

As given op test files include the following changes

1. A new SRO Admin JPM A2 was substituted during exam week from the previously approved JPM for "Determine Voluntary entry into AIA" to a "Standby Liquid Control Operability" JPM. The originally approved JPM was determined to be operationally invalid during admin week by an applicant taking the JPM, so it was removed from the exam and replaced with the SLC JPM, which was validated, then approved onsite by the R4 BC during admin week, who was onsite for exam observations.
2. The replacement of the SRO admin JPM A2 discussed above in item #1 required a change to the SRO ES-301-1 admin outline form.
3. Scenario # 2 was revised to reflect the as-given conditions for the scenario for all four crews that were administered this scenario, including a change in the second critical task due to not needing to Emergency Depressurize in the strategy and therefore the second Critical Task (new one that replaces the old one to ED) was to lower RPV pressure to allow injection with Condensate Booster Pumps and thus prevent an Emergency Depressurization on low RPV water level. This includes both ES-D1 and ES-D2 forms for this scenario.
4. Scenario # 4 was revised to reflect the as-given conditions for the scenario that included a clarification for RPS fuse pulling issue for one crew (added into the D-2 guide that there was a software issue in the simulator that prevented one crew from meeting the critical task of scrambling the remaining rods into the core due to not pulling all of the group B fuses). This scenario was also updated to reflect the need to manually trip recirc pumps at -50 inches because of the setup for the ATWS in the scenario (the instrument failure that is used in the setup for the ATWS in the major event also causes failure of the recirc pumps to trip and was not added to the ES-D2 forms after validation).

Note: A new Simulator JPM S3 was substituted after validation week for the HPCS suction swap JPM because of a simulator modeling issue with the CST. An RHR injection during a LOCA JPM was submitted and approved as part of the exam package prior to admin week, but required validation during exam week prior to administration to ensure that it worked. It is not included in the As-given Adams package because it was approved in the final exam package prior to administration.



**ENERGY
NORTHWEST**

INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	<u>OPERATIONS TRAINING</u>		
COURSE TITLE	<u>JOB PERFORMANCE MEASURE</u>		
LESSON TITLE	<u>DETERMINE THE OPERABILITY OF THE SLC SYSTEM (ADMIN)</u>		
LESSON LENGTH	<u>.5 HRS</u>		
	INSTRUCTIONAL MATERIALS INCLUDED		
LESSON PLAN PQD CODE	<u></u>	Rev. No.	<u></u>
SIMULATOR GUIDE PQD CODE	<u></u>	Rev. No.	<u></u>
JPM PQD CODE	<u>LO001816</u>	Rev. No.	<u>0</u>
EXAM PQD CODE	<u></u>	Rev. No.	<u></u>
DIVISION TITLE	<u>Nuclear Training</u>		
DEPARTMENT	<u>Operations Training</u>		
PREPARED BY	<u>Ron Hayden</u>	DATE	<u>04/28/15</u>
REVISED BY	<u></u>	DATE	<u></u>
TECHNICAL REVIEW BY	<u></u>	DATE	<u></u>
INSTRUCTIONAL REVIEW BY	<u><i>Ron Hayden</i></u>	DATE	<u>5/7/15</u>
APPROVED BY	<u></u>	DATE	<u></u>
	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:

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 the information below. Provide each student with a copy of Attachment 9.6 and 9.7 in addition to the procedure page containing steps 53, 54 and 55.

Step 53 – 66°F

Step 54 – N/A and initial the boxes

Step 55 – 4900 gals

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-0163

Validation Time: 12 minutes

Alternate Path: No

Time Critical: No

PPM Reference: OSP-INST-H101 Rev. 84

Location: Simulator / Classroom

NUREG 1123 Ref: 2.1.25 (3.9 / 4.2)

Performance Method: Perform

Task Standard: OSP-INST-H101 is used to determine that the SLC system is not operable and 'NOT OPERABLE' is initialed on the JPM Answer Sheet. Additionally it has been determined TS 3.1.7 Condition B applies and that is indicated on the JPM Answer Sheet.

JPM CHECKLIST

INITIAL CONDITIONS:	The plant is operating at 100% power. Chemistry has just reported Standby Liquid Control tank concentration is 14.8 percent.
INITIATING CUE:	Review OSP-INST-H101, the Shift and Daily Instrument Checks (Modes 1, 2, & 3) and evaluate steps 53, 54, and 55 to determine if the SLC system is operable. Indicate your answer by filling in the appropriate block/blocks on the JPM Answer Sheet. Hand the JPM to the examiner when complete.

* Items are Critical Steps

Time	Step	Task Element	Performance Standard	Evaluator's Cue	Results
	1	Determines SLC operability	From step 53, determines the need to utilize Attachment 9.6 for comparison.		S / U
	2		Using Attachment 9.6, determines SLC concentration/temperature is NOT within the acceptable region (14.8% and 66°F).		S / U *
	3		From Step 55 determines the need to utilize Attachment 9.7 for comparison.		S / U
	4		Using Attachment 9.7 determines SLC Tank volume is acceptable.		S / U
	5		Initials the line indicating the SLC System is 'NOT OPERABLE'.		S / U *

* Items are Critical Steps

Time	Step	Task Element	Performance Standard	Evaluator's Cue	Results
	6	Determines applicable Tech Specs.	Refers to Technical Specifications and determines Tech Spec 3.1.7 Condition B applies as both SLC systems are inoperable. Writes 3.1.7 Condition B in the appropriate block on the JPM Answer Sheet.		S / U *
Termination Criteria: Student hands the JPM 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

DETERMINE THE OPERABILITY OF THE SLC SYSTEM

Examinee (Print): _____

Evaluator (Print): _____

Task Standard: OSP-INST-H101 is used to determine that the SLC system is not operable and 'NOT OPERABLE' is initialed on the JPM Answer Sheet. Additionally it has been determined TS 3.1.7 Condition B applies and that is indicated on the JPM Answer Sheet.

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

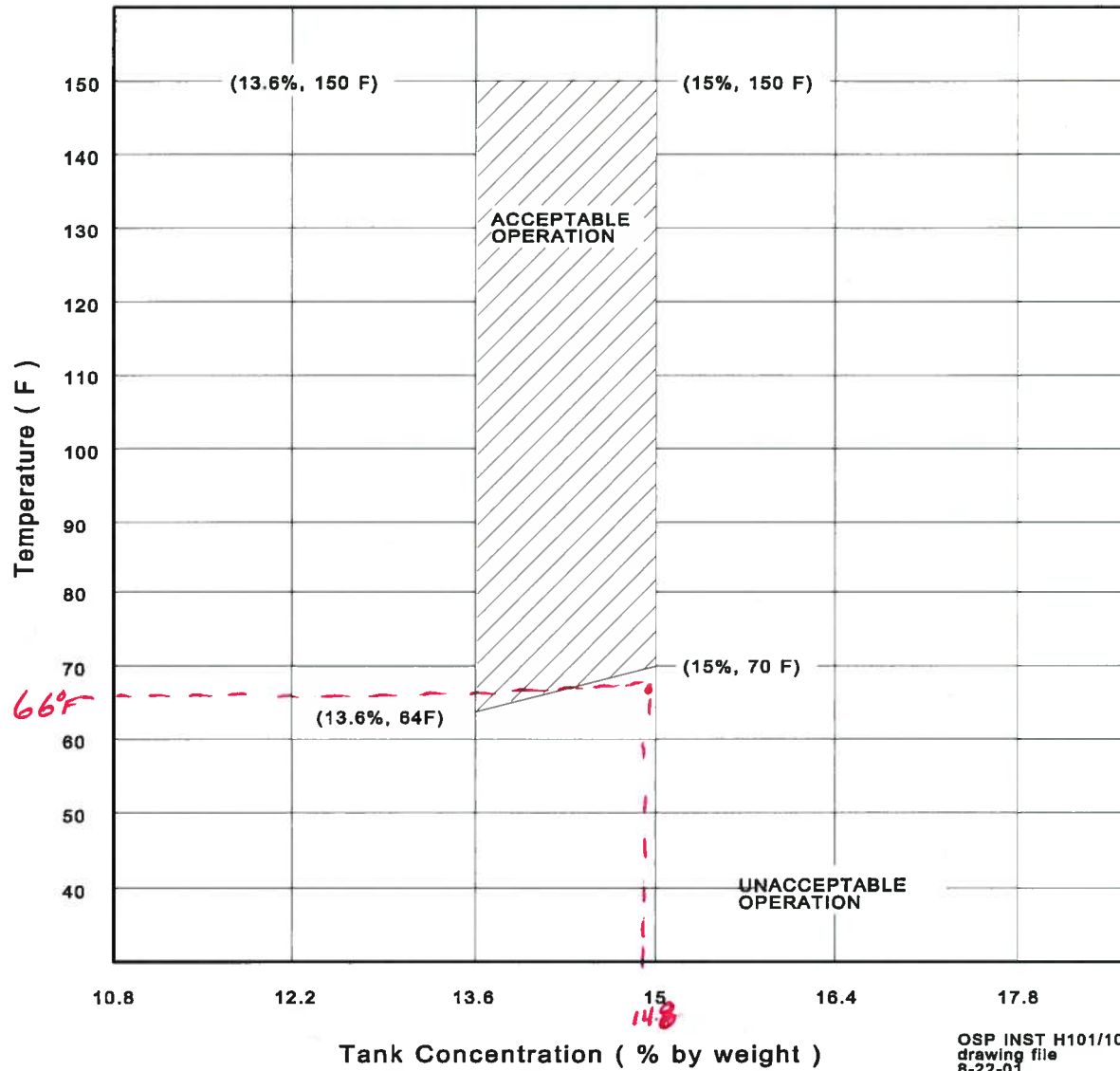
COMMENTS:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Evaluator's Signature: _____ **Date:** _____

Number: OSP-INST-H101	Use Category: CONTINUOUS	Major Rev: 084
Title: Shift and Daily Instrument Checks (Modes 1, 2, 3)		Minor Rev: N/A
		Page: 39 of 42

