

PROGRAM: INITIAL LICENSE OPERATOR PROGRAM

COURSE: INITIAL LICENSE EXAMINATION (NRC 01)

TOPIC: DYNAMIC SIMULATOR EXAMINATION

LESSON: SGTL/R & SBLOCA

LESSON NO.: ES-500-0101

APPROXIMATE TIME FOR INSTRUCTION: 90 min.

REVISION: 2 (As Given)

INSTRUCTOR MATERIALS:

1. Lesson Guide
2. Attachment 1, Simulator Exercise Summary
3. Attachment 2, Simulator Documentation Record
4. Attachment 3, Scenario Objectives
5. Attachment 4, Shift Turnover

LESSON REFERENCES:

1. Technical Specifications
2. AOI 1.2 Steam Generator Tube Leak
3. POP 3.1 Plant Shutdown from Full Power Operations to Zero Power Condition
4. AOI 16.1.1 Dropped or Misaligned Rod / Rod Position Indicator Failure
5. AOI 28.5 Pressurizer Pressure Channel Fails High
6. EOP E-0 Reactor Trip or Safety Injection
7. EOP E-3 Steam Generator Tube Rupture
8. EOP ECA-3.1 SGTR with Loss of Reactor Coolant - Subcooled Recovery Desired
9. SAO 124 Oral Reporting of Non-Emergency Events and Items of Interest

REMARKS:

1.

SUBMITTED: _____ **DATE:** _____

TECH REVIEW: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** _____

TRAINING SUPERVISOR

**QUANTITATIVE ATTRIBUTES PER NRC EXAMINERS STANDARD
ES-301**Total Malfunctions (5-8/scenario):Prior to EOP Entry:

1. Leak, primary to secondary, 23 Steam Generator 40 gpd increase to 70 gpd over 10 minutes
2. Failure, instrument loop, Individual Rod Position Indication (IRPI) System, open circuit
3. Failure, instrument high, PT-455 Pressurizer pressure controller, selected channel fails high
4. Leak, primary to secondary, 23 Steam Generator increase to 500 gpm

After EOP Entry (1-2/scenario):

1. Failure, Auto Action, Auxiliary feedwater actuation circuit inoperable, 22 & 23 AFW pump
2. Leak, primary to containment atmosphere, 23 intermediate leg

Abnormal Events (2-4/scenario):

1. 23 Steam Generator Tube Leak
2. Individual Rod Position Indication signal loop failure open
3. Pressurizer Pressure controlling channel failure
4. Auxiliary Feedwater Actuation circuit failure to automatically start auxiliary feedwater pumps

Major Transients (1-2/scenario):

1. 23 Steam Generator Tube Rupture
2. Loss of Coolant Accident, 23 Reactor Coolant System intermediate leg

EOPs entered/requiring substantive actions (1-2/scenario):

1. E-3 Steam Generator Tube Rupture

EOP Contingencies requiring substantive action (0-2/scenario):

1. ECA-3.1 SGTR with Loss of Reactor Coolant - Subcooled Recovery Desired
2. ECA-3.2 SGTR with Loss of Reactor Coolant - Saturated Recovery Desired

Scenario run time (60-90 minutes):

90 minutes

EOP run time (40-70% of run time):

65%

**QUANTITATIVE ATTRIBUTES PER NRC EXAMINERS STANDARD
ES-301**Critical Tasks (2-3/scenario):

<u>CT #</u>	<u>Task ID</u>	<u>Description</u>
1	E-0 -- F	Establish the minimum required AFW flow rate to the SGs before transition out of E-0, unless transition is to FR-H-1, in which case the task must be initiated before RCPs are manually tripped in accordance with step 3 of generic guideline FR-H.1
2	E-1 -- C	Trip all RCPs so that CET temperatures do not become superheated when forced circulation in the RCS stops
3	E-3 -- A	Isolate feedwater flow and steam flow on the ruptured SG before a transition to ECA-3.1

Technical Specifications referenced during evaluation (1/scenario):

1. T/S 3.7.B.1.a 23Emergency Diesel Generator OOS
2. T/S 3.4.B.(1) Auxiliary Feedwater Pumps OOS
3. T/S 3.10.6 Individual Rod Position Indication System
4. T/S 3.10.3 Quadrant Power Tilt Limits
5. T/S 3.5 Instrumentation Systems

ATTACHMENT 1 - SIMULATOR EXERCISE SUMMARY**SIMULATOR SET-UP**

1. Perform IC reset
2. Perform Simulator Check List
3. Initialize Simulator to 100% power MOL
4. Run Setup, 23 EDG OOS, 23 AFWP OOS, 21 CCP OOS
5. Place 23 EDG, 23 AFWP, 21 CCP in PULLOUT and Stop Tag
6. In MANUAL, run ES5000101 drill file

TIMELINE AND EXAMINER ACTIONS FOR SIMULATION

<u>EVENT</u>	<u>INIT CUE</u>	<u>CONSOLE ENTRY</u>	<u>SYMPTOMS / CUES / DESCRIPTION</u>
A	5 Minutes After Turnover	MAL RDS14C ACT,0,0.075,600,0,0,D	23 SGTL 40 to 70 GPD
B	Floor Instructor Directed	XMT CRF40 1,0,0,0D	IRPI Instrument Loop Failure
C	Floor Instructor Directed	XMT RCS28 1,2500,5,0,D	PZR Press controller PT-455 Failure
D1	Floor Instructor Directed	MAL RCS14C ACT,20,10,0,0,D	23 SGTR 500 gpm
D2	Floor Instructor Directed	MAL RCS4C ACT, 2,30,0,0,C	23 Intermediate Leg SBLOCA

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

NAME		SM	WE	CRS	RO	BOP
SM:	Position Not Manned	X				
WE:	Surrogate:		X			
CRS:				X		
RO:					X	
BOP:						X
TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
—	A 23 SGTL 40 to 70 GPD					
	AOI-1.2 Steam Generator Tube Leak POP-3.1 Plant Shutdown from Full Power Operations to Zero Power Condition					
	Note: DO NOT report leakage greater than 75 gpd Break starts out approximately 40 gpd and increases to 70 gpd over 10 minutes.					
—	1. Check IF a significant increase is observed on R-45, perform the following:					
	Check: R-45 Air Ejector Radiogas dose rates					—
	Performs: Notify Health Physics Commence Leak Rate Estimate per Attachment 8 Dispatch an NPO to N-16 Rad Monitor				—	—
—	2. VERIFY -45 Air Ejector Radiogas AUTOMATIC actions:					
	Check: 21, 22, and 23 SJAЕ Discharge Valves - OPEN SJAЕ Blower - STARTS PCV 1229 and 1230 - OPEN				—	—
	Dispatch an NPO to PCV 1133 - OPEN					—

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	<p>3. VERIFY R-49 AUTOMATIC actions:</p> <p>Check: SG Blowdown Isolation valves - CLOSED: 1214, 1214A, 1215, 1215A, 1216, 1216A, 1217, 1217A</p> <p>Dispatch an NPO to check HCV 5046, 5047, 5048, 5049, 5050, 5051, 5052, 5053, and PCV 1227 - CLOSED</p>				_____	_____
_____	<p>4. DIRECT Chemistry to perform Leak Rate Calculations</p> <p>Check: MAINTAIN steady state conditions while Chemistry performs Leak Rate Calculation</p> <p>Performs: PERFORM Attachment 5 at least once every 15 minutes.</p> <p>Note: With numbers provided at turnover, the attachment calculation should be ~ 82 gpd.</p> <p>INSTRUCTOR CUE:</p> <p>As NPO sent to N-16 monitor, report 23 SGTL jumped from 5 gpd to 40 gpd and then increased to 70 gpd over 10 minutes. Leakrate is now stable at 70 gpd.</p>				_____	_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
5.	CHECK Primary to Secondary Leak Rate: Check: Leak Rate - GREATER THAN 5 GPD Leak Rate - GREATER THAN OR EQUAL TO 30 GPD Leak Rate - GREATER THAN 75 GPD AND INCREASED BY 30 GPD IN THE LAST HOUR Performs: Determines 23 SGTL greater than 30 and less than 75 gpd Note: <u>DO NOT</u> report leakage greater than 75 gpd Time frame for Chemistry analysis results from time of sample to Control Room report is approximately 1 hour					
6.	PERFORM a Normal Plant Shutdown per POP 3.1 concurrently with this procedure Check: Leakage in excess of 30 gpd and less than 75 gpd Performs: Hot Shutdown within 24 hours					
7.	ENSURE necessary notifications are performed per SAO 124.					
8.	Direct Chemistry to calculate AND plot leak rate every 2 hours per IPC-A-110 Verify leak rate is consistent with DRMS <u>AND</u> N-16 indications.					
9.	DIRECT Chemist to obtain grab samples for each S/G blowdown/activity of each SG					

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
10.	CHECK 23 SG Atmospheric Steam Dump Pressure Controller at 74% (1030 psig)					
	Performs: PCV-1136, 23 SG set to app. 74%, 1030 psig					—
11.	Isolate Blowdown On Affected Steam Generator					
	Checks: PCV-1216, 23 SG Isol. Vlv 1 PCV-1216A, 23 SG Isol. Vlv 2					—
12.	Check 22 AND 23 SGs - INTACT					
	Performs: - Declare LCO per Technical Specification 3.4.B.(1)b - Trip PCV-1139 22 AFW pump steam stop valve - Dispatch operator to isolate steam supply from ruptured SG(s) to turbine-driven AFW pump, MS-42 (23 SG) - After ruptured SG is isolated, place PCV-1139 22 AFW pump steam stop valve in AUTO			—	—	—
13.	PERFORM the appropriate attachments(s): Attachment 3 - 23 Steam Generator Isolation			—	—	—
	INSTRUCTOR CUE: Role-play Shift Manager - Inform CRS that another licensed operator will complete Attachment 3 - 23 Steam Generator Isolation AND direct the CRS to commence the shutdown at 200 MW/hr					
14.	POP 3.1 PLANT SHUTDOWN FROM FULL POWER OPERATION TO ZERO POWER OPERATION					
15.	REQUEST Test Group to determine if Pressurizer Level instrumentation must be recalibrated.					
	Note: Pressurizer Level instrumentation must be recalibrated					—

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	16. ENSURE LCV-1129 Hotwell M/U return to CST is closed, isolated locally per SOP-20.2 Check: LCV-1129 Condensate Return Line closed and locally isolated Note: LCV-1129 is locally isolated				_____	_____
_____	17. During load reduction: BORATE per SOP 3.2, as necessary to maintain control banks above insertion limits required by Graph RPC-1A, Rod Bank Insertion Limit - four Loop Operations - IF necessary, PLACE rod control in MANUAL to maintain above the Insertion Limit				_____	_____
_____	18. MAINTAIN delta flux within the target band				_____	_____
_____	19. MONITOR condenser sextants for sodium increase. USE Computer Chemical Information System				_____	_____
_____	20. ENSURE Tave <u>AND</u> Pressurizer Level are maintained on program per Graph RCS-2, Pressurizer Level V.S. Tave				_____	_____
_____	21. MAINTAIN Steam Generator levels between 40 AND 50 percent Narrow Range.				_____	_____
_____	22. NULL manual setpoint on feedwater regulating valve control to facilitate rapid transfer from AUTOMATIC to MANUAL control.				_____	_____
_____	23. NOTIFY nuclear AND conventional NPOs that load reduction is in progress.				_____	_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

