		Comment:
		☐ 2.4.3: Verifies CB-21/11 green light illuminated and green flag displayed
		Comment:
		☐ 2.4.4: Closes CB-21/11
		Comment:
		☐ 2.4.5: Verifies SL-11 voltage is approximately 480 (432-528) volts
		Comment:
		☐ 2.4.6: Verifies (and maintains) E-TR-1/11 load ≤ 277 amps
		Comment:

EVENT No. 5		
Description: RCIC-P-1 coupling discovered broken (Tech Spec) Event is initiated after Bus SL-11 has been restored (or as directed by the Exam team) and commences with a call to the Main Control Room.		
BOOTH OPERATOR – Call the Main Control Room and report the following as OPS-2: **"I discovered several pieces of RCIC pump coupling on the floor in the RCIC Pump room. The pump looks detached from the turbine."**		
	CRS	☐ Directs ATC to trip RCIC turbine
		Comment:
Examiner Note: For ATC credit the CRS will have to be directed to ensure ATC gets assigned task while BOP monitors reactor parameters.		
	ATC	☐ Trips RCIC turbine as directed by pressing RCIC Manual trip pushbutton
		Comment:
		☐ Refers to ARP 601.A4 1-5 (RCIC TURBINE TRIP) for follow up actions
		Comment:
Examiner Note: Following are steps from ARP 601.A4 1-5 (RCIC TURBINE TRIP)		
	ATC	☐ 1: Verifies RCIC-V-1 is closed (RCIC Turbine Trip and Throttle Valve) (H13-P601)
		Comment:
		☐ 2: Verifies RCIC-V-46 is closed
		Comment:
		☐ 5: Refers CRS to Technical Specification 3.5.3
		Comment:
	CRS	☐ 6: Informs Security to take compensatory actions for RCIC out of service
		Comment:
		Enters RCIC as inoperable in the Plant Logging system - Evaluates Technical Specifications and determines the following actions apply: ☐ LCO 3.5.1 Action A.1 applies which immediately requires verifying that HPCS is operable by administrative means (it is)
		Comment:

EVENT No. 5 (CONTINUED)		
	CRS	☐ LCO 3.5.1 Action A.2 which requires restoring RCIC system to operable status within 14 days
		Comment:
		☐ Request assistance on RCIC investigation and unplanned unavailability
		Comment:
		☐ Protects HPCS-P-1, HPCS DG and HPCS Service Water systems
		Comment:

EVENT No. 6

Description: Failure of the RHR-P-2A suction line results in lowering wetwell level (unisolable)

Event is initiated after RCIC system is tripped and Technical Specification call is made (or as directed by the Exam team) and is activated using **TRIGGER 6**.

BOOTH OPERATOR – As briefed or when directed activate TRIGGER 6

Time	Position	Applicants Actions or Behavior
	BOP	☐ Acknowledges annunciator 602.A13 2-1 (REACTOR BLDG FLOOR SUMP R1 LEVEL HI-HI) and informs CRS
		Comment:
Examiner Note: Following are steps from ARP 602.A13 2-1 (REACTOR BLDG FLOOR SUMP R1 LEVEL HI-HI)		
	BOP	☐ 1: Determines Sump Pump status by calling Radwaste Control Room to ensure that either FDR-P-1A or 1B is running
		Comment:
BOOTH ROLEPLAY – If directed to report status of FDR-P-1A and 1B sump pumps, report both floor drain sump pumps are running.”		
	BOP	**WARNING** Flooding in the Power Block may cause personnel injury. Use extreme caution when investigating the source of the flooding. ☐ 2: Sends field operator to investigate RI Sump level (and possible flooding) in RHR “A” pump room ☐ Ensures they understand that this is a potentially hazardous situation and that they need to take the appropriate precaution NOTE: This step is also directed from ABN-FLOODING step 4.1.1
		Comment:

BOOTH ROLEPLAY – If directed to investigate possible flooding in RHR “A” pump room, wait 1 minute and:

If alarm 601.A4 5-3 has not come in report “I hear a big inrush of water in the RHR ‘A’ pump room. The Sump is overflowing with several inches of water on the floor.”

If alarm 601.A4 5-3 has already come in report “I hear a big inrush of water in the RHR ‘A’ pump room with about a foot of water of water on the floor and rising. I’m leaving do to safety concerns.”