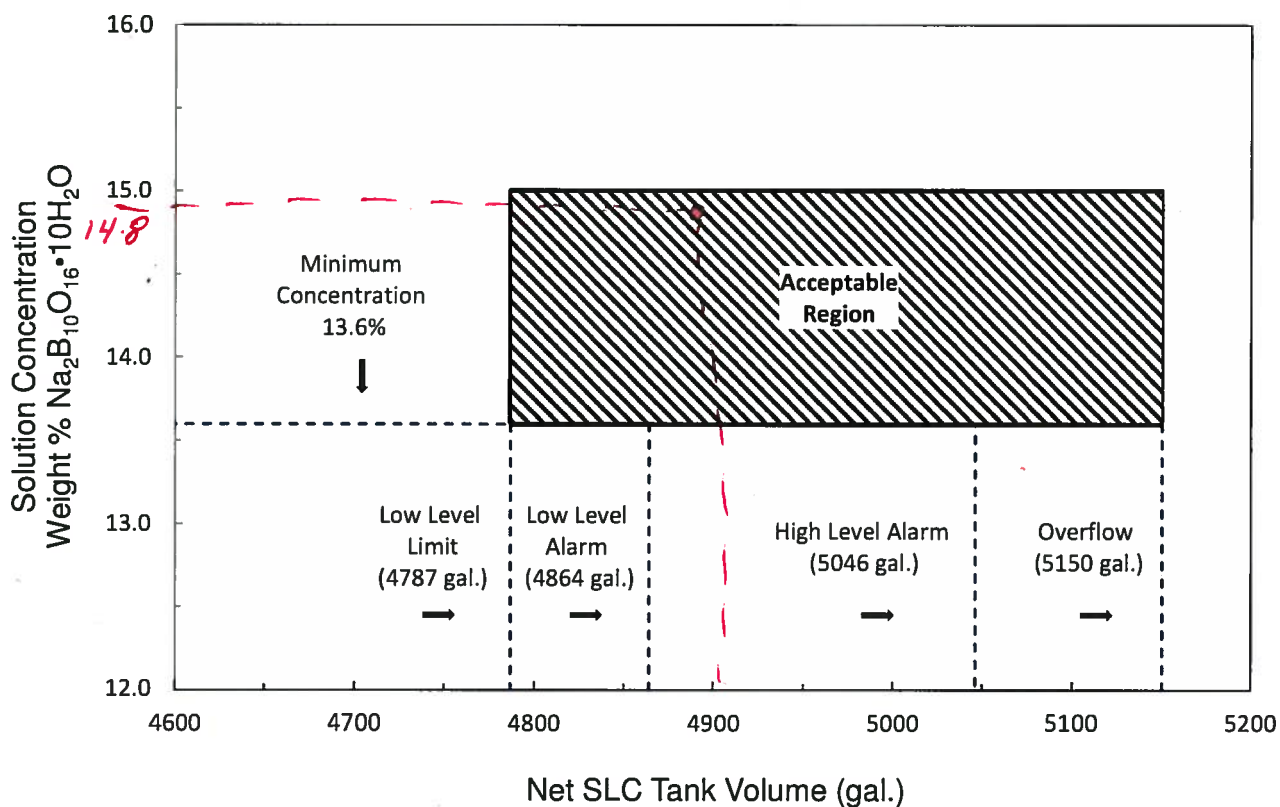
SODIUM PENTABORATE SOLUTION TEMPERATURE - SR 3.1.7.2



END

Number: OSP-INST-H101	Use Category: CONTINUOUS	Major Rev: 084
Title: Shift and Daily Instrument Checks (Modes 1, 2, 3)		Minor Rev: N/A
		Page: 40 of 42

SODIUM PENTABORATE TANK, VOLUME vs. CONCENTRATION REQUIREMENTS - SR 3.1.7.1



NOTE: The minimum required volume to ensure reactor shutdown is 4587 gal.
The low level limit (4587 + 200 gal) includes 200 gal process margin to minimize air entrainment in the pumps.

END

JPM ANSWER SHEET

The Standby Liquid Control System is OPERABLE
(Initial Here): _____

The Standby Liquid Control System is NOT OPERABLE
(Initial Here): _____

If you have determined that the SLC System is NOT
OPERABLE, indicate the specific Technical Specification and
Condition that applies: _____

STUDENT JPM INFORMATION CARD

Initial Conditions:

The plant is operating at 100% power.

Chemistry has just reported Standby Liquid Control tank concentration is 14.8 percent.

Initiating Cue:

Review OSP-INST-H101, the Shift and Daily Instrument Checks (Modes 1, 2, &3) and evaluate steps 53, 54 and 55 to determine if the SLC system is operable.

Indicate your answer by filling in the appropriate block/blocks on the JPM Answer Sheet.

Hand the JPM to the examiner when complete.

Facility: <u>Columbia Generating Station</u>		Date of Examination: <u>April 2015</u>
Examination Level: RO	SRO X	Operating Test Number: 1
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	P, D, R	Based on plant conditions and pull sheets supplied, determine early criticality will occur and then determine required procedural actions.
Conduct of Operations	N, R	Given Standby Liquid Control tank (SLC-TK-1) concentration and temperature, determine SLC is NOT operable and then determine applicable Technical Specifications to be entered.
Equipment Control	M, R	Determination of Operating Point and required action following feedwater heater trip.
Radiation Control	D, R	Estimate Main Condenser air ejector gross gamma activity and determine required actions.
Emergency Procedures/Plan	M, R	Given a QEDPS, determine that a General Emergency should be declared and complete a Classification Notification Form for the declaration.
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected)		



INSTRUCTIONAL COVER SHEET

PROGRAM OPERATIONS TRAINING

COURSE TITLE COLUMBIA GENERATING STATION SIMULATOR EXAMINATION

LESSON TITLE Perform SGT-B System Operability surveillance; APRM Flow Unit 'A' fails upscale; TD-TE-4A fails upscale – RCIC Isolates; RRC-P-1A high vibrations; RRC-P-1A seals fail results in LOCA; Hydraulic ATWS; Reduced SLC flow; Rods Cannot be inserted; Lower Level; RWCU-V-4 fails to close; RFW Pumps trip; Lower RPV Pressure to feed with CBPs

LENGTH OF LESSON 1.5 Hours

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code	_____	Rev. No.	_____
Simulator Guide PQD Code	<u>LO001802</u>	Rev. No.	<u>0</u>
JPM PQD Code	_____	Rev. No.	_____
Exam PQD Code	_____	Rev. No.	_____

DIVISION TITLE Nuclear Training

DEPARTMENT Operations Training

PREPARED BY Ron Hayden DATE 10/21/14

REVISED BY _____ DATE _____

VALIDATED BY _____ DATE _____

TECHNICAL REVIEW _____ DATE _____

INSTRUCTIONAL REVIEW _____ DATE _____

APPROVED _____ DATE _____

Operations Training Manager

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

Facility: Columbia

NRC Scenario No: 2

Examiners: _____

Operators: _____

Initial conditions: Columbia is operating 100% power. OSP-SGT-M702 is scheduled to be performed. APRM 'A' has a failed power supply and is bypassed.

Turnover: Perform the Standby Gas Treatment B System Monthly Operability surveillance, OSP-SGT-M702.

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	N (BOP)	Perform SGT B System Operability surveillance – OSP-SGT-M702.
2.	T = 05	I (ATC) TS (SRO)	APRM Flow Unit "A" fails upscale.
3.	T=15	I (BOP) I (SRO) TS (SRO)	LD-TE-4A fails high causing a RCIC isolation and RCIC turbine trip. RCIC-V-8 does not auto close – is closed manually.
4.	T=25	R (ATC)	RRC-P-1A high vibration. Reduce reactor power with RRC flow.
5.	T = 45	C (ATC) C (SRO) M (All)	RRC-P-1A upper and lower seals fail requiring entry into single loop operations. When seals fail a LOCA begins and a manual reactor scram is inserted.
6.	T = 55	C (ATC)	Hydraulic ATWS. Reduced SLC Flow. RWCU-V-4 does not close – close RWCU-V-1 to isolate RWCU. Lower RPV Level -80" to -140".

Critical Task is to terminate and prevent injection into the RPV with the exception of SLC, RCIC, and CRD, prior to lowering level. (SRO/ATC)

7.	T = 50	M (All)	Hydraulic ATWS; Scram/Reset/Scram not effective in inserting control rods; Control rods cannot be manually driven in.
8.	T = 70	C (ATC) C (SRO)	Both RFW Pumps trip and cannot be restarted.
		M (All)	RPV pressure is lowered with Bypass Valves to facilitate injection with Condensate Booster Pumps.

Critical Task is to lower RPV pressure to allow injection with Condensate Booster Pumps and thus prevent an Emergency Depressurization on low RPV water level. (SRO/ATC/BOP)

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

Critical Task	Justification	References
Terminate and prevent injection into the RPV with the exception of SLC, RCIC, and CRD, prior to lowering level.	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.	PPM 5.0.10 – EOP Bases PPM 5.1.2, RPV Control – ATWS
Lower RPV pressure to allow injection with Condensate Booster Pumps.	Lowering RPV pressure to less than the shutoff head of the Condensate Booster Pumps allows injection into the RPV from the Condensate Booster Pumps and thus prevents an Emergency Depressurization on low RPV level from occurring. NOTE: This is the only time during an ATWS, that RPV pressure can be intentionally lowered (to facilitate getting pressure low to allow feeding the vessel to prevent an Emergency Depressurization).	PPM 5.0.10 – EOP Bases PPM 5.1.2, RPV Control - ATWS

SCENARIO DESCRIPTION

The scenario begins with Columbia operating at full power. APRM 'A' is INOP.

EVENT 1 – Perform OSP-SGT-M702, SGT B Monthly Operability surveillance. This is a normal evolution for the BOP operator that has the candidate start SGT Train B.

EVENT 2 – APRM Flow Unit "A" fails upscale due to failed instrument. The ATC operator will respond to alarms and recognize the flow unit has failed upscale. SRO will refer to Tech Spec 3.3.1.1 RPS Instrumentation and determine Condition A applies – Place channel in trip within 12 hours OR place associated trip system in trip within 12 hours.

EVENT 3 – RCIC isolation on failed temperature instrument. RCIC-V-8 does not auto close but does close when manually attempted. Tech Specs will be referenced: References Tech Spec 3.5.3 RCIC System and determines condition A applies - Verify by administrative means High Pressure Core Spray System is operable immediately AND Restore RCIC to operable status within 14 days. Refers to Tech Spec 3.3.6.1 Primary Containment Isolation Instrumentation and determines Function 3e for LD-TE-4A's failure applies which references Condition F – Isolate the affected penetration flow path(s) within 1 hour.

EVENT 4 – A high vibration alarm will be received for RRC-P-1A. Vibration level reports from the field will be received which require RRC-P-1A speed to be lowered and the pump will eventually be stopped (see Event 5).

EVENT 5 – When reactor power is lowered to 97%, the lower seal for RRC-P-1A will begin to fail. When reactor power reaches 92% the upper seal for RRC-P-1A will begin to fail. This will result in a LOCA and rising Drywell pressure. A manual scram will be inserted prior to Drywell pressure reaching the automatic scram setpoint of 1.68 psig.

EVENT 6 – When the reactor is scrammed a Hydraulic ATWS occurs. SLC will be initiated but develop only 13 gpm injection flow. Additionally, RWCU-V-4 will not close automatically or manually. RWCU-V-1 can be closed to isolate RWCU system. RPV level will be lowered to -80" to -140".

EVENT 7 – Control rods will be attempted to be inserted per PPM 5.5.11, Alternate Control Rod Insertion. Scram – Reset – Scram is not effective in inserting control rods and control rods cannot be inserted by individually driving them.

EVENT 8 – When the scram is reset, both Reactor Feedwater pumps trip due to failed high RPV water level instrumentation. The high RPV water level signals cannot be reset which results in RFPs not being able to be restarted and causes RPV level to drop. RPV pressure will be lowered using Bypass Valves to facilitate injection using the Condensate Booster Pumps.

The scenario will be terminated when RPV level is being maintained using the Condensate Booster Pumps in the given band or as directed by the scenario coordinator.