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_____	24. DIRECT NPOs to perform the following during load reduction: <ul style="list-style-type: none">- MONITOR Main Turbine Oil Temperatures- MONITOR Hydrogen Seal Oil Temperatures- MONITOR MBFP Oil Temperatures- BALANCE Heater Drain Tank Pump flows between the pump in Auto AND Manual per SOP 19.1- IF SJAES are in service, MAINTAIN Steam Pressure per SOP 20.1 AND periodically CHECK SJAES for backfiring- IF FCV-1120 is in MANUAL, ADJUST to maintain FCV-1113 closed.					_____
_____	25. INITIATE load decrease: <ul style="list-style-type: none">- Intermittently LOWER Governor Control					_____
	EVALUATOR CUE: Allow the operating crew to reduce power by greater than 5 % nuclear power then initiate the next event.					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	B IRPI Instrument Loop Failure					
	AOI 16.1.1: Dropped or Misaligned Rod / Rod Position Indicator Failure					
_____	1. DETERMINE power has NOT been lost to the Individual Rod Position Indication system, VERIFY no rods have dropped using the following secondary indications: <ul style="list-style-type: none"> - Power range flux tilt - RCS Temperature Perform: Verify NI's flux tilt and RCS Temperature			_____		_____
_____	2. DETERMINE Turbine load reduction is NOT required: <ul style="list-style-type: none"> - T-AVE Equal to T-REF 				_____	
_____	3. ENSURE PORV block valves 535 and 536 CLOSED once conditions have stabilized.				_____	
_____	4. ENSURE Loss of Load interlock RESET once conditions have stabilized				_____	
_____	5. USE digital voltmeter at the RPI drawer AND RPI graphs (RPC-3 in Graph Book) to determine the nature of RPI failure:					_____
	INSTRUCTOR NOTE: I&C should report 3.345 volts indicated at the RPI drawer when requested to obtain voltage readings					
_____	6. DETERMINE DVM at the RPI drawer indicates expected rod position (within misalignment limitations of step counter position), flight panel indicator has failed. Continue normal operation using DVM at the RPI drawer to monitor rod position.					_____
	EVALUATOR CUE: After the crew determines that the RPI has failed, initiate the next event.					

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
___	C PZR Press controller PT-455 Failure					
	AOI 28.5 Pressurizer Pressure Channel Fails High					
___	1. Obtain correct procedure: AOI 28.5 Pressurizer Pressure Channel Fails High			___		
___	2. Identify failed channel: PT-455 fails high.			___	___	
___	3. PLACE Pressurizer Pressure control in MANUAL					
___	4. STABILIZE Pressurizer Pressure at 2235 psig.				___	
___	5. In Foxboro Rack B6, PLACE the Pressurizer Pressure Defeat Switch (P/455A) to defeat 1&4				___	
	Note: This action places channel 3 in control for Pressurizer pressure.					
___	6. RETURN Pressurizer Pressure control to AUTO.			___	___	
___	7. DETERMINE if placing the bistable trip switches for the affected channel to TRIP would cause a Reactor Trip CHECK Bistable status panel - NO White/Blue/Yellow Pressure trips active.			___		___
___	8. Place the bistable(s) for the affected channel in TRIP					
	PC-455B Hi Press Trip Red rack A-4 (UP)					___
	PC-455A Lo Press Trip Red rack A-4 (UP)					___
	PC-455E SI Red rack A-4 (UP)					___
	PC-455C Unblock SI Red rack A-4 (UP)					___
	TC-411A Overtemp Trip Red rack A-4 (UP)					___
___	9. Ensure that the requirements of Technical Specification Tables 3.5-2 <u>AND</u> 3.5-3 are met.					___

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
	EVALUATOR CUE: After the crew determines that the Technical Specification minimum channels are still being met, insert the next event					
_____	D 23 SGTR 500 gpm And 23 Intermediate Leg SBLOCA					
	E-0 Reactor Trip or Safety Injection					
_____	Initiate Manual Reactor Trip and Safety Injection					
	Performs: DEPRESS Reactor Trip and Initiate Safety Injection PBs when leakage exceeds capacity of 2 charging pumps				_____	_____
_____	1. Verify Reactor Trip					
	Checks: Rod Bottom Lights – LIT Reactor Trip Breakers – OPEN Rod Position Indicators - AT ZERO Neutron Flux – DECREASING					
_____	2. Verify Turbine Trip					
	Checks: Turbine Stop valves – CLOSED Turbine Governor valves – CLOSED					
_____	3. Check if SI is actuated					
	Checks: SI Annunciator – LIT (Low PRZR Pressure) SI System pumps – RUNNING				_____	_____
_____	4. Generator Output breakers - OPEN					
	Checks: Breakers 7 & 9 OPEN					

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	5. AC 480V Busses - At Least One Energized					
	Checks: 2A AND 3A, OR 5A, OR 6A Breaker alignment and voltage					_____
_____	6. AC 480V Busses - all energized by Offsite Power					
	Checks: 2A AND 3A, AND 5A, and 6A Breaker alignment and voltage				_____	_____
_____	7. Verify RCP seal cooling					
	Performs: Start one charging pump Align charging pump suction to the RWST OPEN LCV-112B CLOSE LCV-112C [RCS M/U Control Stop]				_____	_____
_____	8. Verify power to lighting and MCCs					
	Checks: All 480V busses energized by offsite –					
	Performs: Dispatch NPO to: Reset lighting Reset all MCCs except MCC 28 and MCC 28A Ensure MCC 24, MCC 27, and MCC29 energized					
_____	9. Verify CCW System Operation					
	Checks: 3 CCW pumps running					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

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_____	10. Verify FW Isolation					
	Checks: MBFPs - TRIPPED -Amber light-LIT MBFP Discharge valves - CLOSED SG Blowdown Isolation valves - CLOSED				_____	_____
_____	11. Verify Proper Emergency SI Valve Alignment					
	Checks: SI Pump Cold Leg Inj. Valves, 856A, C, D, & E OPEN RHR Hx CCW Outlet valves 822A & B OPEN RHR Hx Motor operated valves 746 & 747 OPEN					_____
_____	12. Verify AFW Pumps Running					
	Checks: Motor Driven Pumps - running Turbine driven pump - running if necessary Performs: Starts 21 Motor Drive Auxiliary Feedwater Pump Dispatch an NPO to investigate/Start the 22 AFW pump NOTE: Only Motor driven pumps receive auto start signal on SI					_____
_____	13. Verify SI System Pumps Running					
	Checks: Three SI pumps - running 22 SI pump discharge isolation MOV-851A & MOV-851B - OPEN Two RHR pumps – running					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	14. Verify Proper Service Water System Operation					
	Checks: Three service water pumps - running on Essential Header Service water valves from Diesel Generator - OPEN [1276 and 1276A]					_____
_____	15. Verify Containment Fan Cooler Units – In Service					
	Checks: 5 Containment Recirc Fans - running Charcoal filter valves - OPEN [Inlets and Outlets] Fan normal discharge valves – CLOSED Service water containment recirc.[TCV-1104 & 1105] OPEN					_____
_____	16. Verify Containment Ventilation Isolation					
	Checks: Containment Purge valves: FCV-1170 through 1173 CLOSED [Air Inlets and Outlets] Containment Pressure Relief valves: PCV-1190 through 1192 CLOSED					_____
_____	17. Verify Containment Isolation Phase A					
	Checks: Phase A actuated Phase A valves CLOSED [Red lights on TWO IS TRUE Pnl] IVSW valves 1410, 1413, 3518, & 3519 OPEN WCP system valves PCV-1238, 1239, 1240, & 1241 OPEN Performs: Places Personnel and Equipment hatch solenoids to INCIDENT on SM panel					_____
_____	18. Verify CCR Air Conditioner Status					
	Checks: Train A and B running in INCIDENT Mode 2					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:**SM WE CRS RO BOP**

19. Check if Main Steamlines Should be Isolated

Checks:

High Steamflow with Low Tave or Low Steamline
Pressure, and
Containment Pressure ever >24 psig

20. Check if Containment Spray Should be Actuated

Checks:

Containment Pressure remained below 24 psig

21. Verify SI Pump Flow

Check:

RCS Pressure <1660 psig (1690 psig)
Check SI pump flow indicators

22. Verify RHR Pump Flow

Check:

RCS Pressure <320 psig (340 psig)
Check RHR pump flow indicators

Performs:

Place an RHR pump in pullout if -
RCS pressure is >320psig (340psig)

23. Verify TOTAL AFW Flow greater than 400 gpm

Check:

Greater than 400 gpm total flow

INSTRUCTOR NOTE:

If NPO was dispatched back in step 12 to investigate 22
AFW pump start failure.

Remove LOA failure on 22 AFW pump and
Report, as NPO, that trip throttle valve on 22 AFW
pump needed reset. 22 AFW pump is now running.

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	MINIMUM AFW FLOW ESTABLISHED TO SGs CT # 1 (400 gpm) complete.					
_____	24. Verify AFW Flow to ALL SGs					
	Check: AFW flow to ALL Steam Generators					_____
	Note: Feed flow to 23 SG should be isolated.					
_____	25. Align Service Water System					
	Check: Service Water System aligned for THREE HEADER OPERATIONS					
	Ensure closed SWN-4 & SWN-5					_____
_____	26. Check RCS Temperatures					
	Expected: RCS Average Temp Stable or Trending to 547 F RCS Cold Leg Temp Stable or Trending to 547 F					_____
	If temperature less than 547 F and decreasing					
	Performs:					_____
	Stop dumping steam					_____
	Isolate unnecessary steam loads					_____
	If cooldown continues reduce AFW flow as required					_____
	If cooldown continues close MSIVs					_____
	If temperature greater than 547 F and increasing					
	Performs:					_____
	Dump steam					
_____	27. Check PZR PORVs					
	Expected: PORVs Closed					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:**SM WE CRS RO BOP**

_____	28. Check Normal PZR Spray Valves					
	Expected: Normal Spray Valves Closed					_____
_____	29. Check Auxiliary Spray Valve					
	Expected: Auxiliary Spray Valve Closed					_____
_____	30. Check if RCP Should be Stopped					
	Check: SI Pumps - AT LEAST ONE RUNNING RCS subcooling based on Core Exit TCs LESS THAN 24F (31F FOR ADVERSE CONTAINMENT)					_____
	Performs: Stops all Reactor Coolant Pumps					_____
_____	31. Check if Any SG Secondary Pressure Boundary is Faulted					
	Check: Any SG Press decreasing in uncontrolled manner Any SG completely depressurized					_____
_____	32. Check if SG Tubes are intact					
	Check: No SG Level increasing in uncontrolled manner R-45 Normal R-49 Normal R-28,29,30,31 Normal					_____
	Performs: Identify 23 Steam Generator Tube Rupture Identify that a transition to E-3, STEAM GENERATOR TUBE RUPTURE, is required.					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	E-3, STEAM GENERATOR TUBE RUPTURE					
_____	1. Obtain correct procedure					
_____	2. Check if RCPs Should be Stopped					
	Checks: SI Pumps - AT LEAST ONE RUNNING RCS subcooling based on Core Exit TCs LESS THAN 24F (31F FOR ADVERSE CONTAINMENT)					
	Performs: Stops all Reactor Coolant Pumps					
	NOTE: Continuous action step RCPs expected secured					
_____	3. RCPs TRIPPED IF A LOSS OF SUBCOOLING OCCURS AND AN SI PUMP IS RUNNING CT # 2					
_____	4. Identify Ruptured SG(s)					
	Checks: Unexpected rise in any SG narrow range level High radiation from any SG sample High radiation on R-28, 29, 30, and 31 High radiation from any SG blowdown on R-49					
_____	5. CHECK 23 SG Atmospheric Steam Dump Pressure Controller at 74% (1030 psig)					
	Performs: PCV-1136, 23 SG set to app. 74%, 1030 psig					
_____	6. Check ruptured SG atmospheric steam dump valve - CLOSED					
	Checks: SG Atmospheric verified closed					