EVENT No. 6 (CONTINUED)		
	BOP	☐ 3: Notes that FDR-V-607 (RCIC Floor Drain Sump FDR Sump R1 Inlet) did not automatically close and attempts to manually close it on H13-P632 ☐ Reports to CRS that FDR-V607 did not auto close and could not be closed manually
		Comment:
		☐ Acknowledges annunciator 601.A4 5-3 (RHR A PUMP ROOM WATER LEVEL HIGH) and informs CRS ☐ Refers CRS to ppm 5.3.1 (Secondary Containment Control) (per ARP)
		Comment:
		☐ Acknowledges annunciator 601.A12 2-3 or 601.A11 2-3 (SUPP POOL LEVEL HIGH/LOW) ☐ Observes lowering level in the Suppression Pool (Wetwell) and provides crew update
		Comment:
	CRS	☐ Enters ABN-FLOODING
		Comment:
		☐ Enters 5.3.1 (Secondary Containment Control) on RB water level above alarm setpoint of 6 inches (RHR Pump Room “A”)
		Comment:
		☐ Enters ppm 5.2.1 (Primary Containment Control) based on low suppression level (-2 inches)
		Comment:
		☐ Directs BOP to verify RHR-P-2A secured and then to shut RHR-V-4A (Pump Suction from Supp Pool) in an attempt to isolate the leak (as directed by ppm 5.3.1 (Secondary Containment Control) step SC-9)
		Comment:
	BOP	☐ Reports after isolation attempt that RHR-V-4A did not close and that Suppression Pool level continues to lower
		Comment:

EVENT No. 6 (CONTINUED)		
	CRS	☐ Directs BOP to make announcement per ABN-FLOODING step 4.2
		Comment:
	BOP	☐ Since flooding was confirmed by report/plant indications: • 4.2.1: Sounds "Alert" Tone for 5 to 10 seconds • 4.2.2: Alert station personnel to flooding in the affected room(s) • 4.2.3: Evacuate all unnecessary personnel (may already be done) • 4.2.4: Refer to PPM 13.5.1 for localized evacuation
		Comment:
	CRS	☐ Directs BOP to emergency makeup to the Suppression Pool per 5.5.23 (Emergency Suppression Pool Makeup) (See Event 7 for actions)
		Comment:
		☐ Sets a Key Plant Parameter for Suppression Pool (Wetwell) level sufficiently above 19 feet 2 inches (to allow margin for actions needed to ED later on before reaching 19 feet 2 inches)
		Comment:
	ATC/BOP	☐ 4.1.2: Trends Key Plant Parameter for Suppression Pool (Wetwell) level
		Comment:
	ATC	☐ Directs field operator to remove trip and close (control power) fuses for RHR-P-2A (per ABN-Flooding Attachment 7.1 (section 7.1.1)
		Comment:
BOOTH ROLEPLAY – <u>If directed to pull the control power fuses for RHR-P-2A</u>, wait 3 minutes then activate <u>TRIGGER 7</u> then report "The trip and close fuses have been removed for RHR-P-2A."		

EVENT No. 7		
Description: SW-V-29 fails to auto open when HPCS-P-2 is started for wetwell makeup Event is activated at the beginning of the scenario and is realized when SW-V-29 fails to auto open.		
Time	**Position**	**Applicants Actions or Behavior**
	BOP	☐ When directed to perform ppm 5.5.23 (Emergency Suppression Pool Makeup) the following actions are taken (per section 4) • 4.1: Verifies HPCS-V-1 is open (Pump Suction from CST) • 4.2: Starts HPCS-P-1 • 4.3: Verifies HPCS-V-12 opens (HPCS-P-1 Minimum Flow Bypass) • 4.4: Starts HPCS-P-2 (HPCS Service Water Pump) • 4.5: Verifies SW-V-29 opens (Service Water Pump Discharge) ▪ Observes that SW-V-29 did NOT automatically open and therefore attempts to open it manually ▪ Reports to the CRS that SW-V-29 did not automatically open but was able to be opened manually • 4.6 is N/A (no HPCS auto initiation signal present) • 4.7: Throttles open HPCS-V-23 (Test Bypass To Suppression Pool) • 4.8: Adjusts flow as necessary to a maximum of 7175 GPM to fill the Suppression Pool • 4.9: Verifies HPCS-V-12 closes • 4.10: Monitors Suppression Pool level ☐ Reports to CRS that HPCS is making up to Suppression Pool but Suppression Pool level continues to lower
		Comment:

EVENT No. 8		
Description: Reactor mode switch fails to scram reactor, requiring use of manual scram pushbuttons to scram reactor prior to wetwell level lowering to 19 feet 2 inches Event is activated at the beginning of the scenario and is realized when the Mode Switch is positioned to Shutdown and no scram occurs.		
Time	**Position**	**Applicants Actions or Behavior**
CT #1 - Manually scram the reactor before wetwell level drops below 19 feet 2 inches.		
	ATC/BOP	☐ Reports when Key Plant Parameter met for Suppression Pool (Wetwell) low level
		Comment:
	CRS	☐ When notified Key Plant Parameter has been reached for Wetwell level, updates the crew on plant conditions then enters PPM 5.1.1 (RPV Control)
		Comment:
		☐ Directs ATC to scram the reactor
		Comment:
Examiner Note: Following steps are Immediate Actions from PPM 3.3.1 (Reactor Scram)		
Examiner Note: The reactor scram procedure (PPM 3.3.1) does not provide direct procedural guidance for the situation where the Mode Switch is taken to Shutdown at < 5% power (APRM downscale) and the rods fail to insert. The ATC may automatically use the Manual Scram pushbuttons (as a backup to the Mode switch) or the CRS may direct use of the Manual Scram pushbuttons as authorized by PPM 1.3.1 (Operating Policies, Programs, and Expectations). As an alternative, when PPM 5.2.1 (Primary Containment Control) directs entry into PPM 5.1.1 (RPV Control – Step L-5), the CRS may consider the failure to scram with the Mode Switch justification for entering PPM 5.1.2 (RPV Control ATWS) via the RC-2 override in PPM 5.3.1. After Inhibiting ADS and taking manual control of HPCS , the Reactor Power leg in PPM 5.2.1 would then direct use of ARI (via pushbuttons) to shut down the reactor.		
	ATC	☐ 6.1.1: Places Reactor Mode Switch to Shutdown • Observes that the control rods DID NOT go in
		Comment:
		☐ 6.1.2: Monitors reactor power, pressure and level (no change)
		Comment:
		☐ 6.1.5: Inserts SRM and IRM monitors (detectors) (some are not fully inserted during this point in the startup)
		Comment:

EVENT No. 8 (CONTINUED)		
	ATC	☐ After above three steps ATC makes scram report to CRS: • Mode switch is in Shutdown • APRMs are downscale • RPV pressure is (value and trend) • RPV level is (value and trend) • No EOP entry (reactor power is < 5%)
		Comment:
	CRS	☐ Repeats back scram report
		Comment:
	ATC	☐ 6.1.6: After CRS repeat back, reports all control rods are NOT IN • If ATC automatically presses the Manual Scram pushbuttons before reporting rod status, all rods will be IN
		Comment:
	CRS	☐ May direct ATC to use Manual Scram pushbuttons (if not used already) to insert all control rods or may direct after entering PPM 5.1.2 (RPV Control – ATWS) initiation of ARI (via switches on H13-P603) **(see examiner note previous page)**
		Comment:
<u>Examiner Note</u>: Following steps are Subsequent Actions from PPM 3.3.1 (Reactor Scram)		
	ATC	☐ 6.2.6: Range down on IRMs, as necessary, to follow power decrease
		Comment:
	BOP	☐ 6.2.7: Make PA announcement for reactor scram
		Comment:
	ATC	☐ 6.2.8: Transfers level control to RFW-FCV-10A/B per SOP-RFW-FCV-QC quick card (No action – already on startup level controller in Auto)
		Comment:
	CRS	☐ Sets a Key Plant Parameter for Suppression Pool (Wetwell) level sufficiently above 19 feet 2 inches to allow a controlled Emergency Depressurization
		Comment:

EVENT No. 9

Description: Prior to wetwell level going below 19 feet 2 inches, the crew determines that wetwell level cannot be maintained ≥ 19 feet 2 inches and initiates RPV Emergency Depressurization (ED) with 7 SRVs opened (SRV MS-RV-4D) fails to open requiring manually opening one non-ADS SRV)

Time	Position	Applicants Actions or Behavior
CT #2 - When wetwell level cannot be maintained above 19 feet 2 inches, initiate emergency depressurization by opening seven (7) Safety Relief Valves (ADS preferred) within 10 minutes of wetwell level lowering to 19 feet 2 inches.		
	CRS	☐ When notified Key Plant Parameter has been reached for Wetwell level, updates the crew on plant conditions, exits the pressure leg of PPM 5.1.1 (RPV Control) via override then enters PPM 5.3.1 (Emerg Depressurization)
		Comment:
		☐ Determines a high Drywell pressure signal is not sealed in
		Comment:
		☐ Determines Wetwell level is > 17 feet
		Comment:
		☐ Directs 7 SRVs be opened (ADS preferred) (ADS SRVs are those with the red stripe on left side of their nameplate)
		Comment:
Examiner Note: Proper containment response (comparing Wetwell and Drywell pressures as each SRV is opened to detect tailpipe failure) will be difficult at an already low RPV pressure.		
	BOP	☐ Opens 7 SRVs (ADS preferred) as directed while verifying proper containment response as each is opened and reports completion to CRS • Observes that SRV (MS-RV-4D) did not open • Opens one other non-ADS SRV ☐ Reports 7 SRV opened and that SRV 4D failed to open requiring the opening of another SRV
		Comment:
	CRS	☐ Directs RPV level band of +13 to +54 inches
		Comment:
	ATC	☐ Maintains RPV level as required to maintain RPV level band
		Comment:

TERMINATION CRITERIA: The scenario will be terminated when emergency depressurization has commenced (7 SRVs open) and RPV level is being controlled in the prescribed band OR as directed by the Examination Team.

TURNOVER

Initial Conditions:

- The reactor is in Mode 2 during reactor startup
- Reactor is critical at 3% power with RPV pressure at approximately 300 psig
- Reactor Building Exhaust Fan 1A (REA-FN-1A) is out of service for extended maintenance

Shift Turnover:

- Withdraw control rods as required to establish and maintain Bypass Valves approximately 20% open
- Next control rod movement is Rod 16-43 (Group 30-13) going from notch 12 to 48
- Continuous rod withdrawal permitted