Event No. 1		
Description: Perform SGT B Monthly Surveillance OSP-SGT-M702. The event is initiated by the turnover.		
Time	Position	Applicants Actions or Behavior
T = 0	SRO	Directs Standby Gas Treatment System B monthly operability surveillance, OSP-SGT-M702 be performed.
ROLEPLAY – If asked there are no paint fumes, etc. in SGT area and SGT integrity has been verified.		
	BOP	Performs the following actions for OSP-SGT-M702 steps: <ul style="list-style-type: none"> 7.1.1 - Contacts OPS 2 and verifies no paint fumes. 7.1.2 - Contacts OPS 2 and verifies SGT integrity. 7.1.3 - Records moisture reading on SGT-MI-4B. 7.1.4 - Verifies SGT-V-2B is open (Rx Bldg. inlet). 7.1.5 - Verifies SGT-V-3B1 is open (fan 1B2 inlet). 7.1.6 - Depresses BISI Manual Out of Service pushbutton. 7.1.7 - Informs SRO to enters SGT system B as inoperable in the TS surveillance log. 7.1.8 - Places SGT-DPIC-1B2 in MANUAL. 7.1.9 - Adjusts SGT-DPIC-1B2 output to minimum (100%). 7.1.10 - Places SGT-EHC-1B2 control switch to ON. 7.1.11 - Verifies SGT-FN-1B2 auto starts 10 sec. after heaters energize. 7.1.12 - Promptly opens SGT-V-5B2 (exhaust to stack). 7.1.13 - Slowly adjusts SGT-DPIC-1B2 to obtain 4800 CFM \pm 480CFM. 7.1.14 – Verifies Reactor Building pressure controller REA-DPIC-1A (B) responds (MAN or AUTO) to control Reactor Building pressure at approximately - 0.8” WC. 7.1.15 – Records Date and Time. Standby Gas Treatment is left in this configuration for the remainder of the scenario.
COMMENTS:		

Event No. 2		
<p>Description: APRM Flow Unit “A” fails upscale.</p> <p>The event is initiated after the SGT surveillance step 7.1.7 has been completed (CRS informed to enter SGT inoperable in Plant Logging System) by <u>ACTIVATING TRIGGER 1.</u></p>		
Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 1.		
T = 05	ATC	<p>Acknowledges P603.A7 2-7 ‘ROD OUT BLOCK’ and P603.A8 3-6 ‘FLOW REFERENCE OFF NORMAL’ alarms and refers to ARP.</p> <p>Observes Flow Unit indications on P603 apron and reports APRM Flow Unit “A” Upscale or INOP light is illuminated.</p> <p>Refers SRO to LCS 1.3.2.1 and TS 3.3.1.1 from Flow Reference Off Normal ARP.</p>
	SRO	<p>Refers to Tech Spec 3.3.1.1 RPS Instrumentation and determine Condition A applies – Place channel in trip within 12 hours OR place associated trip system in trip within 12 hours.</p> <p>Contacts Work Control/PSRO for investigation of Flow Unit “A” failure.</p>
	SRO	Directs bypassing Flow Unit “A”.
	ATC	<p>Moves the Flow Unit Bypass switch to bypass Flow Unit “A” as directed.</p> <p>Resets annunciators when they clear.</p>
	SRO	Conducts Brief.
<p>COMMENTS:</p> 		

Event No. 3		
<p>Description: LD-TE-4A Fails upscale – Causes a RCIC System isolation.</p> <p>The event is initiated after the Flow Unit has been bypassed and Tech Specs have been addressed by <u>ACTIVATING TRIGGER 2.</u></p>		
Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 2.		
T = 15	BOP	<p>Responds to RCIC system alarms:</p> <p>P601.A4 6-8 ‘RCIC DIV 1 OUT OF SERVICE’; P601.A4 1-5 ‘RCIC TURBINE TRIP’; P601.A12.5-2 ‘LEAK DET RCIC EQUIP AREA TEMP HI’ and P601.A3 1-4 LEAK DET RCIC EQUIP AREA TEMP HI HI’.</p> <p>Reports the P601.A3 1-4 LEAK DET RCIC EQUIP AREA TEMP HI HI annunciator is a possible EOP entry (has orange triangle on alarm window).</p> <p>Refers to ARPs.</p> <p>Reports that RCIC-V-1 is closed (green light on vertical panel is lit).</p>
	SRO	Directs back panel investigation of Leak Detection monitors on H13-P642 and H13-P632.
	BOP	<p>Investigates leak detection monitors and notes normal temperature on LD-TE-4B indicating 82°F (normal) and LD-TE-4A is indicating upscale (3 up arrows) and 400 °F on LD-TRS-608’s digital display (if checked).</p> <p>Reports observations to SRO.</p>
	BOP	<p>Observes that the white BISI (Bypass and Inoperable Status Display) light indicating DIV 1 ISOLATION SIGNAL is in.</p> <p>Refers to ARP for RCIC OUT OF SERVICE (P601.A4 6-8) and that it was caused by RCIC ISOL SIGNAL A INITIATION and refers to the that ARP.</p> <p>Recognizes that the automatic actions state that RCIC-V-1 and RCIC-V-8 close.</p> <p>Recognizes RCIC-V-8 is still open.</p> <p>Informs the SRO.</p>
	SRO	Directs RCIC-V-8 be closed.

Event No. 3		
ROLEPLAY – If sent to RCIC pump room (wait two minutes) – nothing abnormal observed.		
Time	Position	Applicants Actions or Behavior
	BOP	<p>Obtains key 11 from the key locker outside the Shift Managers office and takes the control switch for RCIC-V-8 to close.</p> <p>Observes RCIC-V-8 does close.</p> <p>Informs the SRO when RCIC-V-8 is closed.</p> <p>Refers the SRO to Tech Spec 3.5.3.</p>
	SRO	<p>References Tech Spec 3.5.3 RCIC System and determines condition A applies - Verify by administrative means High Pressure Core Spray System is operable immediately AND Restore RCIC to operable status within 14 days.</p> <p>Refers to Tech Spec 3.3.6.1 Primary Containment Isolation Instrumentation and determines Function 3e for LD-TE-4A's failure applies which references Condition F – Isolate the affected penetration flow path(s) within 1 hour.</p> <p>Conducts brief.</p>
COMMENTS:		

Event No. 4		
Description: High vibrations on RRC-P-1A that require the pump to be stopped. The event is initiated after the SRO has conducted a brief for RCIC being inoperable by <u>ACTIVATING TRIGGER 3.</u>		
Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 3.		
T = 25	ATC	Reports P602.A6 2-4 'RECIRC A SYSTEM VIB HIGH' alarm and references the ARP.
	SRO	Directs OPS 2 be dispatched to check Vibration Panel RRC-VMP-1 on 522 Rx. Bldg.
ROLEPLAY: Two minutes after request, call 2171 and report vibrations for RRC-P-1A are: <ul style="list-style-type: none"> RRC-VBI-P1A/PXY = 4 PK-G & rising slowly on both A/B channels. RRC-VBI-P1A/PZ = 4.5 PK-G & rising slowly. 		
(If crew delays in lowering pump speed, call as OPS 2 and report vibration levels rising slowly at the direction of the scenario coordinator.)		
PROCEDURE COMMENTS: ARP 4.602.A6, 2-4 step 4: if casing vibration exceeds 6.0 PK-G (on PXY) then trip RRC-P-1A and enter ABN-RRC-LOSS.		
	SRO	Directs lowering RRC-P-1A (and RRC-P-1B) speed per ARP step 2c and 2d in an effort to reduce pump vibrations. May set a key parameter of vibrations on RRC-P-1A.

Event No. 4		
Time	Position	Applicants Actions or Behavior
	ATC	<p>Lowers RRC pump speed as directed using SOP-RRC-FLOW-QC quick card:</p> <p>Step 2.1 Reactor Power Change with RRC Flow Controllers in Auto</p> <p>Step 2.1.1 Monitor fuel-preconditioning limits (per 9.3.18) while changing reactor power</p> <p>Step 2.1.2 Raise/Lower RRC flow using RRC-M/A-R675 (Master Control), as necessary</p> <p>Depresses the lower pushbutton on the Master Controller to lower speed as directed.</p> <p>(May also place the pumps individual controller in Manual and use it to lower pump speed).</p>
ROLEPLAY: If asked, after pump speed has been reduced, vibrations are lower, but seem to be about at the original values of PXY = 4 PK-G and PZ = 4.5 PK-G, and are still rising slowly.		
COMMENTS:		

Event No. 5

Description: RRC-P-1A seal failures resulting in a LOCA, rising Drywell Pressure and a Reactor Scram.

The event is active at the beginning of the scenario, but is only realized when Reactor Power reaches 97% (Trigger 4) by the failure of the lower seal for RRC-P-1A. At 92% power, the upper seal will fail (Trigger 5), which will result in rising Drywell Pressure.

Time	Position	Applicants Actions or Behavior
T = 40	ATC	While lowering pump speed, acknowledges and reports P602.A6 2-3 'RECIRC A PUMP SEAL STAGING FLOW HIGH/LOW' alarm. Refers to ARP. Recognizes the failure of the lower seal based on rising upper seal pressure. Refers SRO to ABN-RRC-SEAL. Directs an EO to check seal staging flow, RRC-FIS-39A.
	SRO	Updates crew and enters ABN-RRC-SEAL. Sets Key Parameter of Upper Seal pressure.
ROLEPLAY: Wait 2 minutes after being directed to check RRC-FIS-39A, and then report RRC-FIS-39A indicated 5 gpm.		
NOTE: If power is lowered to LE 92% the upper seal fails causing seal pressure to drop. RRC-P-1A should also be secured if upper seal pressure reaches 925 psig.		
	ATC	As pump speed is lowered, acknowledges and reports P602.A6 2-2 RECIRC A PUMP OUTER SEAL LEAKAGE HIGH alarm. Recognizes the upper seal pressure is now trending down indicating a loss of the outer seal. Directs an EO to check outer seal leakage (RRC-FIS-2A) and seal staging flow (RRC-FIS-7A) for RRC-P-1A.
	SRO	Conducts brief on the impending stopping of RRC-P-1A.