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___	7. Verify Blowdown isolation valve(s) from ruptured SG(s) - CLOSED Checks: Blowdown isolation valves closed				___	
___	8. Verify at least one motor-driven AFW pump - RUNNING Checks: Motor-driven AFW pump status 23 motor driven AFW pump in service					___
___	9. Check 22 and 23 SGs – INTACT Performs: Close turbine-driven AFW Pump steam supply valve PCV-1139				___	___
___	10. Dispatch operator to perform the following: Performs: Dispatch operator to: Close steam traps upstream of ruptured SG(s) MSIV Ensure ruptured SG(s) MSIV bypass valve - Closed				___	___
___	11. Close ruptured SG(s) MSIV(s) Performs: Close ruptured SG(s) MSIV(s) INSTRUCTOR NOTE: Insert malfunction for LOCA on loop 3 when 23 MSIV is closed					___

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	12. Check ruptured SG(s) level Checks: Narrow range level >9% (26%) Performs: Stops feed flow to 23 SG when NR level >9%.				_____	
_____	13. RUPTURED SG IDENTIFIED AND ISOLATED CT # 3 complete				_____	_____
_____	14. Check PZR PORVs and Block Valves - CLOSED Checks: Power available to block valves PORVs CLOSED NOTE: This is a continuous action step				_____	
_____	15. Check if any SG is Faulted Checks: Any SG pressure decreasing in an uncontrolled manner or completely depressurized				_____	
_____	16. Check Intact SG Levels Checks: Narrow Range SG level >9% (26%) Performs: Controls feed flow to maintain between 9% (26%) and 52% NOTE: This is a continuous action step				_____	

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	17. Check CCW Pump status Check: CCW Pumps running Performs: Places CCW pump control switches in pullout if not running					_____
_____	18. Place controls for main feedwater and bypass feedwater regulating valves in CLOSE Performs: Place controls for main feedwater and bypass feedwater regulating valves in CLOSE					_____
_____	19. Ensure Automatic Safeguards Actuation Key switches on Panel SB-2 in DEFEAT Performs: Places key switches to DEFEAT					_____
	20. Depress Safety Injection Reset Pushbutton (Panel-SB2) Train A Train B					_____
_____	21. Verify SI Reset Relays SIA-1, SIA-2, SIM-1, and SIM-2 VERTICAL POSITION					_____
_____	22. Place IVSW switches to OPEN Performs: Place IVSW switches to OPEN [SOV3518,3519,1410, and 1413]					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	23. Place Containment Rad Monitor WCPS Valve switch to OPEN Performs: Places CNTMT RAD MON WCPS valves to open[1238 and 1241					_____
_____	24. Personnel and Equipment Hatch Solenoid switches to INCIDENT Performs: Places Personnel and Equipment Hatch Solenoid switches to the INCIDENT mode.					_____
_____	25. Place ALL remaining phase "A" Valves switches in CLOSE Performs: Places ALL remaining Phase "A" valves switches to CLOSE [Yellow plaques]					_____
_____	26. Reset Phase "A" Containment Isolation Performs: Depress Phase "A" Containment Isolation reset pushbuttons Train A Train B					_____
_____	27. Verify Train A and B Reset Checks: Phase "A" Containment Isolation Train A and Train B reset Relays CA-1 and CA-2 VERTICAL POSITION					_____
_____	28. Check Phase "B" Actuated Checks: Check Containment Isolation Phase "B" actuation Expected: Operator proceeds to next step as Phase "B" should not have actuated					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	29. Establish Instrument Air to Containment Required Actions: Open PCV-1228					_____
_____	30. Check Ruptured SG(s) pressure Checks: Ruptured SG pressure >440 psig					_____
_____	31. Determine required core exit temperature from table Checks: Ruptured SG pressure				_____	_____
_____	32. Transfer steam dump to pressure mode and dump steam to condenser from intact SG(s) at maximum rate not to exceed 0.5E6 lbs/hr Performs: Transfers steam dump controller to pressure mode Dump steam at maximum rate not to exceed 0.5E6 lbs/hr					_____
_____	33. Core Exit TCs - less than required temperature Checks: Core exit TCs Performs: Stops cooldown and maintain required core exit temperature					_____
_____	34. Establish Charging flow Checks: Charging Pump – one running Charging pump suction aligned to the RWST Charging pump speed to maximum NOTE: This step should be performed during cooldown					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:**SM WE CRS RO BOP**

_____ 35. Caution prior to Step 14 specifies RCS cooldown must be completed prior to continuing

_____ 36. Check Ruptured SG(s) pressure - stable or increasing

_____ 37. Check core exit TCs greater than value from table

Checks:

RCS pressure and obtains desired subcooling value

RCS subcooling against value obtained

Performs:

Identify that a transition to ECA-3.1, STGR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED, is required

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___	D ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED					
___	1. Obtain correct procedure					
___	2. Reset SI					
	Checks: Safety Injection Reset					
___	3. Reset Containment Isolation Phase "A" and "B"					
	Checks: Containment Isolation Phase "A" RESET Containment Isolation Phase "B" NEVER ACTUATED					
___	4. Establish Instrument Air to Containment					
	Checks: Instrument Air aligned to Containment					
___	5. Verify ALL 480V Busses - Energized by Off-site power					
	Checks: ALL 480V Busses energized by Off-site power					
___	6. Restore Ventilation Systems					
	Checks: Radiation Monitors R-43 and R-44 IN SERVICE Verify adequate power to restore PAB ventilation Restore PAB ventilation on buss supplied by off-site power Dispatch operator to locally start one 480V switchgear room exhaust fan, 213 or 215 or 216 Verify at least one cable tunnel exhaust fan running					
___	7. Check if Containment Spray should be STOPPED					
	Checks: Containment Spray pumps running					

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	8. Check if RHR Pumps should be stopped					
	Checks: RCS Pressure greater than 320 psig (340 psig) RCS Pressure stable or increasing				_____	
	Performs: Stop RHR Pumps and place in AUTO					_____
_____	9. Check Ruptured SG(s) Levels					
	Checks: Narrow Range greater than 9%				_____	
	Performs: Stop feed flow to ruptured SGs					_____
_____	10. Initiate Evaluation of Plant Status					
	Checks: PAB radiation normal Operating safeguards equipment for proper operation					
	Performs: Obtains samples Places plant equipment in service as necessary to assist in recovery					_____
_____	11. Establish Charging Flow					
	Checks: Charging pump – one running Charging pump suction aligned to the RWST Establish maximum charging flow – start additional charging pumps					_____
_____	12. Check if ANY SG Secondary Pressure Boundary is Faulted					
	Checks: Pressures in all Steam Generators - Any decreasing in an uncontrolled manner or completely depressurized					_____

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

_____ 13. Check Intact Steam Generator levels

Checks:

Narrow range level greater than 9% (26%)

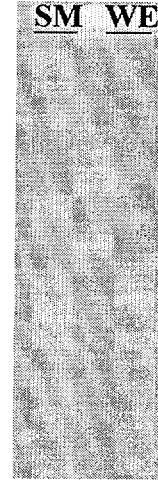
_____ 14. Initiate RCS Cooldown to Cold Shutdown

Performs:

RCS cooldown maintaining cooldown rate in RCS cold
legs less than 100F/hr

**TERMINATE THE DRILL AFTER THE RCS
COOLDOWN HAS BEEN STARTED.**

SM WE CRS RO BOP

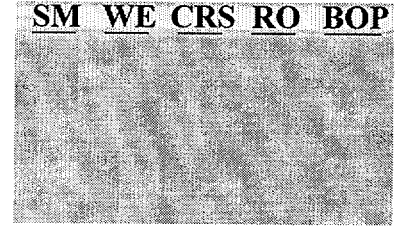


ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:SM WE CRS RO BOP**EMERGENCY PLAN**

Evaluated by job performance measure.

1. Classifies event as an **ALERT** (3.1.2)



ATTACHMENT 3 – SCENARIO OBJECTIVES**TERMINAL OBJECTIVES**

00960 Utilize references and indications to identify and quantify Steam Generator primary to secondary leaks, and implement contingency actions to mitigate adverse consequences

ENABLING OBJECTIVES

2884 Demonstrate the ability to perform the required actions to decrease Turbine Load from 100% to 50%

2894 Demonstrate the ability to perform the required actions for a Steam Generator Tube Leak

2984 Demonstrate the ability to perform the required actions for a small break LOCA

2964 Demonstrate the ability to perform the required actions for a Pressurizer Pressure channel failing high

2994 Demonstrate the ability to perform the required actions for a Reactor trip or Safety Injection (E-0)

3015 Demonstrate the ability to perform the required actions for a SGTR with Loss of Reactor Coolant, Subcooled Recovery Desired (ECA-3.1)

Watch Crew Turnover Sheet:

Date/Time:	TODAY	Condition:	Power Ops
RCS Temp:	559°F	% Power:	100%
RCS Press:	2235 psig	MW Gross:	990
PZR Level:	45%	River Water:	66°F
RCS Total Leakage:	0.4 gpm	Boron Conc:	805 ppm
RCS Unidentified Leakage:	0.4 gpm	Rod Position:	220 CBD
Xenon:	Equilibrium	RCS Total Act:	$2.85E^{-1}$ μ Ci/cc
EFPD:	30	Air In-Leakage:	19.0 SCFM
PZR Press Control:	Channel 1		
PZR Level Control:	Channel 2		
Service Water:	3 Header Ops		
Risk Assessment:	YELLOW	Daily Risk Factor:	10.8

Plant Equipment Status:

1. 23 Emergency Diesel Generator, Out of Service, 6 hours ago. Mechanical Maintenance and FIN troubleshooting high differential pressure on the fuel oil duplex strainers. Fuel oil supply system is disassembled. Tech Spec 3.7.B.1.a (7 day LCO) entered.
2. 23 Motor Driven Auxiliary Feedwater Pump, Out of Service, 48 hours ago, pump disassembled due to excessive leakage on the inboard seal package. Mechanical Maintenance working, expected back for surveillance test within 12 hours. Tech Spec 3.4.B.1.(1).a) (72 hour LCO) entered.
3. 21 Charging Pump, Out of Service, 3 weeks ago, needs replacement of hydraulic coupling vane packages, awaiting qualification of parts from manufacturer.
4. 23 S/G has 5 gallon per day steam generator tube leakage by Chemistry report.
5. 11 Centac Air compressor Out of Service, awaiting parts for inner cooler.
6. 22 Condenser - Increased air in-leakage, Vendor to inspect later today.
7. From the Con Edison System Operator - "A thunderstorm warning is in effect for the next 4 hours for the Greater New York City Metropolitan Area and the lower Hudson Valley Regions."

Instructions to the Shift:

1. Maintain 100% power.

PROGRAM: INITIAL LICENSE OPERATOR PROGRAM

COURSE: INITIAL LICENSE EXAMINATION (NRC 02)

TOPIC: DYNAMIC SIMULATOR EVALUATION

LESSON: LOSS OF OFF-SITE POWER AND STATION BLACKOUT **LESSON NO.:** ES-500-0102

APPROXIMATE TIME FOR INSTRUCTION: 90 min. **REVISION:** 2 (As Given)

INSTRUCTOR MATERIALS:

1. Lesson Guide
2. Attachment 1, Simulator Exercise Summary
3. Attachment 2, Simulator Documentation Record
4. Attachment 3, Scenario Objectives
5. Attachment 4, Shift Turnover
6. DSR-4A Unit 2 Quadrant Power Tilt forms

LESSON REFERENCES:

- | | | |
|-----|-------------|--|
| 1. | POP 1.3 | Plant Startup from Zero Power Conditions to Full Power Operation |
| 2. | SOP 20.2 | Condensate System Operation |
| 3. | AOI 13.1.3 | Power Range Channel Failure |
| 4. | SOP 13.1 | Nuclear Instrumentation System Operation |
| 5. | AOI 28.12 | Steam Generator Level Channel Fails Low |
| 6. | AOI 16.1.1 | Dropped or Misaligned Rod/Rod Position Indicator Failure |
| 7. | AOI 20.1 | Loss of Condenser Vacuum |
| 8. | EOP E-0 | Reactor Trip or Safety Injection |
| 9. | EOP ES-0.1 | Response to Reactor Trip |
| 10. | AOI 27.0 | Diagnosis and Response to Electrical Failure |
| 11. | AOI 27.1.13 | Loss of 480V Bus |
| 12. | EOP ECA-0.0 | Loss of All AC Power |

REMARKS:

1.

SUBMITTED: _____ **DATE:** _____

TECH REVIEW: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** _____

TRAINING SUPERVISOR

Total Malfunctions (5-8/scenario):

Prior to EOP Entry:

1. Power Range N-44 fails high
2. 21 Steam Generator level transmitter LT-417B fails low
3. Rod N-3 drops

After EOP Entry (1-2/scenario):

1. 21 EDG fails to start
2. 22 EDG fails to start

Abnormal Events (2-4/scenario):

1. Power Range N-44 failure AOI-13.1.3
2. 21 Steam Generator level transmitter LT-417B failure AOI-28.12
3. Rod N-3 drops AOI-16.1.1

Major Transients (1-2/scenario):

1. Loss of Condenser vacuum
2. Loss of Offsite power

EOPs entered/requiring substantive actions (1-2/scenario):

1. E-0
2. ES-0.1

EOP Contingencies requiring substantive action (0-2/scenario):

1. ECA-0.0

Scenario run time (45-60 minutes, one scenario may approach 90 minutes):

90 minutes

EOP run time (40-70% of run time):

70%

Critical Tasks (2-3/scenario):

<u>CT #</u>	<u>Task ID</u>	<u>Description</u>
1	E-0 -- C	Energize at least one AC emergency bus before transition out of E-0/ES-0.1, unless the transition is to ECA-0.0, in which case the critical task must be performed before placing safeguards equipment handswitches in the pull-to-lock position
2	ECA-0.0 -- G	Depressurize the intact SG(s) at the maximum rate such that all the following limiting conditions are met: <ul style="list-style-type: none"> - SG depressurization is not initiated until narrow-range level in at least one intact SG is greater than 4% - If narrow-range level cannot be maintained greater than 4% in at least one intact SG (after depressurization is commenced), then SG depressurization is stopped until narrow-range level is restored to greater than 4% in at least one intact SG - SG pressure does not decrease to less than 130 psig - RCS cold leg temperature does not decrease to less than 243F - If a positive SUR is indicated on either the source range or the intermediate range (after depressurization is commenced), then SG depressurization is stopped and the RCS is allowed to heatup
3	ECA-0.0 -- H	Isolate RCP seal injection before a charging pump starts or is started

Technical Specifications referenced during test (1/scenario):

1. T/S 3.7.B.1.a 23 Emergency Diesel Generator OOS
2. T/S 3.4.B.(1).a 23 Motor Driven Auxiliary Feedwater Pump OOS
3. T/S 3.5 Power Range Nuclear Instrumentation OOS
4. T/S 3.10 Dropped Rod
5. T/S 3.7 Electrical Distribution

ATTACHMENT 1 - SIMULATOR EXERCISE SUMMARY

SIMULATOR SET-UP

1. Perform IC reset
2. Perform Simulator Check List
3. Initialize Simulator to 89% power.
4. Run Setup, 23EDG OOS, 23AFWP OOS, 21CCP OOS
5. Place 23 EDG, 23AFWP, 21 CCP in PULLOUT and Stop Tag
6. Stop 22 Condensate pump and ensure '22 Condensate Pump Auto Start ON'
7. In MANUAL run ES5000102 drill file

TIMELINE AND EXAMINER ACTIONS FOR SIMULATION

<u>EVENT</u>	<u>INIT CUE</u>	<u>CONSOLE ENTRY</u>	<u>SYMPTOMS / CUES / DESCRIPTION</u>
A	Floor Instructor Directed	MAL NIS4D ACT,120,12,0,0,D	Power Range N-44 fails high
B	Floor Instructor Directed	XMT SGN14 1,0,40,0,D	21 Steam Generator level transmitter LT-417B fails low
C	Floor Instructor Directed	MAL CRF2A ACT,N3,2,0,0,D	Rod N-3 drops
C	60 seconds after Rod N-3 drops	MAL CRF2A CLR	Clear malfunction for Rod N-3 dropping
D	Floor Instructor directed	MAL CFW4B ACT,100,240,0,0,D	Loss of vacuum 22 Condenser
E	Conditional On timer	MAL SWD2C ACT,540,0,C, JI:P.NE.0	Loss of Off-Site Power
	Floor Instructor directed	MAL DSG3A CLR	Clear malfunction on 21 EDG

POWER RANGE FAILURE/ SG LEVEL
EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS **SCENARIO** ES-500-0102
 OF ALL 480V BUSSES
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

NAME	SM	WE	CRS	RO	BOP
SM: Position Not Manned	X				
STA: Surrogate:		X			
CRS:			X		
RO:				X	
BOP:					X

TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
_____	Power Escalation					
_____	1. Obtain correct procedure POP-1.3 Plant Startup From Zero Power To Full Power Operation			—		
_____	2. Obtain SOP-20.2 Condensate System Operation for placing 22 Condensate Pump in service.			—		
_____	3. Place Unit Aux Tap Changer in manual and adjust 480V bus voltage to within specs on DSR-1 for 480V bus voltage					—
_____	4. Start 22 Condensate Pump					—
_____	5. Place Unit Aux Tap Changer in Auto					—

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSESSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	A Power Range N-44 fails high					
_____	Obtain correct procedure AOI-13.1.3 Power Range Channel Failure				_____	
_____	1. Place rod control to manual, (Crew may elect to restore Tave to Tref with rod withdrawal or load reduction.				_____	_____
_____	2. Ensure the requirements of Tech Spec 3.10.10 and 3.10.2.9 are met				_____	
_____	3. Verify remaining NIS channels are operable					
_____	4. Obtain SOP-13.1 Nuclear Instrumentation System Operation to remove channel from service				_____	
_____	5. Obtain guidance from I&C and Rx engineering to determine which sections of procedure to perform if a partial failure				_____	
	INSTRUCTOR CUE: If necessary inform crew, as engineering, entire channel is to be removed from service					
_____	6. Ensure Rod Control is in manual				_____	
_____	7. PLACE the Overpower Rod Stop Bypass Switch to BYPASS for the failed channel (Miscellaneous Control and Indication Panel, Rack C-8)					_____
_____	8. PLACE the Delta-T Defeat switch T/411A <u>OR</u> T/411B to DEFEAT (Foxboro Rack B-8) for the failed channel:					
	Performs: Place switch T/411B to DFEAT LOOP 4					_____
_____	9. PLACE the NIS Dropped Rod Mode Switch (Power Range A Drawer) for channel 44 to BYPASS					_____

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS SCENARIO ES-500-0102 OF ALL 480V BUSSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD
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<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	10. Determine if tripping the OT delta-T bistables will cause a Reactor trip Checks: Bistable Status panel and determines that tripping the bistable will not cause a Reactor trip			—		—
_____	11. Trip OT delta-T bistable in Foxboro Rack B-10					—
_____	12. PLACE the Power Mismatch Bypass Switch (Miscellaneous Control and Indication Panel, Rack C-8) to BYPASS for channel 44					—
_____	13. PLACE the Upper Section <u>AND</u> Lower Section Switches (Detector Current Comparator, Rack C-8) to defeat the failed channel N-44					—
_____	14. PLACE the Comparator Channel Defeat Selector Switch (Comparator and Rate Drawer, Rack C-8) to defeat the failed channel N-44					—
_____	15. TRIP all nuclear bistables associated with the failed channel by removing the Control Power Fuses for channel N-44					—
_____	16. <u>IF</u> directed by the CRS, RESTORE Rod Control to AUTO					—
_____	17. <u>IF</u> Reactor power remains above 75 percent, DETERMINE the core quadrant power balance daily with the movable detectors, using at least two thimbles per quadrant (Technical Specification 3.10.2.9)			—		
_____	18. PERFORM a Manual Tilt calculation, using DSR-4A (preferred) <u>OR</u> DSR-4B					—
	INSTRUCTOR CUE: As Shift Manager, inform CRS that another licensed operator will perform the manual QPTR calculation. AFTER 2 minutes, inform CRS that QPTR is SAT.					


Comments:

POWER RANGE FAILURE/ SG LEVEL
EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS **SCENARIO** ES-500-0102
OF ALL 480V BUSSES
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

_____ 19. Ensure compliance with Technical Specification 3.10.10

**After Technical Specifications have been referenced,
Insert the next event.**

<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
				

Comments:

<p>POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

- | | |
|--|---|
| <p>_____ B 21 SG Level transmitter LT-417B fails low</p> <p>_____ 1. Identify failed channel LT-417B, and refer to AOI 28.12
 "Steam Generator Level Channel Fails Low"</p> <p>_____ 2. Place affected steam generator feedwater regulator in
 MANUAL</p> <p>_____ 3. Adjust steam generator level to programmed level</p> <p>_____ 4. Place appropriate steam generator level bistable trip
 switches to TRIP</p> <p>_____ 5. Performs:
 Trips Loop 1B High Level bistable in Blue rack B-2
 Trips Loop 1B Low Level bistable in Blue rack B-2
 Ensure requirements of Technical Specification
 Table 3.5-1, 3.5-2, and 3.5-3 are met.</p> | <p>SM WE CRS RO BOP</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> |
|--|---|

Comments:

<p style="text-align: center;">POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

- | | | | | | | |
|--|----------|---|--|--|--|-------|
| _____ | C | Dropped Rod N-3 | | | | |
| _____ | 1. | Identify Rod N-3 dropped | | | | _____ |
| _____ | 2. | Obtain correct procedure AOI-16.1.1 Dropped or Misaligned Rod/Rod Position Indicator Failure | | | | _____ |
| _____ | 3. | Determines that load reduction is required | | | | _____ |
| _____ | 4. | Adjust Turbine load | | | | _____ |
| _____ | 5. | CHECK RPI <u>AND</u> Digital Volt Meter (DVM) at the RPI drawer to DETERMINE which rod(s) is dropped or misaligned | | | | _____ |
| <p>NOTE:
I&C reports that DVM voltage indicates Zero volts if requested</p> | | | | | | |
| _____ | 6. | DETERMINE if rod(s) is dropped <u>OR</u> misaligned | | | | |
| <p>Checks:
OBSERVE for deviation between power range channels
OBSERVE NIS recorder for unexpected drop in power</p> | | | | | | |
| _____ | 7. | RESET Dropped Rod Mode Switch on affected NIS channels | | | | _____ |
| _____ | 8. | DETERMINE Quadrant Power Tilt Ratio per SOP 15.3, <u>AND</u> ENSURE requirements of Technical Specification 3.10.3 are met. | | | | _____ |

INSTRUCTOR CUE:

As Shift Manager, inform CRS that another licensed operator will perform the manual QPTR calculation. AFTER 2 minutes, inform CRS that QPTR is SAT.