Event No. 5		
Time	Position	Applicants Actions or Behavior
	ATC	Reports upper seal pressure as it drops. Informs the SRO when Key Parameter reached.
	SRO	Directs stopping RRC-P-1A by depressing the stop pushbutton.
	ATC	Stops RRC-P-1A as directed by depressing the ASD stop pushbutton.
	BOP	Acknowledges P601.A3 6-5 ' Leak Detection Drywell Flow Drain Flow High' and reports Unidentified Leakage in the drywell increasing. Reports rising drywell pressure.
	SRO	Directs Reactor scram prior to the 1.68 psig auto scram.
COMMENTS:		

Event No. 6		
<p>Description: Hydraulic ATWS. Reduced SLC flow. RWCU-V-4 does not close.</p> <p>This event is active at the beginning of the scenario and is realized when a manual reactor scram is inserted.</p>		
Time	Position	Applicants Actions or Behavior
Critical Task is to terminate and prevent injection into the RPV with the exception of SLC, RCIC, and CRD, prior to lowering level.		
T = 60	ATC	<p>Manually scrams the reactor as directed and performs immediate operator actions of PPM 3.3.1, Reactor Scram:</p> <ul style="list-style-type: none"> Places mode switch to shutdown Monitors/reports power/level/pressure Reports APRMs not downscale and performs the following: <ul style="list-style-type: none"> Depresses the manual scram pushbuttons Initiates ARI Recognizes reactor power is GT 5% and performs the following: <ul style="list-style-type: none"> Informs the SRO
	ATC	<p>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:</p> <p>Step 2.1 Remove the SLC keylock switch blanks and insert both keys into the SLC System control switches.</p> <p>Step 2.2 Initiate SLC injection by performing the following (H13-P603):</p> <ul style="list-style-type: none"> Places SLC System A control switch to the OPER position. Places SLC System B control switch to the OPER position. <p>Step 2.3 Record the following:</p> <ul style="list-style-type: none"> SLC Flow rate (~43 gpm for one pump, or 86 gpm for both pumps) Initial tank level Circle RWCU-V-4 status (should be closed)

Event No. 6		
Time	Position	Applicants Actions or Behavior
	ATC	<p>Verifies the status of RWCU-V-4 and recognizes the valve is still open.</p> <p>Attempts to close RWCU-V-4 using the control switch but recognizes that the valve does not close.</p> <p>Closes RWCU-V-1 to isolate RWCU.</p> <p>Informs the CRS of status of RWCU-V-1 and RWCU-V-4.</p>
		<p>Step 2.4 Report one of the following, or similar words, to the CRS as you hand him this procedure:</p> <ul style="list-style-type: none"> • SLC is injecting normally • SLC is partially injecting • SLC failed to inject <p>Reports initial SLC tank level of 4800 gallons and that SLC flow rate is only 13 gpm.</p> <p>Insert SRMs and IRM by depressing the power on and insert pushbuttons.</p> <p>Reports all rods NOT in and current reactor power.</p>
	ATC	Directs local investigation of reduced SLC flow.
ROLEPLAY – Wait three minutes and report relief valves lifting and you have contacted mechanical maintenance for assistance.		

Event No. 6		
Time	Position	Applicants Actions or Behavior
	SRO	<p>Updates crew on EOP entry into PPM 5.1.1, RPV Control, and directs/verifies that the Mode Switch has been placed in SHUTDOWN.</p> <p>Updates crew and exits PPM 5.1.1, RPV Control and transitions to PPM 5.1.2, RPV Control - ATWS.</p> <p>Directs BOP to:</p> <ul style="list-style-type: none"> • 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.
	BOP	<p>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).</p> <p>Arms and Depresses the HPCS system initiation pushbutton while holding the control switch for HPCS-P-1 to STOP.</p> <p>Takes the control switch for HPCS-V-4 to close when it gets fully opened.</p> <p>Reports ADS inhibited and manual control of HPCS taken to SRO.</p>
	SRO	Directs PPM 5.5.6, Bypassing the MSIV Isolation Interlocks on High Tunnel Temperature and low RPV level.
	BOP	<p>Goes to EOP drawer and gets PPM 5.5.6 procedure and equipment bag containing two keys.</p> <p>Performs PPM 5.5.6:</p> <ul style="list-style-type: none"> • At H13-P609 places MS-RMS-S84 to BYPASS • At H13-P611 places MS-RMS-S85 to BYPASS <p>Updates Crew on the completion of PPM 5.5.6.</p>

Event No. 6		
Time	Position	Applicants Actions or Behavior
	BOP	Recognizes and reports EOP entry conditions due to Drywell pressure, Drywell temperature and Wetwell level (as they occur).
	SRO	<p>Updates crew and enters PPM 5.2.1, Secondary Containment Control.</p> <p>Establishes a key parameter: Wetwell pressure of 2 psig.</p> <p>May establish a key parameter of Drywell temperature at 285°F.</p>
	BOP	Reports when Wetwell pressure reaches 2 psig.
	SRO	Recognizes RCIC-V-1 is already closed (noted to keep Main Turbine on line).
	SRO	Directs performance of PPM 5.5.1, Overriding ECCS Valve Logic to Allow Throttling RPV Injection.
	BOP	<p>Goes to EOP drawer and pulls PPM 5.5.1 procedure and equipment bag containing 5 keys.</p> <p>Performs PPM 5.5.1:</p> <ul style="list-style-type: none"> • 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). <p>Updates crew to completion of PPM 5.5.1, and that the ECCS injection valves are closed and throttleable.</p>

Event No. 6		
Time	Position	Applicants Actions or Behavior
	SRO	<p>Direct the ATC to:</p> <ul style="list-style-type: none"> • Stop and prevent condensate and feedwater. • Lower level to a band less than –65” but greater than –183” (preferred band is –80” to –140”). • Commence RPV injection at -65”.
	ATC	<p>Aligns the Feed and Condensate system per SOP-RFW-FCV-QC quick card as follows:</p> <ul style="list-style-type: none"> • Step 2.1.1 – Start closing RFW-V-112A and RFW-V-112B • Step 2.1.2 – Start opening RFW-V-118. • Step 2.1.3 – Verify RFW-V-109 is closed. • Step 2.1.4 – Verify RFW-V-117A and RFW-V-117B open. • Step 2.1.5 – Verify RFW-LIC-620 is in manual (V selected for Valve position demand) with 0 output.
		<ul style="list-style-type: none"> • Step 2.1.6 – If Reactor Feed Pumps are operating then perform the following: <ul style="list-style-type: none"> a. If non-ATWS, then verify RFPs have ramped down in speed b. Place RFW-P-1B in MDEM mode. c. Place RFW-P-1A in MDEM mode. d. Control Turbine speed as required. e. If desired, then place RFW-FCV-2A (B) in manual and slowly open to approximately 80%. • Step 2.1.7 - Verify RFW-V-112A and RFW-V-112B are fully closed. • Step 2.1.8 - Verify RFW-V-118 is fully open.

Event No. 6		
Time	Position	Applicants Actions or Behavior
		<ul style="list-style-type: none">• Step 2.1.9 - If Reactor Feed Pumps are operating, then adjust the running RFP speed to establish ~ 200 psid across RFW-FCV-10A & 10B using either Feedwater touch screen (H13-P840).• Step 2.1.10 - Adjust RFW-LIC-620 manual output to control RPV level.
		<p>Reports EOP entry on low RPV water level at +13".</p> <p>Reports Reactor Power as it drops due to lowering level.</p> <p>Maintains RPV level between -65" and -183" as directed (-80" to -140" is the preferred band).</p> <p>Does not commence feeding until RPV level drops below -65".</p>
Comments:		

Event No. 7

Description: Hydraulic ATWS – Insert Control Rods. No control rods will be able to be manually driven in nor insert on scram/reset/scram.

This event is active at the beginning of the scenario and is realized when a manual reactor scram is inserted.

Time	Position	Applicants Actions or Behavior
T = 70	SRO	Directs PPM 5.5.11, ALTERNATE Control Rod Insertions, be performed to insert control rods.
	BOP	<p>Goes to EOP drawer and pulls procedure for PPM 5.5.11 and equipment bag.</p> <p>Performs PPM 5.5.11:</p> <p style="padding-left: 40px;">Determines that no RPS scram lights are lit and:</p> <p style="padding-left: 80px;">Removes one TB1 ARI fuse (P650 F01, F02, F03 or F04)</p> <p style="padding-left: 80px;">Removes one TB2 ARI fuse (P650 F01, F02, F03 or F04).</p> <p>Observes that some or all blue scram valve lights are lit and determines Tab B should be performed:</p> <p>Operator Actions per TAB B:</p> <p style="padding-left: 40px;">Places the SDV HIGH LEVEL TRIP control switch to BYPASS.</p> <p style="padding-left: 40px;">Determines the scram cannot be reset.</p> <p style="padding-left: 40px;">Overrides RPS trip signals per Attachment 6.1.</p>

Event No. 7		
Time	Position	Applicants Actions or Behavior
	BOP	<p>ATTACHEMNT 6.1</p> <p>At H13-P611 - Installs a jumper between RPS-RLY-K9B terminal stud 2 and RPS-RLY-K12F terminal stud 4.</p> <p>At H13-P611 - Installs a jumper between RPS-RLY-K9D terminal stud 2 and RPS-RLY-K12H terminal stud 4.</p> <p>At H13-P609 - Installs a jumper between RPS-RLY-K9A terminal stud 2 and RPS-RLY-K12E terminal stud 4.</p> <p>At H13-P609 - Installs a jumper between RPS-RLY-K9C terminal stud 2 and RPS-RLY-K12G terminal stud 4.</p>
	BOP	<p>Continues with Tab B operator actions:</p> <p>Reset the scram by depressing reset pushbuttons.</p> <p>Ensures both CRD pumps are running – may direct ABN-CRD MAXFLOW be performed.</p>
ROLEPLAY: Wait two minutes and ACTIVATE TRIGGER 26. Report completion when valves are fully opened.		
	BOP	<p>Determines that CRD drive header pressure can be established and performs Attachment 6.2 to bypass all RSCS rod blocks:</p> <p>At H13-P613 - Installs one jumper from terminal 7 to terminal 8 on Baily Alarm Card AHH.</p> <p>At H13-P613 - Installs one jumper from terminal 7 to terminal 8 on Baily Alarm Card AGG.</p> <p>Places the RWM bypass switch to bypass on H13-P603.</p>
	BOP	<p>Manually starts to drive control rods by starting at 10-43 and inserting every other rod in every other row.</p> <p>Reports no success in driving control rods to SRO.</p>

Event No. 7		
Time	Position	Applicants Actions or Behavior
		<p>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.</p> <p>If all rods did not insert, continues scram/reset/scram Tab B and raises SDV drain time by 2 minutes.</p> <p>Determines no control rod motion and requests drain time extension.</p>
Comments:		

Event No. 8		
<p>Description: Both Reactor Feedwater Pumps trip after manual insertion of control rods has begun, or as determined by the scenario coordinator, which requires an Emergency Depressurization when RPV Level drops to -183”.</p> <p>The event is initiated after the scram has been reset per PPM 5.5.11, Alternate Control Rod Insertion, or as determined by the scenario coordinator by <u>ACTIVATING TRIGGER 8.</u></p>		
Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 8.		
Critical Task is to lower RPV pressure to allow injection with Condensate Booster Pumps and thus prevent an Emergency Depressurization on low RPV water level. (SRO/ATC/BOP)		
T=60	ATC	<p>Reports reactor power as it drops due to lowering RPV level.</p> <p>Responds to P840.A1 1-1 ‘TURB A TRIP’ and P840.A1 1-5 ‘TURB B TRTRIP’ annunciators and recognizes that both Reactor feedwater pumps have tripped.</p> <p>Attempts to reset both pumps by taking the EMERG TRIP/RESET switch to reset but recognizes neither will reset and informs the SRO.</p>
	SRO	<p>Directs all injection flow be maximized (Note: All high pressure injection flow should already be injecting).</p> <p>Conducts brief/update.</p> <p>Directs RPV pressure reduction using Bypass Valves to facilitate feeding the RPV using Condensate Booster Pumps.</p>

Event No. 8		
Time	Position	Applicants Actions or Behavior
	BOP	<p>Lowerts RPV pressure using SOP-DEH-QC ‘Main Turbine DEH Operations Quick Card’.</p> <p>Step 2.1.1a. Select Pressure Target.</p> <p>Step 2.1.1b Enter desired pressure.</p> <p>Step 2.1.1c Select OK.</p> <p>Step 2.1.1d If a change in pressure rate is desired, then perform the following:</p> <ol style="list-style-type: none"> 1. Select pressure rate 2. Enter desired pressure rate 3. Select OK <p>Step 2.1.1e Select GO</p> <p>Step 2.1.1f Select Yes</p> <p>Step 2.1.1g Verify pressure demand and throttle pressure change at the pressure rate.</p>
	SRO	<p>Directs feeding vessel using Condensate Booster Pumps.</p> <p>May expand RPV level band based on RPV level and trend.</p>
	ATC	<p>When RPV pressure drops to less than the shutoff head of the Condensate Booster Pumps (approximately 600 psig), verifies injection into the RPV.</p> <p>Maintains RPV level in level band given by CRS.</p>
<p>Termination Cue: The scenario will be terminated when RPV pressure has been lowered and Condensate Booster Pump injection level is bean Emergency Depressurization has been performed, RPV Pressure has dropped to less than 188 psig, and RPV level has been returned to =80” to -140” level band or as directed by the scenario coordinator.</p>		
<p>COMMENTS:</p>		

TURNOVER INFORMATION**Initial Conditions:**

Columbia is operating 100% power.