Comments:

POWER RANGE FAILURE/ SG LEVEL
EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS **SCENARIO** ES-500-0102
OF ALL 480V BUSSES
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ 9. ENSURE requirements of Tech. Spec. 3.10.5 (Rod
Misalignment Limitations) are met.

**After Technical Specifications have been referenced,
Insert the next event.**

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___	D Loss of Vacuum 22 Condenser					
	1. Identify loss of Turbine load due to loss of vacuum			—	—	—
___	1. Obtain correct procedure AOI-20.1 Loss of Condenser Vacuum			—		
___	2. Reduce Turbine load as required			—	—	
___	3. DISPATCH NPO(s) to check the following:			—		
	SJAE Air Lanes for backfiring <u>OR</u> failure					
	Gland Steam Pressure					
	Gland Seal Steam Drop Out Tank Level					
	Hogger <u>OR</u> SJAE steam supply					
	Indications of Air Inleakage					
___	4. DISPATCH NPO to ensure both vacuum pumps in service per SOP 20.1			—		
___	5. DETERMINE whether turbine trip is required			—		—
	Checks:					
	Condenser vacuum decreases to less than that required by Figure 1					
	Vacuum differential between condensers exceeds 2 inches Hg.					
	Turbine exhaust hood differential between condensers exceeds 30°F					
	Turbine exhaust hood temperature exceeds 175°F for greater than 15 minutes					
	Turbine Exhaust hood temperature exceeds 250°F					

Comments:

POWER RANGE FAILURE/ SG LEVEL	SCENARIO ES-500-0102
EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES	
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ **E-0 Reactor Trip or Safety Injection**

NOTE:

Manual Reactor trip initiated due to loss of Condenser vacuum

_____ 1. **Verify Reactor Trip**

Checks:

Rod Bottom Lights – LIT
Reactor Trip Breakers – OPEN
Rod Position Indicators - AT ZERO
Neutron Flux – DECREASING

_____ 2. **Verify Turbine Trip**

Checks:

Turbine Stop valves – CLOSED
Turbine Governor valves – CLOSED

_____ 3. **Check if SI is actuated**

Checks:

SI annunciator – LIT
SI System pumps – RUNNING

NOTE:

SI is not required. Transition to ES-0.1 is required

Comments:

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	ES-0.1 Reactor Trip Response					
_____	1. Generator Output Breakers Open and Gennerrex Excitation Off				_____	
_____	2. 6.9KV busses transferred to Busses 5 and 6					_____
_____	3. Check 480V Buses - At Least One Energized					
	Checks: 2A AND 3A, OR 5A, OR 6A Breaker alignment and voltage					_____
_____	4. All 480V Buses - all energized by Offsite Power					
	Checks: 2A AND 3A, AND 5A, and 6A Breaker alignment and voltage				_____	_____
	5. Start one charging pump				_____	
_____	6. Dispatch an NPO to Reset lighting Reset all MCCs except MCC 28 and MCC 28A Ensure MCC 24, MCC 27, and MCC29 energized				_____	
	INSTRUCTOR NOTE: Loss of power is on a 3 minute T.D. EDG 21 will start but it's output breaker will fail to close. Crew should recognize and manually close EDG 21 output breaker. When EDG 21 trips, crew will transition to ECA 0.0 on page 19. (Remaining steps of ES-0.1 will not be performed)					
_____	Manually close EDG 21 Output breaker					_____

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

CT#1 Complete (E-0-C)

Energize at least one AC emergency bus before transition out of E-0/ES-0.1, unless the transition is to ECA-0.0, in which case the critical task must be performed before placing safeguards equipment handswitches in the pull-to-lock position

7. Check RCS Temperatures

Expected:

RCS Average Temp Stable or Trending to 547 F

RCS Cold Leg Temp Stable or Trending to 547 F

If temperature less than 547 F and decreasing

Performs:

Stop dumping steam

Isolate unnecessary steam loads

If cooldown continues reduce AFW flow as required

If cooldown continues close MSIVs

If temperature greater than 547 F and increasing

Performs:

Dump steam

8. Check FW status

Checks:

Checks RCS temperature less than 541 F

Main Feed Regs closed

Low Flow Feed Regs closed after 90 seconds

Total Aux Feed flow greater than 400 gpm

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSES	SCENARIO ES-500-0102
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 9. Verify Auto actions have occurred

Checks:

Heater Drain Tank pumps tripped
 22 Condensate pump tripped
 Transformer cooling equipment shutdown (Local)
 Reheat steam supply valves closed
 Extraction steam Valves closed (Local if necessary)
 MBFP turbine reheat steam supply non-return "A" valves closed

____ 10. Verify all Control Rods fully inserted

____ 11. Check Pressurizer level control

Checks:

Charging in service
 Pressurizer level greater than 18%
 Letdown in service
 Pressurizer level trending to 37%

____ 12. Check Pressurizer pressure control

Checks:

Pressurizer pressure greater than 1840 psig
 Pressurizer pressure stable at or trending to 2235 psig

____ 13. Check SG levels

Checks:

Narrow range level greater than 9%

Performs:

Control feed flow to maintain narrow level between 9% and 52% if narrow level greater than 9%

Comments:

<p style="text-align: center;">POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSESSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 14. All 480V Buses - all energized by Offsite Power

Checks:

2A AND 3A, AND 5A, and 6A Breaker alignment and voltage

____ 15. Check radiation monitors R-43/44 in service

____ 16. Restore PAB ventilation

____ 17. Locally start one 480V room exhaust fan

____ 18. Verify One Cable Tunnel fan in service

____ 19. Transfer Condenser Steam Dumps to pressure mode

____ 20. Check MCC 28 and MCC 28A energized

____ 21. Check RCP status at least one running

____ 22. Check Source Range detectors energized

Performs:

Transfers nuclear recorder to the Source Range scale

____ 23. Shutdown unnecessary plant equipment

Circulators not required

Condensate pumps not required

Service Water pumps not required

____ 24. Maintain stable plant conditions

Pressurizer pressure at 2235 psig

Pressurizer level at 37%

SG narrow range levels 9% - 52%

RCS temperature at 547 F

____ 25. Place Main turbine and MBFP turbines on turning gear after shafts stop

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ 26. Determine if Cooldown is required

Performs:

Transition to POP-3.2

or

POP-3.3

or

ES-0.2

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___ E	ECA-0.0 Loss of all AC Power			—		
	NOTE: Loss of Offsite Power should occur when in ES-0.1					
___ 1.	Obtain correct procedure ECA-0.0 Loss of all AC Power			—		
___ 2.	Verify Reactor Trip					
	Checks: Reactor Trip Breakers - OPEN Neutron Flux - DECREASING				—	
___ 3.	Verify Turbine Trip					
	Checks: Turbine Stop valves - CLOSED Turbine Governor valves - CLOSED				—	
___ 4.	Check if RCS is Isolated					
	Checks: PZR PORVs - CLOSED LCV-459 and 200A, B, & C - CLOSED 213 - CLOSED				—	—
___ 5.	Verify AFW flow greater than 400 gpm					
	Checks: Turbine-Driven AFW pump running					
	Required Actions: Aligns turbine-driven AFW pump flow control valves as necessary					—

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

___ 6. Generator Output breakers - OPEN

Checks:

Breakers 7 & 9 OPEN

___ 7. Generex excitation - OFF

Checks:

Generator Field Amps - Zero

___ 8. 6.9KV busses transferred to busses 5 and 6

___ 9. **Instructor Cue:**

Report as SO/DO:

138 KV is unavailable due to problems in Buchanan Switchyard

___ 10. Check diesel generator status

Checks:

If any diesel generator running

___ 11. Dispatch NPO to attempt start of 21 and 22 EDGs

___ 12. Check 480V Buses - At Least One Energized

Checks:

2A AND 3A, OR 5A, OR 6A Breaker alignment and voltage

SM WE CRS RO BOP

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

- | TIME | EVENT/EXPECTED OPERATOR RESPONSE: | SM | WE | CRS | RO | BOP |
|-------|--|----|----|-----|----|-----|
| — 13. | Place following equipment switches in Pullout:
Spray Pumps
SI pumps
FCUs
Motor-driven AFW pumps
CCW pumps
RHR pumps
Turning Gear Oil pump
Bearing Oil pump
Turbine Auxiliary oil pump | | | | | — |
| — 14. | Check Power available to any 480V buses
2A and 3A
OR
5A
OR
6A | | | | | — |
| — 15. | Check 480 V bus switchgear and cabling available
2A and 3A
OR
5A
OR
6A | | | | | — |
| — 16. | Check if any 480 V bus energized
2A and 3A
OR
5A
OR
6A | | | | | — |

Comments:

<p>POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

___ 17. Dispatch personnel to locally isolate RCP seals

Performs:

Places controls switches to CLOSE and directs NPO to locally close following valves:
MOV-222, 250A, B, C, & D, and 789

CT#3 Complete (ECA-0.0-H)

Isolate RCP seal injection before a charging pump starts or is started

___ 18. Check if CST is isolated from hotwell

Performs:

Verifies LCV-1128, 1128A, 1129, CD-6, & CT-8 CLOSED
Places valve controllers to manual for LCVs

___ 19. Check SG status

Checks:

MSIVs CLOSED
Main and Bypass Feedwater valves CLOSED
Blowdown isolation valves CLOSED

___ 20. Check if any SG Pressure Boundary is faulted

Checks:

Any SG pressure decreasing in an uncontrolled manner or completely depressurized

SM WE CRS RO BOP

Comments:

<p style="text-align: center;">POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

		<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___ 21.	Check if SG tubes intact					
	<p>Checks:</p> <p>SG level increasing in an uncontrolled manner</p> <p>Secondary radiation monitors R-45, R-49, and R-28, 29, 30 and 31 abnormal</p>					
___ 22.	Check Intact SG Levels					
	<p>Checks:</p> <p>Narrow Range SG level >9% (26%)</p> <p>Performs:</p> <p>Controls feed flow to maintain between 9% (26%) and 52%</p>					
___ 23.	Check DC Bus loads					
	<p>Performs:</p> <p>Sheds all large non-essential DC loads</p> <p>Directs NPO to purge H₂ and shutdown DC seal oil pump</p> <p>Directs NPO to monitor DC power supplies and shed loads as necessary</p>					
___ 24.	Check CST level >2 feet					

Comments:

<p style="text-align: center;">POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS SCENARIO ES-500-0102</p> <p style="text-align: center;">OF ALL 480V BUSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

— 25. Depressurize Intact S/Gs to <210 psig

Checks:

Narrow range level >9% (26%) in at least one SG

Performs:

Dumps steam to atmosphere until SG pressure <210 psig (but >110 psig) or RCS cold leg <325°F and maintains SG pressure constant.