OSP-SGT-M702 is scheduled to be performed.

APRM 'A' has a failed power supply and is bypassed.

Turnover:

Perform the Standby Gas Treatment B System Monthly Operability surveillance, OSP-SGT-M702.

SIMULATOR SETUP INSTRUCTIONS

Reset to IC-213.

Hang a blue Equipment Tag on the Bypass Switch for APRM A/C/E in the “A” position on H13-P603.

Have surveillance ready for each crew.

SCHEDULE

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<!-- This file contains a Thunder Simulations Schedule -->
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</SCHEDULE>

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EVENT

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<!-- This file contains a Thunder Simulations Event -->
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  <TRIGGER id="6" description="Small Recirc leak when RRC-P-1A LT 10 Hz">X02D117D &lt 10</TRIGGER>
  <TRIGGER id="7" description="Stick all rods on SLC-A red light on">X03O042R &gt 0</TRIGGER>
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```




INSTRUCTIONAL COVER SHEET

PROGRAM TITLE	OPERATIONS TRAINING
COURSE TITLE	COLUMBIA GENERATING STATION SIMULATOR EXAMINATION
LESSON TITLE	Start CW-P-1B; Raise power with flow; RHR-RLY-K112C fails and RHR-V-42C opens; SDV level instrument fails, Half scram, 2 control rods scram, one not full in; Steam Leak Main Steam Tunnel; Partial Electric ATWS, Pull fuses to insert rods, SLC fails to initiate; CB-S1 fails to auto close; Main Steam Tunnel leak gets larger and spreads to a second area; Emergency Depressurize when 2 Areas GT Max Safe

LENGTH OF LESSON 1.5 Hours

INSTRUCTIONAL MATERIALS INCLUDED

Lesson Plan PQD Code		Rev. No.	
Simulator Guide PQD Code	LO001804	Rev. No.	0
JPM PQD Code		Rev. No.	
Exam PQD Code		Rev. No.	

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

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

Facility: Columbia

NRC Scenario No: 4

Examiners: _____

Operators: _____

Initial conditions: Reactor Power is 90%. Power was reduced due to CW-P-1B not being available. The work on CW-P-1B has been completed. OPS4 is standing by in the CWPB for a start of CW-P-1B

Turnover: Start CW-P-1B. After the pump start, raise reactor power with flow to 100%. The reactivity brief has been performed.

Event No.	Timeline	Event Type*	Event Description
1.	T = 0	N (BOP)	Start CW-P-1B.
2.	T = 5	R (ATC)	Raise power with Flow.
3.	T = 10	I (BOP) I (SRO) TS (SRO)	RHR-RLY-K112C Fails and RHR-V-42C opens.
4.	T = 20	I (ATC) I (SRO) TS (SRO)	Scram Discharge Volume level instrument fails – Half Scram. 2 Control Rods Scram but one does not go full in.
5.	T = 35	M (All)	Main Steam Tunnel steam leak – Insert a manual reactor scram. One Main steam line does not isolate.
6.	T = 40	C (ATC) I (BOP)	Electric ATWS – B RPS side – Pull fuses to insert control rods. SLC fails to initiate.

Critical Task is to insert control rods prior to exiting PPM 5.1.2 RPV Control - ATWS.

7.	T = 60	C (BOP)	CB-S1 Fails to auto close – closed manually – repower SL-11.
8.	T = 70	C (SRO)	Main Steam Tunnel steam leak gets larger and spreads to another area.
9.	T = 70		Emergency Depressurize when 2 Areas GT Max Safe Temperatures.

Critical task is to initiate an EMERGENCY DEPRESSURIZATION when 2 Areas have exceeded their Max Safe Operating Temperatures and within 5 minutes of establishing that the second areas temperature has exceeded its MSOT and complete actions before 15 minutes (time associated with when Emergency Director could direct evacuation of personnel at SAE).

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

Critical Task	Justification	References
Insert control rods prior to exiting PPM 5.1.2 RPV Control - ATWS.	This is a required action per the power leg of PPM 5.1.2, RPV Control – ATWS.	PPM 5.1.2, RPV Control ATWS PPM 5.0.10 - EOP Bases
Initiate an EMERGENCY DEPRESSURIZATION when 2 Areas have exceeded their Max Safe Operating Temperatures and within 5 minutes of establishing that the second areas temperature has exceeded its MSOT and complete actions before 15 minutes	Emergency depressurization when two areas have exceeded Max Safe is a procedural requirement of PPM 5.2.1, Primary Containment Control. The 5 minutes allows Operations Management expectation that a second operator be given the time to verify a second area has exceeded Max Safe values, which prevents unnecessary ED's. 15 minutes is the time associated with when the Emergency Director could direct evacuation of personnel at SAE declaration.	PPM 5.2.1, Primary Containment Control PPM 5.0.10 - EOP Bases PPM 13.1.1 – Classifying the Emergency

SCENARIO DESCRIPTION

EVENT 1 – The BOP operator will start CW-P-1B as a normal evolution.

EVENT 2 – Reactor power will be raised to 100% with RRC flow at the rate of 1% power per minute or 1 Hz per minute.

EVENT 3 – The next event is a failure of RHR-RLY-K112C which is the RHR-V-42B/C Open Permissive relay. The crew will respond and find RHR-V-42C stroking open. The crew will manually close RHR-V-42C. The CRS will declare RHR-RLY-K112C inop and enter Tech Spec 3.3.5.1, Emergency Core Cooling System (ECCS) Instrumentation and uses table 3.3.5.1-1 to determine the function is 2f and that condition C applies which requires to declare supported features inop when redundant feature ECCS initiation capability is inoperable within 1 hour (is not applicable) and restore channel to operable status within 24 hours.

EVENT 4 – The next event is a failure of a Scram Discharge Volume level switch (fails high) which causes a half scram on A RPS. Due to failed fuses on the B RPS side, two control rods will scram but only one goes full in. Control rod 30-03 stops at position 10. The crew will enter ABN-ROD and reduce reactor power with flow to LE 80 Mlbm/hr. Control rod 30-03 will be manually driven full in. For the control rods - Refers to Tech Spec 3.1.3, Control Rod Operability, and determines Condition C (One or more control rods inoperable for reasons other than A or B) applies which requires to fully insert inoperable control rod within 3 hours and disarm the associated CRD within 4 hours. For the SDV Level switch – Refers to Tech Spec 3.3.1.1, Reactor Protection System (RPS) Instrumentation and determines Condition A (one or more required channels inoperable) which requires place channel in trip within 12 hours OR place associated trip system in trip within 12 hours. Recognizes that the system already in a tripped condition.

EVENT 5 – The next event is a steam leak in the Main Steam Tunnel. As temperatures rise the crew will determine the MSIVs will eventually close and a manual reactor scram will be inserted. When the isolation for high Main Steam Tunnel temperature occurs, both the inboard and outboard MSIVs on the A Main Steam line do not close.

EVENT 6 – When the scram is inserted, only about one quarter of the control rods will insert due to a partial Electric ATWS on the B RPS side (A RPS is tripped due to the SDV instrument failure). When SLC is started the systems will not initiate. The crew will pull RPS fuses and all control rods will insert.

EVENT 7 – When the Main Turbine trips the startup breaker for SM-1 will not auto close. Actions will be taken to manually close the S1 breaker and then to repower SL-11.

EVENT 8 –The Main Steam line steam leak gets bigger and spreads to a second area. The first area is the Main Steam Tunnel and Max Safe temperature is 320°F.

EVENT 9 – The crew will Emergency Depressurize the RPV when two areas are greater than their Max Safe Operating temperatures. The second area is the RWCU Pipe Area temperature and Max Safe temperature is 340°F.

The scenario will be terminated after the Emergency Depressurization has been performed.

Event No. 1

Description: Start CW-P-1B per SOP-CW-START.

This event is initiated by shift turnover.

Time	Position	Applicants Actions or Behavior
T = 0	SRO	Directs the start of CW-P-1B per SOP-CW-START.
	BOP	<p>Performs SOP-CW-START Section 5.3 actions as follows:</p> <ul style="list-style-type: none"> • 5.3.1 – No actions • 5.3.2 – Verifies section 5.1 complete. • 5.3.3 – Contacts OPS4 to verify upper and lower motor bearing lube oil levels OK (Roleplay levels normal). • 5.3.4 – Contacts OPS4 and verifies motor air ports free of obstructions (Roleplay – motor free of obstructions). • 5.3.8 – Verifies CWPB bay level between 441' (23') and 445' elevation (27') (Roleplay 25'). • 5.3.9 – Places C/S for CW-V-13B and TSW-V-115B to OPEN and when valves start to open releases switch. • 5.3.10 – Observes blue ready to start light on. • 5.3.12 Makes plant announcement of CW-P-1B start. • 5.3.13 – Places CW-P-1B C/S to START (verifies pump starts, discharge valve opens, and CW-V-13B and TSW-V-115B close). <p>Acknowledges 4.840.A4 4-5 'CW PMP B DISCH NOT FULL OPEN' alarm.</p> <p>Informs CRS that CW-P-1B is running.</p>

COMMENTS:

Event No. 2		
Description: Raise Power with Flow to 100%. This event is initiated by shift turnover.		
Time	Position	Applicants Actions or Behavior
T = 5	SRO	Directs ATC to raise power with flow to achieve 100% reactor power at 1% per minute (1 Hz per minute).
	ATC	<p>Notes Reactor Power and/or Main Generator Output.</p> <p>Refers to SOP-RRC-FLOW-QC quick card and performs the following:</p> <p>Step 2.1 Reactor Power change with RRC Flow controllers in auto:</p> <p>Step 2.1.1 Monitor fuel-preconditioning limits (per 9.3.18) while changing reactor power.</p> <p>Step 2.1.2 Raise/lower RRC flow using RTC-M/A-R675 (Master controller) as necessary.</p> <p>Step 2.1.3 Verify total core flow is LT 103%.</p> <p>Step 2.1.4 Verify RRC loop B is LT 55.9 Mlb/hr.</p> <p>Step 2.1.5 Notify the CRS when the change in Reactor power is complete.</p> <p>At 100% power, stops the power increase.</p> <p>Reports power/pressure and level after power/flow increase is complete.</p>
	ATC	Informs the CRS of Power/Pressure/Level after power increase has been completed.
COMMENTS:		