CT#2 Complete (ECA-0.0-G)

Depressurize the intact SG(s) at the maximum rate such that all the following limiting conditions are met:

- SG depressurization is not initiated until narrow-range level in at least one intact SG is greater than 9%
- If narrow-range level cannot be maintained greater than 9% in at least one intact SG (after depressurization is commenced), then SG depressurization is stopped until narrow-range level is restored to greater than 9% in at least one intact SG
- SG pressure does not decrease to less than 130 psig
- RCS cold leg temperature does not decrease to less than 243F

If a positive SUR is indicated on either the source range or the intermediate range (after depressurization is commenced), then SG depressurization is stopped and the RCS is allowed to heatup

Comments:

<p>POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

		<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
—	26. Check Reactor Subcritical					
	<p>Checks: Intermediate range channels - ZERO OR NEGATIVE STARTUP RATE</p> <p>Source range channels - ZERO OR NEGATIVE STARTUP RATE</p>				—	
—	27. Check SI Signal Status:					
	<p>Checks: SI – HAS NOT BEEN ACTUATED</p>			—	—	—
—	28. Check CCW Pump status					
	<p>Check: CCW Pumps running</p> <p>Performs: Places CCW pump control switches in pullout if not running</p>					—
—	29. Place controls for main feedwater and bypass feedwater regulating valves in CLOSE					
	<p>Performs: Place controls for main feedwater and bypass feedwater regulating valves in CLOSE</p>				—	
—	30. Ensure Automatic Safeguards Actuation Key switches on Panel SB-2 in DEFEAT					
	<p>Performs: Places key switches to DEFEAT</p>					—

Comments:

POWER RANGE FAILURE/ SG LEVEL EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSSES ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	SCENARIO ES-500-0102
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<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___	31. Depress Safety Injection Reset Pushbutton (Panel-SB2) Train A Train B					___
___	32. Verify SI Reset					___
___	33. Place IVSW switches to OPEN Performs: Place IVSW switches to OPEN					___
___	34. Place Containment Rad Monitor WCPS Valve switch to OPEN Performs: Places CNTMT RAD MON WCPS valves to open					___
___	35. Personnel and Equipment Hatch Solenoid switches to INCIDENT Performs: Places Personnel and Equipment Hatch Solenoid switches to the INCIDENT mode.					___
___	36. Place ALL remaining phase "A" Valves switches in CLOSE Performs: Places ALL remaining Phase "A" valves switches to CLOSE					___
___	37. Reset Phase "A" Containment Isolation Performs: Depress Phase "A" Containment Isolation reset pushbuttons Train A Train B					___

Comments:

<p>POWER RANGE FAILURE/ SG LEVEL</p> <p>EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS OF ALL 480V BUSES</p> <p>ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD</p>	<p>SCENARIO ES-500-0102</p>
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TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

___ 38. Verify Train A and B Reset

Checks:

Phase "A" Containment Isolation Train A and Train B reset

___ 39. Verify Containment Ventilation Isolation

Checks:

Containment Purge valves:
FCV-1170 through 1173 CLOSED
Containment Pressure Relief valves:
PCV-1190 through 1192 CLOSED

___ 40. Check Containment pressure

Checks:

Containment pressure has remained less than 24 psig

___ 41. Checks Containment radiation

Checks:

Containment radiation less than 10 R

___ 42. Checks Core Exit TCs

Checks:

Core Exit TCs- less than 1200F

___ 43. Stabilize SG pressures

Performs:

Manually control atmospheric steam dumps

**Terminate scenario when SG pressures are stabilized or
at the direction of the Lead Evaluator**

Comments:

POWER RANGE FAILURE/ SG LEVEL
EXERCISE: CHANNEL FAILURE/DROPPED ROD/LOSS **SCENARIO** ES-500-0102
OF ALL 480V BUSSES
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

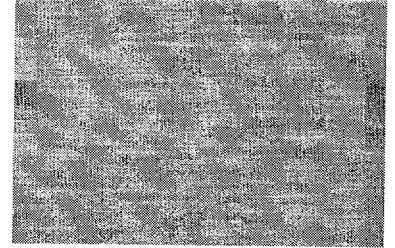
TIME EVENT/EXPECTED OPERATOR RESPONSE:

EMERGENCY PLAN

Evaluated by job performance measure.

1. Classifies event as an **Site Area Emergency** (6.1.4)

SM WE CRS RO BOP



Comments:

ATTACHMENT 3 – SCENARIO OBJECTIVES**TERMINAL OBJECTIVES**

00931 Demonstrate the ability to perform actions for ECA-0.0 "LOSS OF ALL AC POWER"

ENABLING OBJECTIVES

- 2901 Demonstrate the ability to perform the required actions for a power range channel failing high
- 2972 Demonstrate the ability to perform the required actions for a steam generator level channel "B" failing low.
- 2903 Demonstrate the ability to perform the required actions for a dropped rod.
- 2906 Demonstrate the ability to perform the required actions for loss of condenser vacuum.
- 2915 Demonstrate the ability to perform the required actions for a loss of outside power (Unit Shutdown)
- 2994 Demonstrate the ability to perform the required actions for a reactor trip or safety injection (E-0)
- 3000 Demonstrate the ability to perform the required actions for a reactor trip response (E-0.1)
- 3009 Given specific conditions, establish priorities and state the required actions following a loss of all AC power (ECA-0.0)

Comments:

ATTACHMENT 4, SHIFT TURNOVER

1 of 1

Watch Crew Turnover Sheet:

Date/Time:	TODAY	Condition:	Power Ops
RCS Temp:	557°F	% Power:	89%
RCS Press:	2235 psig	MW Gross:	898
PZR Level:	44%	River Water:	66°F
RCS Total Leakage:	0.4 gpm	Boron Conc:	855 ppm
RCS Unidentified Leakage:	0.4 gpm	Rod Position:	212 CBD
Xenon:	Burning Out (-1 pcm/min)	RCS Total Act:	2.85E^{-1} $\mu\text{Ci/cc}$
EFPD:	30	Air In-Leakage:	19.0 SCFM
PZR Press Control:	Channel 1		
PZR Level Control:	Channel 2		
Service Water:	3 Header Ops		
Risk Assessment:	YELLOW	Daily Risk Factor:	10.8

Plant Equipment Status:

1. 23 Emergency Diesel Generator, Out of Service, 6 hours ago, Mechanical Maintenance and FIN troubleshooting high differential pressure on the fuel oil duplex strainers. Fuel oil supply system disassembled.
2. 23 Motor Driven Auxiliary Feedwater Pump, Out of Service, 48 hours ago, pump disassembled, excessive leakage on the inboard seal package, Mechanical Maintenance working, expected back for surveillance test within 12 hours.
3. 21 Charging Pump, Out of Service, 3 weeks ago, replacement of hydraulic coupling vane packages, awaiting qualification of parts from manufacturer.
4. 23 S/G has 5 gallon per day steam generator tube leakage by Chemistry report.
5. 11 Centac Air compressor Out of Service, awaiting parts for inner cooler.
6. 22 Condenser - Increased air in-leakage, Vendor to inspect later today.
7. From the Con Edison System Operator - "A thunderstorm warning is in effect for the next 4 hours for the Greater New York City Metropolitan Area and the lower Hudson Valley Regions."

Instructions to the Shift:

1. Increase power to 100% using POP-1.3 beginning at step 4.70. All prior steps have been completed in POP-1.3.

PROGRAM: INITIAL LICENSE OPERATOR PROGRAM

COURSE: INITIAL LICENSE EXAMINATION (NRC 04)

TOPIC: DYNAMIC SIMULATOR EVALUATION

LESSON: ATWAS AND LOSS OF SECONDARY COOLANT **LESSON NO.:** ES-500-0104

APPROXIMATE TIME FOR INSTRUCTION: 90 min. **REVISION:** 2 (As Given)

INSTRUCTOR MATERIALS:

1. Lesson Guide
2. Attachment 1, Simulator Exercise Summary
3. Attachment 2, Simulator Documentation Record
4. Attachment 3, Scenario Objectives
5. Attachment 4, Shift Turnover

LESSON REFERENCES:

- | | | |
|----|------------|--|
| 1. | POP 1.3 | Plant Startup from Zero Power Conditions to Full Power Operation |
| 2. | SOP 27.1.6 | Instrument Bus, DC Distribution, and PA System Inverter |
| 3. | AOI 3.4 | Uncontrolled Reactivity Addition |
| 4. | AOI 27.1.6 | Loss of Instrument Bus |
| 5. | EOP E-0 | Reactor Trip or Safety Injection |
| 6. | EOP FR-S.1 | Response to Nuclear Power Generation/ATWAS |
| 7. | EOP E-2 | Faulted Steam Generator Isolation |

REMARKS:

1.

SUBMITTED: _____ **DATE:** _____

TECH REVIEW: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** _____

TRAINING SUPERVISOR

Total Malfunctions (5-8/scenario):

Prior to EOP Entry:

1. Boric Acid Blender totalizer failure
2. 22 Battery Charger output breaker opens
3. Loss of 22 Instrument Bus

After EOP Entry (1-2/scenario):

1. Automatic and manual Reactor trip failure
2. MOV-333 Emergency Boration Valve Failed Closed
3. 24 Steam Generator safeties fail open

Abnormal Events (2-4/scenario):

1. Blender totalizer failure AOI-3.4 Uncontrolled Reactivity Addition
2. 22 Battery Charger DC output breaker opens SOP-27.1.6
3. Loss of 22 Instrument Bus AOI-27.1.6 Loss of Instrument Bus

Major Transients (1-2/scenario):

1. ATWAS
2. 24 Steam Generator Safeties fail Open

EOPs entered/requiring substantive actions (1-2/scenario):

1. E-2 Faulted Steam Generator Isolation

EOP Contingencies requiring substantive action (0-2/scenario):

1. FR-S.1 Response to Nuclear Power Generation ATWS

Scenario run time (60-90):

90 minutes

EOP run time (40-70% of run time):

70%

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
QUANTITATIVE ATTRIBUTES PER NRC EXAMINERS STANDARD	
ES-301	

Critical Tasks (2-3/scenario):

<u>CT #</u>	<u>Task ID</u>	<u>Description</u>
1	FR-S.1-A	Isolate the main turbine from the SGs before plant and scenario-specific criteria are exceeded
2	FR-S.1-C	Insert negative reactivity into the core by at least one of the following methods before completing the immediate-actions steps of FR-S.1 <ul style="list-style-type: none">- De-energize the control rod drive MG sets- Insert RCCAs- Establish emergency boration flow to the RCS
3	E-2-A	Isolate the faulted SG before transition out of E-2

Technical Specifications referenced during test (1/scenario):

- | | |
|-----------------------|--|
| 1. T/S 3.7.B.6 | 22 Battery Charger |
| 2. T/S 3.7.B.1.a | 23 Emergency Diesel Generator |
| 3. T/S 3.4.B.1.(1).a) | 23 Motor Driven Auxiliary Feedwater Pump |

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT
ATTACHMENT 1 - SIMULATOR EXERCISE SUMMARY

SCENARIO ES-500-0104

SIMULATOR SET-UP

1. Perform IC reset
2. Perform Simulator Check List
3. Initialize Simulator to 91% power.
4. Run setup 23 EDG OOS, 23AFWP OOS, 21CCP OOS, Primary Water totalizer failed, Reactor trip breakers failed as is, Fail all breakers on 2A and 6A to 6.9KV busses so that 2A cannot be de-energized, Fail MOV-333 Emergency Boration valve closed.
5. Place 23 EDG, 23 AFWP, 21CCP in PULLOUT and Stop Tag
6. In MANUAL, run ES5000104 drill file

TIMELINE AND EXAMINER ACTIONS FOR SIMULATION

<u>EVENT</u>	<u>INIT CUE</u>	<u>CONSOLE ENTRY</u>	<u>SYMPTOMS / CUES / DESCRIPTION</u>
A	Malfunction entered in Setup	SWI CVC42H ACT,1,0,D	Primary Water Totalizer failed
B	Floor Instructor Directed	LOA EPS890 F,0,D	22 Battery Charger DC breaker open
C	Floor Instructor Directed	LOA EPS152 F, 0, D LOA EPS893 F, 0, D	Loss of 22 Instrument Bus
D	Floor Instructor Directed		21 SG level channel fails low/ATWS Requiring Transition to FR-S.1
E	Floor Instructor Directed	PLP SGN14 100,0,D PLP SGN18 100,0,D PLP SGN22 100,0,D	24 Steam Generator Safeties (3) fail open

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

NAME	SM	WE	CRS	RO	BOP
SM: Position Not Manned	X				
WE: Surrogate:		X			
CRS:			X		
RO:				X	
BOP:					X

TIME EVENT/EXPECTED OPERATOR RESPONSE:

TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
1	<p>Raise Reactor/Turbine Power to 98% Crew determines amount of dilution water required for turbine power increase.</p> <p>Commences RCS dilution</p> <p>Raise turbine load by increasing governor control</p> <p>EVALUATOR CUE: After reactor power has been raised to 96%(or as instructed by lead evaluator), insert the primary water totalizer failure so the next dilution will be affected.</p>					
A	Primary Water Totalizer Failed					
1.	<p>Primary Water Totalizer to Boric Acid Blender Totalizer Failure</p> <p>Performs: Place CVCS Makeup Control Switch to STOP</p> <p>EVALUATOR NOTE: Depending on how quickly the failure is recognized, there may not be the need to reference AOI-3.4 UNCONTROLLED REACTIVITY ADDITION. If the crew stops the dilution quickly, and doesn't need to apply AOI-3.4 UNCONTROLLED REACTIVITY ADDITION, then steps 2-4 will not need performed.</p>					

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ 2. Obtain correct procedure AOI-3.4 UNCONTROLLED REACTIVITY ADDITION

_____ 3. INITIATE Boration using the desired method AND CONTINUE Boration UNTIL one of the following conditions has been satisfied:
 IF Boration is due to an uncontrolled reactivity addition, CONTINUE Boration UNTIL the Termination Criteria of Attachment 3 have been satisfied as determined by the SM

Performs:

Normal Boration Path (Preferred)

Set boric acid integrator to 600 gals
 Place RCS Makeup Control Switch to STOP
 Place RCS Makeup Mode Selector Switch to BORATE
 Place RCS Makeup Control Switch to START
 Place FCV-110 Boric Acid Blow Controller in MANUAL AND ADJUST to maximum flow.

_____ 4. Determine Termination Criteria of Attachment 3

Directs:

Boration until Neutron Flux stable OR decreasing
 AND
 Rods above RIL per Graph RPC-1A

_____ 5. CONTACT maintenance to perform repairs of the blender

EVALUATOR CUE:

After maintenance is contacted, Insert next event

Comments:

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

B 22 Battery Charger DC breaker open

1. Obtain correct procedure ARP SKF 1-2 "22 DC BUS TROUBLE"

Performs:

CHECK 22 DC Bus Voltage AND Dispatches an NPO to check 22 Battery Charger, 22 Battery, to determine the cause of the alarm.

2. IF 22 charger can NOT be maintained in service, VERIFY, that the conditions of Technical Specification 3.7.B.(6) are met.

Checks:

Technical Specifications 3.7.B.(6) 24 hour LCO

INSTRUCTOR CUE:

After 5 minutes Report as NPO 22 Battery Charger AC supply breaker is OPEN. Electrical Maintenance Personnel performing a walkdown of a workpackage inadvertently tripped the breaker OPEN.

3. Obtain correct procedure SOP 27.1.6, INSTRUMENT BUS, DC DISTRIBUTION SYSTEM AND PA SYSTEM INVERTER

EVALUATOR CUE:

If necessary, role-play the Shift Manager and instruct the CRS to restore 22 Battery Charger to service

4. Startup of 21, 22, 23 and 24 Battery Charger

Performs:

Direct NPO to restore 22 Battery Charger to service In Accordance With SOP 27.1.6 Step 4.2.1

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

INSTRUCTOR CUE:

**After 5 minutes remove LOA EPS890 F,0,D and reclose
22 Battery charger breaker**

EVALUATOR CUE:

**After 22 Battery charger breaker is reclosed, Insert the
next event.**

Comments:

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ C Loss of 22 Instrument Bus

- _____ 1. Identify 22 Instrument bus failure by All instruments powered by 22 Instrument bus (WHITE power supply markings) fail low
- _____ 2. Obtain correct procedure AOI-27.1.6 Loss of Instrument Bus
- _____ 3. IDENTIFY the failed instrument bus by observing the Instrument Bus voltage indication on the rear of the Panel FD.

Dispatch an NPO to investigate the cause of the Instrument Bus failure.
- _____ 4. PLACE the Rod Control System in manual
- _____ 5. ENSURE that the following control functions have operable instrument channels-
Pressurizer Pressure, Pressurizer Level, Steam Generator Level, Overpressure Protection System (OPS)

Performs:
PLACES Pressurizer level controller and Main Feed regulator valves to MANUAL and restores level to program value. Selects operable channel for control or IF an operable channel can NOT be selected, THEN PLACE the associated controller(s) in manual.
- _____ 6. PLACE control switches for 21,22,and 23 B/U Group PRZR heaters to OFF

Comments:

- ___ 7. PLACE 22 Charging pump speed to control to MANUAL
- ___ 8. PLACE pressurizer level defeat switch (L460A) to "DEFEAT 2"
- 9. PLACE 22 Charging pump speed to control to AUTOMATIC
- 10. PLACE control switches for 21,22,and 23 B/U Group PRZR heaters to AUTO
- RESTORE LETDOWN
- 11. CLOSE 75 gpm letdown orifice stop valve 200A
- 12. PLACE LCV - 459 to OPEN
- 13. PLACE PCV-135 in MANUAL and ADJUST to 75 % OPEN(25% on the output scale)
- 14. OPEN 75 gpm letdown orifice stop valve 200A
- 15. ADJUST PCV-135 to maintain letdown pressure to between 225 and 275 psig and place in AUTO

EVALUATOR CUE:

After Letdown has been re-established, Insert the next event.

INSTRUCTOR CUE:

AS NPO sent to investigate Instrument bus failure, call CRS and report that the Inverter has failed and it did NOT automatically swap to the Alternate power supply. Inform CRS that a Manual transfer to the alternate power supply to restore the bus is possible.

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT SCENARIO ES-500-0104 ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

INSTRUCTOR CUE:

Once FR-S.1 is entered, restore power to the 22 Instrument Bus by removing the previously entered malfunction on the bus.

- _____ **D 21 SG Level Transmitter 417A Fails Low/ATWS Requiring Transition to FR-S.1**

E-0, REACTOR TRIP OR SAFETY INJECTION

Automatic or Manual Initiated Reactor Trip

Perform:

Trip Reactor

- _____ 1. Verify Reactor Trip

Checks:

Rod Bottom Lights – LIT
 Reactor Trip Breakers – OPEN
 Rod Position Indicators – AT ZERO
 Neutron Flux – DECREASING

Perform:

Ensure Rx trip breakers open and flux decreasing
 Manually trip reactor

2. The reactor will NOT trip AND is NOT Subcritical

Perform:

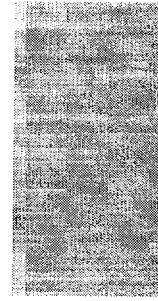
De-energize 480V busses 2A AND 6A for 10 seconds

Comments:

- _____ 3. The reactor can NOT be tripped, GO TO FR.S-1,
RESPONSE TO NUCLEAR POWER
GENERATION/ATWAS Step 1

Identify:

Reactor is NOT shutdown
Transition to FR.S-1



Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	1. FR.S-1 RESPONSE TO NUCLEAR POWER GENERATION/ATWAS Note: Steps 2 through 10 are immediate action steps					
_____	2. Verify Reactor Trip Checks: Reactor Trip Breakers – OPEN Neutron Flux – DECREASING Rob bottom lights – LIT Rod position indicators – AT ZERO					
_____	3. Manually trip reactor Performs: Manual reactor trip Check: The reactor will NOT trip, THEN perform the following: Performs: Manually insert control rods					
_____	4. MANUAL Turbine Trip Check: Turbine stop valves AND control valves – CLOSED					
_____	ISOLATE THE MAIN TURBINE FROM THE SGs BEFORE PLANT AND SCENARIO-SPECIFIC CRITERIA ARE EXCEEDED CT # 1					

Comments:

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME	EVENT/EXPECTED OPERATOR RESPONSE:	SM	WE	CRS	RO	BOP
_____	5. Check AFW Pumps Running: Check: Motor-driven pumps – RUNNING Turbine-driven pumps – RUNNING					_____
_____	6. Check Containment Conditions Check: Containment conditions NOT ADVERSE Containment pressure LESS THAN 4 psig Containment Radiation LESS THAN $1E^{+5}$ R/hr Reactor SUBCRITICAL Power range channels – LESS THAN 5% AND Intermediate range channels – NEGATIVE STARTUP RATE				_____	_____
_____	7. Initiate Emergency Boration of the RCS: Performs: Start charging pumps Establish emergency boration flow path - Open emergency boration valve: MOV-333 Identifies: MOV-333 NOT OPEN					_____
_____	8. Align AND establish normal boration flow path per SOP 3.2, REACTOR COOLANT SYSTEM BORON CONCENTRATION CONTROL					_____

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

- | | | |
|------------------|--|--|
| <p>_____ 9.</p> | <p>Establish normal boration flow path</p> <p>Performs:</p> <ul style="list-style-type: none"> -PLACE Boric Acid Makeup Control Switch to Stop -SET Boric Acid Integrator to 600 -Place the RCS Makeup Mode Selector switch to BORATE -FCV-110 in AUTO or MANUAL -ENSURE boric acid transfer pumps are in AUTO -PLACE the RCS Makeup Control Switch to START -ENSURE BATPs shift to FAST speed | <p>_____</p> |
| <p>_____ 10.</p> | <p>Align charging pump suction to RWST</p> <p>Performs:</p> <ul style="list-style-type: none"> -Open charging pump suction valve from RWST
LCV-112B -Close charging pump suction valve from VCT
LCV-112C -Place RCS Makeup Control switch to STOP <p>INSERT NEGATIVE REACTIVITY INTO THE
CORE BY AT LEAST ONE OF THE FOLLOWING
METHODS BEFORE COMPLETING THE
IMMEDIATE ACTIONS STEPS OF FR-S.1</p> <ul style="list-style-type: none"> - De-energize the control rod drive MG sets - Insert RCCAs - Establish emergency boration flow to the
RCS <p>CT # 2</p> | <p>_____</p> <p>_____</p> <p>_____</p> |
| <p>_____ 11.</p> | <p>Check PRZR pressure – LESS THAN 2335 PSIG</p> <p>Check:</p> <p>Pressurizer pressure less than 2335 psig,
IF pressure greater than 2335 psig, ENSURE PORVs AND
block valves OPEN
IF pressure less than 2135 psig, ensure PORVs are closed</p> | <p>_____</p> |