Event No. 3		
<p>Description: RHR-RLY-K112C (RHR B/C Injection Valve Open Permissive) fails and RHR-V-42C goes open.</p> <p>This event is initiated by activating TRIGGER 1 after Reactor Power is at least 95%.</p>		
Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR: ACTIVATE TRIGGER 1.		
T = 10	BOP	<p>Responds to P601.A2 4-4 'RHR B/C INJECTION VLV OPEN PERMISSIVE' alarm.</p> <p>Refers to the ARP.</p>
		Observes RHR-V-42C going open and informs the CRS.
	SRO	Observes Reactor Pressure GT 470 psig and directs RHR-V-42C be closed.
	BOP	Takes the control switch for RHR-V-42C to close, recognizes it closes, and informs the CRS.
	SRO	Directs backpanel investigation of RHR-RLY-K112B and RHR-RLY-K112C.
	BOP	<p>Investigates H13-P618 and recognizes RHR-RLY-K112C is picked up and RHR-RLY-K112B is not.</p> <p>Reports findings to CRS.</p>

Event No. 3		
Time	Position	Applicants Actions or Behavior
	SRO	Declares RHR-RLY-K112C inop and enters Tech Spec 3.3.5.1, Emergency Core Cooling System (ECCS) Instrumentation and uses table 3.3.5.1-1 to determine the function is 2f and that condition C applies which requires to declare supported features inop when redundant feature ECCS initiation capability is inoperable within 1 hour (is not applicable) and restore channel to operable status within 24 hours.
	SRO	Conducts brief.
COMMENTS:		

Event No. 4		
<p>Description: Scram Discharge Volume Level Switch fails upscale – Half Scram – Two Control Rods scram but only One goes Full In.</p> <p>The event is initiated by activating TRIGGER 2 after Tech Specs for the RHR system have been referenced.</p>		
Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 2.		
T = 10	ATC	<p>Responds to annunciator P603.A8 1-3 ‘SDV LEVEL HIGH TRIP’ and P603.A7 3-4 ‘1/2 SCRAM RPS A’.</p> <p>Recognizes a half scram on RPS A and informs the CRS.</p>
	ATC	<p>Responds to P603.A7 5-7, ‘ROD DRIFT’ alarm.</p> <p>Scans the full core display (or observes RWM screen) for drifting and/or scrammed control rods.</p> <p>Recognizes two control rods have blue scram lights lit and informs the CRS.</p>
	ATC	<p>Selects control rod 30-03 and observes it is at position 10.</p> <p>Selects control rod 34-03 and observes it is full in (position 00).</p>
	BOP	<p>Makes an announcement for half scram on RPS A system.</p> <p>Investigates backpanel for SDV level switch and recognizes RPS-RLY-K1A has dropped out.</p>
	SRO	<p>Updates crew and enters ABN-ROD.</p> <p>May set a key parameter of a third scrammed control rod.</p> <p>Refers to section 4.2 of ABN-ROD and directs core flow be lowered to LE 80 Mlbm/hr (should give a specific value).</p>

Event No. 4		
Time	Position	Applicants Actions or Behavior
	ATC	<p>Ensures both individual pump controllers are in AUTO and depresses the Master Controller lower pushbutton to lower flow to directed value.</p> <p>Informs CRS of Power/Pressure and RPV Level when flow decrease has been completed (power will be about 80% at the end of the flow reduction).</p>
	SRO	Directs control rod 30-03 be selected and driven full in using the continuous insert pushbutton.
	ATC	<p>Selects control rod 30-03 and depresses the continuous insert pushbutton and drives the control rod full in.</p> <p>Releases the continuous insert pushbutton and verifies the control rod remains at position 00.</p> <p>Informs the CRS that the control rod is full in.</p>
	SRO	<p>For the control rods - Refers to Tech Spec 3.1.3, Control Rod Operability, and determines Condition C (One or more control rods inoperable for reasons other than A or B) applies which requires to fully insert inoperable control rod within 3 hours and disarm the associated CRD within 4 hours.</p> <p>For the SDV Level switch – Refers to Tech Spec 3.3.1.1, Reactor Protection System (RPS) Instrumentation and determines Condition A (one or more required channels inoperable) which requires place channel in trip within 12 hours OR place associated trip system in trip within 12 hours. Recognizes system already in tripped condition.</p>
	SRO	Per ARP for ½ SCRAM SYSTEM A – directs announcement be made stopping all maintenance and surveillance testing that has a potential for generating a trip on RPS B side.
	BOP	Makes announcement as directed.
<p>COMMENTS:</p>		

Event No. 5

Description: Main Steam Tunnel Steam Leak – MSIV closure – Two MSIVs fail to close. It takes six minutes to get the first temperature alarm after trigger 3 initiation. It takes another 2 minutes to get MSIV closure and an automatic reactor scram.

This event is initiated when the Tech Specs for the SDV level switch failure have been referenced by activating **TRIGGER 3**.

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 3.		
ROLEPLAY: Wait one minute after trigger 3 is activated and call the control room on x2222 and, as the security fire tour, inform the control room that it feels like there is steam coming up from between the floor plugs on the North side of the Reactor Building 522' elevation. If OPS2 is sent to validate – There is definitely steam coming up from between the floor plugs.		
T = 35	CRS	<p>Takes the phone call and after the call is completed performs a update and informs the crew of the potential steam leak report.</p> <p>Directs investigation of leak detection monitors on H13-P632 and H13-P642.</p>
	BOP	Investigates leak detection monitors and reports temperatures and delta temperatures rising for the Main Steam Tunnel on LD-MON-2B points A1-1 and A2-1.
	SRO	<p>Updates crew and enters ABN-HELB.</p> <p>May direct that the Reactor Building be evacuated due to a steam leak.</p>
	BOP	<p>Acknowledges P601.A3 3-8 'LEAK DET MSL TUNNEL dT HIGH' and refers to ARP.</p> <p>Provides temperature and trend on Main Steam Tunnel temperatures.</p>
	SRO	Updates crew and directs a manual scram prior to an automatic scram.
NOTE: The remainder of these steps occur after the scram but are included here for continuity purposes.		
		Acknowledges P601.A2 3-1 and P601.A3 1-7 'LEAK DET STEAM TUNNEL TEMP HI HI' annunciators and informs the CRS of the EOP entry.

Event No. 5		
Time	Position	Applicants Actions or Behavior
	SRO	Updates the crew and enters PPM 5.3.1, Secondary Containment Control.
	BOP	When the MSIVs close, takes all of the control switches for the MSIVs to the close position. Recognizes MS-V-22A and MS-V-28A did not close automatically and will not manually close and reports the failure of MS-V-22A and MS-V-28A to close to the CRS.
COMMENTS:		

Event No. 6		
<p>Description: Electric ATWS B RPS side (Group 2, 3, 4). SLC Fails to initiate.</p> <p>This event was activated when TRIGGER 3 was initiated for the last event and is realized when a manual scram is inserted.</p>		
Time	Position	Applicants Actions or Behavior
Critical Task is to insert control rods prior to exiting PPM 5.1.2.		
T = 55	ATC	<p>Manually scrams the reactor as directed and performs immediate operator actions of PPM 3.3.1, Reactor Scram:</p> <ul style="list-style-type: none"> Places mode switch to shutdown Monitors/reports power/level/pressure Reports APRMs not downscale and performs the following: <ul style="list-style-type: none"> Depresses the manual scram pushbuttons Initiates ARI Recognizes reactor power is GT 5% and performs the following: <ul style="list-style-type: none"> Informs the SRO
	ATC	<p>When it is recognized that depressing the manual scram pushbuttons and initiating ARI has not inserted the control rods, and if power is still GT 5%, refers to SOP-SLC-INJECTION-QC quick card and performs the following:</p> <p>Step 2.1 Remove the SLC keylock switch blanks and insert both keys into the SLC System control switches.</p> <p>Step 2.2 Initiate SLC injection by performing the following (H13-P603):</p> <ul style="list-style-type: none"> Places SLC System A control switch to the OPER position. Places SLC System B control switch to the OPER position. <p>Step 2.3 Record the following:</p> <ul style="list-style-type: none"> SLC Flow rate (~43 gpm for one pump, or 86 gpm for both pumps) Initial tank level Circle RWCU-V-4 status (should be closed)

Event No. 6		
Time	Position	Applicants Actions or Behavior
		<p>Step 2.4 Report one of the following, or similar words, to the CRS as you hand him this procedure:</p> <ul style="list-style-type: none"> • SLC is injecting normally • SLC is partially injecting • SLC failed to inject <p>Recognizes and reports that neither SLC pump started and neither SLC suction valve opened when the key lock switches were taken to OPER.</p> <p>Insert SRMs and IRM by depressing the power on and insert pushbuttons.</p> <p>Reports all rods not in and current reactor power (about 12% and drops to downscale lit).</p> <p>Reports EOP entry on failure to scram.</p> <p>Reports an Electrical ATWS on B RPS side in that three RPS white lights are still illuminated (Groups 2, 3, and 4).</p>
	CRS	<p>Updates crew on EOP entry into PPM 5.1.1, RPV Control, and directs/verifies that the Mode Switch has been placed in SHUTDOWN.</p> <p>Updates crew and exits PPM 5.1.1, RPV Control, and transitions to PPM 5.1.2, RPV Control - ATWS.</p> <p>Directs BOP to:</p> <ul style="list-style-type: none"> • Inhibit ADS and take manual control of HPCS. • Verify pressure is being maintained by the bypass valves in Auto. <p>Directs RPV level be maintained -50" to +54".</p>

Event No. 6		
Time	Position	Applicants Actions or Behavior
	BOP	<p>Takes both ADS control switches to the INHIBIT position and acknowledges associated alarms.</p> <p>Arms and Depresses the HPCS system initiation pushbutton while holding the control switch for HPCS-P-1 to STOP.</p> <p>Takes the control switch for HPCS-V-4 to close when it gets fully opened.</p> <p>Reports ADS inhibited and manual control of HPCS taken to CRS.</p>
	SRO	Directs PPM 5.5.6, Bypassing the MSIV Isolation Interlocks on High Tunnel Temperature and low RPV level.
	BOP	<p>Goes to EOP drawer and gets PPM 5.5.6 procedure and equipment bag containing two keys.</p> <p>Performs PPM 5.5.6:</p> <ul style="list-style-type: none"> • At H13-P609 places MS-RMS-S84 to BYPASS • At H13-P611 places MS-RMS-S85 to BYPASS <p>Updates Crew on the completion of PPM 5.5.6.</p>
	SRO	Directs performance of PPM 5.5.1, Overriding ECCS Valve Logic to Allow Throttling RPV Injection.

Event No. 6		
Time	Position	Applicants Actions or Behavior
	BOP	<p>Goes to EOP drawer and pulls PPM 5.5.1 procedure and equipment bag containing 5 keys.</p> <p>Performs PPM 5.5.1:</p> <ul style="list-style-type: none"> • 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). <p>Updates crew to completion of PPM 5.5.1, and that the ECCS injection valves are closed and throttleable.</p>
	SRO	<p>Direct the ATC to:</p> <ul style="list-style-type: none"> • Stop and prevent condensate and feedwater. • Lower level to a band less than –65” but greater than –183” (preferred band is –80” to –140”). • Commence RPV injection at -65”.

Event No. 6		
Time	Position	Applicants Actions or Behavior
	ATC	<p>Aligns the Feed and Condensate system per SOP-RFW-FCV-QC quick card as follows:</p> <ul style="list-style-type: none"> • Step 2.1.1 – Start closing RFW-V-112A and RFW-V-112B • Step 2.1.2 – Start opening RFW-V-118. • Step 2.1.3 – Verify RFW-V-109 is closed. • Step 2.1.4 – Verify RFW-V-117A and RFW-V-117B open. • Step 2.1.5 – Verify RFW-LIC-620 is in manual (V selected for Valve position demand) with 0 output. • Step 2.1.6 – If Reactor Feed Pumps are operating then perform the following: <ul style="list-style-type: none"> • a. If non-ATWS, then verify RFPs have ramped down in speed • b. Place RFW-P-1B in MDEM mode. • c. Place RFW-P-1A in MDEM mode. • d. Control Turbine speed as required. • e. If desired, then place RFW-FCV-2A (B) in manual and slowly open to approximately 80%. • Step 2.1.7 - Verify RFW-V-112A and RFW-V-112B are fully closed. • Step 2.1.8 - Verify RFW-V-118 is fully open. • Step 2.1.9 - If Reactor Feed Pumps are operating, then adjust the running RFP speed to establish ~ 200 psid across RFW-FCV-10A & 10B using either Feedwater touch screen (H13-P840). • Step 2.1.10 - Adjust RFW-LIC-620 manual output to control RPV level.

Event No. 6		
Time	Position	Applicants Actions or Behavior
		<p>Reports EOP entry on low RPV water level at +13".</p> <p>Reports Reactor Power as it drops due to lowering level.</p> <p>Maintains RPV level between -65" and -183" as directed (-80" to -140" is the preferred band).</p> <p>Does not commence feeding until RPV level drops below -65".</p>
	ATC	<p>At -50" RPV level, recognizes RRC pumps have not tripped (due to failed instrument for electric ATWS) and depresses the stop pushbuttons for both RRC pumps.</p> <p>Reports RRC pumps failed to trip to the CRS.</p>
	SRO	<p>Per the power leg of PPM 5.1.2, RPV Control ATWS, directs control rod insertion by pulling RPS fuses per PPM 5.5.11, Alternate Control Rod Insertion.</p>
	BOP	<p>Refers to PPM 5.5.11 and determines there are white RPS scram lights lit on the B RPS side and performs the following:</p> <p>Updates crew that RPS fuses are about to be removed and control rods should be inserting.</p> <p>Removes the RPS fuses in H13-P611 associated with Groups 2, 3, and 4 on B RPS:</p> <ul style="list-style-type: none"> • LL-F13 (May not be pulled as this is Group 1 fuse and it is deenergized) • MM-F21 (Group 2 fuse) • BB-F12 (Group 3 fuse) • AA-F20 (Group 4 fuse)

Event No. 6		
Time	Position	Applicants Actions or Behavior
<p>NOTE: During the running of the this scenario for the third time, the crew only removed the three fuses associated with the groups that failed to deenergize (Groups 2, 3 and 4) (all other crews removed all four B RPS fuses). It was discovered at that time that the simulator software that assigned the individual fuses to the associated B RPS groups, was incorrect as the fuses were not assigned to the correct groups. This resulted in that crew only inserting three quarters of the control rods even though the correct fuses were removed per procedure PPM 5.5.11, Alternate Control Rod Insertion.</p>		
	ATC	<p>As RPS fuses are being removed, informs the CRS that control rods are inserting.</p> <p>When the last RPS fuse is removed, informs the CRS that all control rods are inserted.</p>
	SRO	May direct SLC switches be taken to OFF.
	ATC	<p>Takes the control switches for both SLC Systems to off if directed.</p> <p>Reports completion to CRS.</p>
	SRO	Updates crew and exits PPM 5.1.2, RPV Control – ATWS and enters PPM 5.1.1, RPV Control.
	SRO	<p>Directs RPV level control at -50” to + 54” with Condensate, Feed, RCIC and HPCS as necessary.</p> <p>Directs PPM 3.3.1 be completed.</p>

Event No. 6		
Time	Position	Applicants Actions or Behavior
	ATC	<p>Announces reactor scram over PA.</p> <p>Transfers RPV level control to Startup level control valves per SOP-RFW-FCV-QC:</p> <p>Step 2.1.1 Starts closing RFW-V-112A and RFW-V-112B.</p> <p>Step 2.1.2 Starts opening RFW-V-118.</p> <p>Step 2.1.3 Verifies RFW-V-109 open.</p> <p>Step 2.1.4 Verifies RFW-V-117A and RFW-V-117B open</p> <p>Step 2.1.5 Verifies RFW-LIC-620 in manual.</p> <p>Step 2.1.6 Places RFW-P-1B in MDEM; Places RFW-P-1A in MDEM; Adjusts turbine speed as required.</p> <p>Step 2.1.7 Verifies RFW-V-112A and RFW-V-112B closed.</p> <p>Step 2.1.8 Verifies RFW-V-118 open.</p> <p>Step 2.1.9 Adjusts turbine speed to get 200 psid across Startup valves.</p> <p>Step 2.1.10 Adjusts level in manual.</p> <p>Step 2.1.11 Places RFW-LIC-620 in automatic at 36".</p> <p>Informs the CRS feed pumps are on the Startup level controllers in automatic.</p>
COMMENTS:		

Event No. 7		
<p>Description: Breaker CB-S1 fails to auto close on transfer of electrical busses to Startup power.</p> <p>This event is active from the beginning of the scenario and is realized when the Main Turbine trips and the electrical plant transfers to the Startup Transformer.</p>		
Time	Position	Applicants Actions or Behavior
T = 55	BOP	<p>Responds to the electrical boards and recognizes SM-1 is de-energized, SM-7 is on Backup power and DG-1 is running. Verifies SW-A running to support DG-1 operation.</p> <p>Observes there are no lockouts indicated on SM-1.</p> <p>Takes the sync selector switch for CB-S1 to the MAN position.</p> <p>Takes the control switch for CB-S1 to close and observes red light comes on and green light goes out and that the breaker did close to repower SM-1.</p>
	BOP	<p>Observes SL-11 not energized and may re-energize it using SOP-ELEC-480V-OPS-QC quick card:</p> <p>Step 2.1.1 Verifies SM-1 energized.</p> <p>Step 2.1.2 Verify CB-11/1 green light illuminated and green flag displayed.</p> <p>Step 2.1.3 IF CB-1/11 is open, then perform the following:</p> <ol style="list-style-type: none"> Verify CB-1/11 white LOCKOUT CIRCUIT AVAIL light illuminated. Verify CB-1/11 green light illuminated and green flag displayed. Close CB-1/11. <p>Step 2.1.4 Close CB-11/1.</p> <p>Step 2.1.5 Verify SL-11 voltage is approximately 480 (432 – 528 volts).</p> <p>Informs CRS of electrical board status and actions taken.</p>

Event No. 7

ATC

Recognizes a CRD pump is not running and starts a CRD pump using ARP guidance using P603.A7 3-8 'CRD CHARGE WATER PRESS LOW':

Step 3. If neither pump is running then perform the following:

- a. Place CRD-FC-600 in manual (CRD Flow Controller).
- b. Reduce CRD-FC-600 output to zero.
- c. Start the standby pump.
- d. Null CRD-FC-600.
- e. Transfer CRD-FC-600 to auto.

COMMENTS:

Event No. 8

Description: Steam Leak gets larger and spreads to a second area. It takes 75 seconds to get the temperature alarm and nine minutes total to reach Max Safe temperature after trigger initiation.

This event is initiated when control rods are inserted and SM-1 and SL-11 have been repowered by activating **TRIGGER 4.**

Time	Position	Applicants Actions or Behavior
BOOTH OPERATOR – ACTIVATE TRIGGER 4.		
T = 65	SRO	Sets a key parameter of Main Steam Tunnel Temperature of 320°F (Max Safe value for Main Steam Tunnel on LD-MON-2B points A1-1 and A1-2).
	BOP	Reports Main Steam Tunnel temperature as it approaches and when it reached Max Safe temperature of 320°F. THIS IS FIRST AREA THAT EXCEEDED MAX SAFE TEMPERATURE – IF ON HEADSET, LET THE EVALUATORS KNOW WHEN THIS VALUE IS REACHED.
		Acknowledges P601.A2 2-2 'LEAK DET RWCU ROOM TEMP HI HI' annunciator and refers to the ARP. Informs the CRS of EOP entry. Acknowledges Secondary Containment dP High annunciator and reports it as an EOP entry.
	SRO	Updates crew and reenters PPM 5.3.1, Secondary Containment Control. Directs back panel investigation of the RWCU temperature.
	BOP	Investigates back panel leak detection monitors and observes temperature on LD-MON-1B point A2-4, RWCU Pipe Area RB 522 N, trending up and reports current value and trend to the CRS.

Event No. 8		
Time	Position	Applicants Actions or Behavior
	SRO	Establishes a Key Parameter of Max Safe temperature of 340°F.
	SRO	Updates crew and reenters PPM 5.3.1, Secondary Containment Control.
	BOP	Monitors RWCU Pipe Area temperature as it rises and reports when it reaches max safe temperature of 340°F. THIS IS SECOND AREA THAT EXCEEDED MAX SAFE TEMPERATURE- IF ON HEADSET, LET THE EVALUATORS KNOW WHEN THIS VALUE IS REACHED.
	SRO	Directs second operator verify max safe temperature in two areas exceeded.
COMMENTS:		

Event No. 9		
<p>Description: EMERGENCY DEPRESSURIZATION when 2 Area's exceed Max Safe Operating Temperatures.</p> <p>This event is initiated when it is determined that 2 Areas have exceeded their Max Safe Operating Temperatures (Main Steam Tunnel and RWCU Pipe Area).</p>		
Time	Position	Applicants Actions or Behavior
<p>Critical task is to initiate an EMERGENCY DEPRESSURIZATION when 2 Areas have exceeded their Max Safe Operating Temperatures and within 5 minutes of establishing that the second areas temperature has exceeded its MSOT and complete actions before 15 minutes (time associated with when Emergency Director could direct evacuation of personnel at SAE).</p>		
T = 70	ATC	Verifies max safe temperature exceeded in two areas and informs the CRS.
	SRO	<p>Per PPM 5.3.1, Secondary Containment Control, determines that any one parameter has exceeded its maximum safe operating value in 2 or more areas and an Emergency Depressurization is required.</p> <p>Updates crew that an Emergency depressurization is required and takes the PPM 5.1.1, RPV Control override to PPM 5.1.3, Emergency RPV Depressurization.</p>
	SRO	Determines a high drywell pressure signal is not in and Wetwell level is GT 17 foot and directs seven SRVs, ADS preferred, be opened.
	ATC/BOP	<p>Opens seven ADS SRVs as directed.</p> <p>Verifies containment response as each is opened and reports completion to CRS.</p>
	SRO	<p>Directs pumps not required for adequate core cooling be stopped from injecting.</p> <p>Directs RPV/L maintenance -50 inches to +54 inches.</p>

Event No. 9		
Time	Position	Applicants Actions or Behavior
	ATC	Maintains RPV level as required to maintain water level band.
Termination Cue: The scenario can be terminated when the reactor has been Emergency Depressurized or as directed by the scenario coordinator.		
COMMENTS:		

TURNOVER INFORMATION

Initial conditions: Reactor Power is 90%. Power was reduced due to CW-P-1B not being available. The work on CW-P-1B has just been completed. OPS4 is standing by in the CWPH for a start of CW-P-1B.

Turnover: Start CW-P-1B. After the pump start, raise reactor power with flow to 100%. The reactivity brief has been performed.

SIMULATOR SETUP INSTRUCTIONS

Reset to IC 211.
Ensure power at 90%.
Place Simulator in Run.

SCHEDULE

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

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  <ACTION>Insert malfunction BKR-EPS049 to FAI_AUT_CLOS</ACTION>
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  <ACTION>Insert malfunction AOV-RRS003F to FAIL_AS_IS</ACTION>
  <DESCRIPTION>MS-V-22A INBOARD MSIV</DESCRIPTION>
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<ITEM row = 3>
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  <ACTION>Insert malfunction AOV-RRS007F to FAIL_AS_IS</ACTION>
  <DESCRIPTION>MS-V-28A OUTBOARD MSIV</DESCRIPTION>
</ITEM>

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  <EVENT>1</EVENT>
  <ACTION>Insert malfunction RLY-RHR013F to TRIP on event 1</ACTION>
  <DESCRIPTION>RHR-RLY-K112C - RHR-V-42C INJECT LW PRESS INTRLK</DESCRIPTION>
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  <DESCRIPTION>SLC KEYLOCK SWITCH TO OFF</DESCRIPTION>
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<ITEM row = 6>
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  <ACTION>Insert override OVR-SLC002C to OFF</ACTION>
  <DESCRIPTION>SLC KEYLOCK SWITCH TO OFF</DESCRIPTION>
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<ITEM row = 7>
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</ITEM>

<ITEM row = 8>
  <TIME>1</TIME>
  <EVENT>2</EVENT>
  <ACTION>Insert malfunction RLY-RPS045F to TRIP on event 2</ACTION>
  <DESCRIPTION>RPS-RLY-K1A SCRAM DISCH VOL HI LEVEL SCRAM</DESCRIPTION>
</ITEM>

<ITEM row = 9>
  <TIME>1</TIME>
  <EVENT>2</EVENT>
  <ACTION>Insert malfunction MAL-RMC007-3003 after 2 on event 2 delete in 2</ACTION>
  <DESCRIPTION>ROD 3003 SINGLE ROD SCRAM</DESCRIPTION>
</ITEM>

<ITEM row = 10>
  <TIME>1</TIME>
  <EVENT>2</EVENT>
  <ACTION>Insert override IND-RMC001BPF to ON after 2 on event 2</ACTION>
  <DESCRIPTION>SCRAM LIGHT FOR 3003</DESCRIPTION>
</ITEM>

<ITEM row = 11>
  <TIME>1</TIME>
  <EVENT>2</EVENT>
  <ACTION>Insert malfunction MAL-RMC007-3403 after 2 on event 2</ACTION>
  <DESCRIPTION>ROD 3403 SINGLE ROD SCRAM</DESCRIPTION>
</ITEM>

  <ITEM row = 12>
    <TIME>0</TIME>
    <EVENT>3</EVENT>
    <ACTION>insert malfunction MAL-RRS006B to 21500 in 300 on event 3</ACTION>
    <DESCRIPTION>>MSL-B BREAK IN THE STEAM TUNNEL</DESCRIPTION>
  </ITEM>

<ITEM row = 13>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS025F to FAIL_TO_TRIP on event 3</ACTION>
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<DESCRIPTION>RPS-RLY-K14A RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 14>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS026F to FAIL TO TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14B RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 15>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS027F to FAIL TO TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14C RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 16>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS028F to FAIL TO TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14D RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 17>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS029F to FAIL TO TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14E RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 18>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS030F to FAIL TO TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14F RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 19>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS031F to FAIL TO TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14G RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>
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<ITEM row = 20>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction RLY-RPS032F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>RPS-RLY-K14H RPS AUTO SCRAM RELAY</DESCRIPTION>
</ITEM>

<ITEM row = 21>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert override OVR-RPS007B to OFF on event 3</ACTION>
  <DESCRIPTION>ARI-RMS-4A SDV SYSTEM ATWS-ARI SYSTEM A TRIP</DESCRIPTION>
</ITEM>

<ITEM row = 22>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert override OVR-RPS008B to OFF on event 3</ACTION>
  <DESCRIPTION>ARI-RMS-4B SDV SYSTEM ATWS-ARI SYSTEM B TRIP</DESCRIPTION>
</ITEM>

<ITEM row = 23>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction ANN-603A7D01 to OFF on event 3</ACTION>
  <DESCRIPTION>ATWS-ARI IN TEST/LOSS OF POWER</DESCRIPTION>
</ITEM>

<ITEM row = 24>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction ANN-603A8D01 to OFF on event 3</ACTION>
  <DESCRIPTION>ATWS-ARI IN TEST/LOSS OF POWER</DESCRIPTION>
</ITEM>

<ITEM row = 25>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS029F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-LS-36A RPV LVL ATWS-RPT & ARI (RECIRC)</DESCRIPTION>
</ITEM>

<ITEM row = 26>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
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<ACTION>Insert malfunction BST-RRS030F to FAIL_TO_TRIP on event 3</ACTION>
<DESCRIPTION>MS-LS-36B RPV LVL ATWS-RPT & ARI (RECIRC)</DESCRIPTION>
</ITEM>

<ITEM row = 27>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS031F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-LS-36C RPV LVL ATWS-RPT & ARI (RECIRC)</DESCRIPTION>
</ITEM>

<ITEM row = 28>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS032F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-LS-36D RPV LVL ATWS-RPT & ARI (RECIRC)</DESCRIPTION>
</ITEM>

<ITEM row = 29>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS090F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-PS-45A RPV PRES RRC PMP TRIP ATWS-ARI</DESCRIPTION>
</ITEM>

<ITEM row = 30>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS091F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-PS-45B RPV PRES RRC PMP TRIP ATWS-ARI</DESCRIPTION>
</ITEM>

<ITEM row = 31>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS092F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-PS-45C RPV PRES RRC PMP TRIP ATWS-ARI</DESCRIPTION>
</ITEM>

<ITEM row = 32>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert malfunction BST-RRS093F to FAIL_TO_TRIP on event 3</ACTION>
  <DESCRIPTION>MS-PS-45D RPV PRES RRC PMP TRIP ATWS-ARI</DESCRIPTION>
</ITEM>
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<ITEM row = 33>
  <TIME>1</TIME>
  <EVENT>3</EVENT>
  <ACTION>Insert override OVR-RMS031F to 350 in 2100 on event 3</ACTION>
  <DESCRIPTION>ARM-RIS-7</DESCRIPTION>
</ITEM>

<ITEM row = 34>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>insert malfunction MAL-RRS006B from 21500 to 250000 in 600 on event 4</ACTION>
  <DESCRIPTION>>MSL-B BREAK IN THE STEAM TUNNEL</DESCRIPTION>
</ITEM>

<ITEM row = 35>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>insert malfunction XMT-SCN030A from 96 to 360 in 420 on event 4</ACTION>
  <DESCRIPTION>>LD-TE-24E RWCU PIPE ROUTING AREA</DESCRIPTION>
</ITEM>

<ITEM row = 36>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>insert malfunction XMT-SCN031A from 96 to 360 in 420 on event 4</ACTION>
  <DESCRIPTION>>LD-TE-24F RWCU PIPE ROUTING AREA</DESCRIPTION>
</ITEM>

<ITEM row = 37>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN058A to 360 in 300 on event 4</ACTION>
  <DESCRIPTION>LD-TE-31A MSL A PIPE TNL AMB</DESCRIPTION>
</ITEM>

<ITEM row = 38>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN060A to 340 in 300 on event 4</ACTION>
  <DESCRIPTION>LD-TE-31C MSL C PIPE TNL AMB</DESCRIPTION>
</ITEM>

<ITEM row = 39>
  <TIME>0</TIME>
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<EVENT>4</EVENT>
<ACTION>Insert malfunction XMT-SCN059A to 340 in 300 on event 4</ACTION>
<DESCRIPTION>LD-TE-31B MSL B PIPE TNL AMB</DESCRIPTION>
</ITEM>

<ITEM row = 40>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN061A to 340 in 300 on event 4</ACTION>
  <DESCRIPTION>LD-TE-31D MSL D PIPE TNL AMB</DESCRIPTION>
</ITEM>

<ITEM row = 41>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN046A to 200 in 120 on event 4</ACTION>
  <DESCRIPTION>LD-TE-29C MSL C PIPE TNL INLET</DESCRIPTION>
</ITEM>

<ITEM row = 42>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN044A to 200 in 120 on event 4</ACTION>
  <DESCRIPTION>LD-TE-29A MSL A PIPE TNL INLET</DESCRIPTION>
</ITEM>

<ITEM row = 43>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN045A to 200 in 120 on event 4</ACTION>
  <DESCRIPTION>LD-TE-29B MSL B PIPE TNL INLET</DESCRIPTION>
</ITEM>

<ITEM row = 44>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert malfunction XMT-SCN047A to 200 in 120 on event 4</ACTION>
  <DESCRIPTION>LD-TE-29D MSL D PIPE TNL INLET</DESCRIPTION>
</ITEM>

<ITEM row = 45>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert override OVR-RMS029F to 350 in 900 on event 4</ACTION>
  <DESCRIPTION>ARM-RIS-5</DESCRIPTION>
```

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</ITEM>

<ITEM row = 46>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert override OVR-RMS028F to 350 in 1200 on event 4</ACTION>
  <DESCRIPTION>ARM-RIS-4</DESCRIPTION>
</ITEM>

<ITEM row = 47>
  <TIME>0</TIME>
  <EVENT>4</EVENT>
  <ACTION>Insert override OVR-RMS030F to 500 in 5400 on event 4</ACTION>
  <DESCRIPTION>ARM-RIS-6</DESCRIPTION>
</ITEM>

<ITEM row = 48>
  <TIME>0</TIME>
  <EVENT>6</EVENT>
  <ACTION>Insert override OVR-RPS097A to OFF on event 6</ACTION>
  <DESCRIPTION>RPS CH B1 FUSES REMOVED</DESCRIPTION>
</ITEM>

<ITEM row = 49>
  <TIME>1</TIME>
  <ACTION>Schedule Schedule/Local.sch</ACTION>
  <DESCRIPTION></DESCRIPTION>
</ITEM>

<ITEM row = 50>
  <TIME>1</TIME>
  <ACTION>Event Events\LO001804.evt</ACTION>
  <DESCRIPTION>Load the Event file</DESCRIPTION>
</ITEM>

</SCHEDULE>

```

EVENT

```

<!-- This file contains a Thunder Simulations Event -->
<EVENT>
  <TRIGGER id="6" description="Mode switch out of RUN causes some rods to insert">X03I102R &lt 1</TRIGGER>
</EVENT>

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