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT SCENARIO ES-500-0104 ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 12. Verify Containment Ventilation Isolation

Check:

Containment Purge valves:
FCV-1170 through 1173 CLOSED
Containment Pressure Relief valves:
PCV-1190 through 1192 CLOSED

____ 13. Check if the Following Trips have Occurred:

Check:

Reactor Trip
Turbine Trip

Dispatch:

Operator to locally open trip breakers

INSTRUCTOR NOTE:

2 Minutes after being dispatched, Insert LOA to locally open reactor trip breakers and report to CCR

____ 14. Check If SI Is Actuated

Check:

SI Annunciator – LIT
OR
SI system pumps – RUNNING

____ 15. Verify Power to 480V Busses

Check:

Generator Output Breakers – OPEN
480V Busses – AT LEAST ONE ENERGIZED

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___	16. AC 480V Busses - all energized by Offsite Power If ALL 480V energized from offsite: Perform: 1) Start one charging pump Dispatch an NPO to: 2) Reset Lighting 3) Reset all MCCs except 28 & 28A 4) Ensure MCC 24, 27, & 29 energized Instructor CUE: Insert LOA to restore MCCs and lighting				___	
___	17. Verify CCW System Operation Checks: CCW pumps on busses supplied by offsite power running					___
___	18. Verify FW Isolation Checks: MBFPs - TRIPPED MBFP Discharge valves - CLOSED SG Blowdown Isolation valves - CLOSED					___
___	19. Verify Proper Emergency SI Valve Alignment Checks: SI Pump Cold Leg Inj. Valves, 856A, C, D, & E OPEN RHR Hx CCW Outlet valves 822A & B OPEN RHR Hx Motor operated valves 746 & 747 OPEN					___

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 20. Verify Containment Isolation Phase A

Checks:

Phase A actuated
Phase A valves CLOSED
IVSW valves 1410, 1413, 3518, & 3519 OPEN
WCP system valves PCV-1238, 1239, 1240, &
1241 OPEN

Performs:

Places Personnel and Equipment hatch solenoids to
INCIDENT on SM panel

____ 21. Verify AFW Pumps Running

Checks:

Motor Driven Pumps - running
Turbine driven pump - running if necessary

NOTE: Only Motor driven pumps receive auto start signal
on SI, turbine driven pump may be operating if low level
exists in 2 S/Gs

____ 22. Verify SI System Pumps Running

Checks:

Three SI pumps - running
22 SI pump discharge isolation MOV-851A &
MOV-851B - OPEN
Two RHR pumps – running

____ 23. Verify Proper Service Water System Operation

Checks:

Three service water pumps - running on Essential
Header
Service water valves from Diesel Generator -
OPEN

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ 24. Verify Containment Fan Cooler Units - Running in Incident Mode

Checks:

Fan Coolers - running
 Charcoal filter butterfly valves - OPEN
 Fan discharge butterfly valves – CLOSED
 TCV-1104 & 1105 OPEN

_____ 25. Verify Containment Ventilation Isolation

Checks:

Purge duct isolation valves FCV-1170 through 1173 CLOSED
 Relief duct isolation valves PCV-1190 through 1192 CLOSED

_____ 26. Verify CCR Air Conditioner Status

Checks:

Train A and B running in INCIDENT mode

_____ 27. Check if Containment Spray Should be Actuated

Checks:

Containment Pressure ever >24 psig, **if it was:**
 Spray pumps running
 Spray pump discharge valves MOV-866A, B, C, & D OPEN
 Containment Isolation Phase B valves CLOSED

Performs:

Stop all RCPs

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

- | | | | |
|--------------|------------|--|--------------|
| <p>_____</p> | <p>28.</p> | <p>Check SG levels</p> <p>Checks:
Narrow Range level in at least one Steam Generator greater than 9% (26%)</p> <p>Performs:
If NO Narrow Range level in at least one Steam Generator greater than 9% (26%) ensure 800gpm total feed flow</p> <p>If Narrow Range level in at least one Steam Generator greater than 9% (26%) control feed flow to maintain between 9% (26%) and 52%</p> | <p>_____</p> |
| <p>_____</p> | <p>29.</p> | <p>Verify ALL Dilution paths isolated</p> <p>Checks:
FCV-111A Primary Water to Blender closed
NO flow indicated on FI-111 Primary Water flow indicator</p> | <p>_____</p> |
| <p>_____</p> | <p>30.</p> | <p>Check for Reactivity insertion from Uncontrolled Cooldown</p> <p>Checks:
RCS temperature decreasing in an uncontrolled manner
Any Steam Generator pressure decreasing in an uncontrolled manner OR completely depressurized</p> | <p>_____</p> |
| <p>_____</p> | <p>31.</p> | <p>Check MSIVs closed</p> <p>Performs:
Close all MSIVs</p> <p>NOTE:
This step performed only if an uncontrolled cooldown is in progress</p> | <p>_____</p> |

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___ 32.	Identify Faulted Steam Generator Checks: Pressures in ALL Steam Generators – Any Steam Generator decreasing in an uncontrolled manner OR completely depressurized NOTE: This step performed only if an uncontrolled cooldown is in progress					
___ 33.	Isolate Main Feed Line Checks: Main & Low Flow Reg Vlv's Closed					
___ 34.	Isolate AFW Flow Performs: CLOSES affected S/G AFW Reg Valve					
___ 35.	Isolate Flow to 22 AFW Pump if necessary Performs: Directs NPO to Shut MS-41 or 42 if #22 or #23 S/G was determined to be Faulted					
___ 36.	Verify S/G Atmospheric Steam Dump Closed Checks: Affected S/G Atmospheric Steam Dump Closed					
___ 37.	Check Core Exit TCs less than 1200F					

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT **SCENARIO** ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 38. Verify Reactor Subcritical

Checks:

Power range channels – LESS THAN 5%

AND

Intermediate range channels – NEGATIVE STARTUP
RATE

____ 39. Return to procedure and step in effect

Performs:

Transition to E-0 step 1

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

E 24 Steam Generator Safeties fail open

E-0 Reactor Trip OR Safety Injection

____ 1. Verify Reactor Trip

Checks:

Rod Bottom Lights – LIT
Reactor Trip Breakers – OPEN
Rod Position Indicators - AT ZERO
Neutron Flux – DECREASING

____ 2. Verify Turbine Trip

Checks:

Turbine Stop valves – CLOSED
Turbine Governor valves – CLOSED

____ 3. Check if SI is actuated

Checks:

SI Annunciator – LIT
SI System pumps – RUNNING

____ 4. Generator Output breakers - OPEN

Checks:

Breakers 7 & 9 OPEN

____ 5. AC 480V Busses - At Least One Energized

Checks:

2A AND 3A, OR 5A, OR 6A Breaker alignment and
voltage

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	6. AC 480V Busses - all energized by Offsite Power Checks: 2A AND 3A, AND 5A, and 6A Breaker alignment and voltage					_____
_____	7. Verify RCP seal cooling Performs: Start one charging pump Align charging pump suction to the RWST					_____
_____	8. Verify power to lighting and MCCs Checks: All 480V busses energized by offsite – Performs: Reset lighting Reset all MCCs except MCC 28 and MCC 28A Ensure MCC 24, MCC 27, and MCC29 energized If all 480V busses NOT energized by offsite – Verify MCC 26A, MCC 26B, MCC26C, MCC24A, MCC 24A, MCC27A, MCC29A, and MCC211 energized Ensure one cable tunnel fan running if any EDG loaded Align lighting to the TSC bus per AOI-27.1.12					_____
_____	9. Verify CCW System Operation Checks: 3 CCW pumps running					_____
_____	10. Verify FW Isolation Checks: MBFPs - TRIPPED MBFP Discharge valves - CLOSED SG Blowdown Isolation valves - CLOSED					_____

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
_____	11. Verify Proper Emergency SI Valve Alignment Checks: SI Pump Cold Leg Inj. Valves, 856A, C, D, & E OPEN RHR Hx CCW Outlet valves 822A & B OPEN RHR Hx Motor operated valves 746 & 747 OPEN					_____
_____	12. Verify AFW Pumps Running Checks: Motor Driven Pumps - running Turbine driven pump - running if necessary					_____
_____	13. Verify SI System Pumps Running Checks: Three SI pumps - running 22 SI pump discharge isolation MOV-851A & MOV-851B - OPEN Two RHR pumps – running Performs: Start three Safety Injection pumps					_____
_____	14. Verify Proper Service Water System Operation Checks: Three service water pumps - running on Essential Header Service water valves from Diesel Generator - OPEN					_____

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 15. Verify Containment Fan Cooler Units – In Service

Checks:

5 Fan Coolers - running
Charcoal filter valves - OPEN
Fan normal discharge valves – CLOSED
TCV-1104 & 1105 OPEN

____ 16. Verify Containment Ventilation Isolation

Checks:

Containment Purge valves:
FCV-1170 through 1173 CLOSED
Containment Pressure Relief valves:
PCV-1190 through 1192 CLOSED

____ 17. Verify Containment Isolation Phase A

Checks:

Phase A actuated
Phase A valves CLOSED
IVSW valves 1410, 1413, 3518, & 3519 OPEN
WCP system valves PCV-1238, 1239, 1240, &
1241 OPEN

Performs:

Places Personnel and Equipment hatch solenoids to
INCIDENT on SM panel

____ 18. Verify CCR Air Conditioner Status

Checks:

Train A and B running in INCIDENT Mode 2

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ 19. Check if Main Steamlines Should be Isolated

Checks:

High Steamflow with Low Tave or Low Steamline Pressure, and
Containment Pressure ever >24 psig

If required, MSIVs are verified CLOSED

_____ 20. Check if Containment Spray Should be Actuated

Checks:

Containment Pressure ever >24 psig, **if it was:**

Spray Pumps Running

Spray Pump Discharge valves

MOV-866A, B, C, & D OPEN

Containment Isolation Phase B valves CLOSED

IVSW isolation Phase B valves (NPO action)

7864, 7865, 7866, & 7867 OPEN

Performs:

Stop all RCPs

_____ 21. Verify SI Pump Flow

Check:

RCS Pressure <1660 psig (1690 psig)

Check SI pump flow indicators

Performs:

Place an RHR pump in pullout if -

RCS pressure is >1660 psig (1690 psig)

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

- | | | |
|--------------|--|---------------------------|
| <p>_____</p> | <p>22. Verify RHR Pump Flow</p> <p style="margin-left: 40px;">Check:
RCS Pressure <320 psig (340 psig)
Check RHR pump flow indicators</p> <p style="margin-left: 40px;">Performs:
Place an RHR pump in pullout if -
RCS pressure is >320psig (340psig)</p> | <p>_____</p> <p>_____</p> |
| <p>_____</p> | <p>23. Verify TOTAL AFW Flow greater than 400 gpm</p> <p style="margin-left: 40px;">Check:
Greater than 400 gpm total flow</p> | <p>_____</p> |
| <p>_____</p> | <p>24. Verify AFW Flow to ALL SGs</p> <p style="margin-left: 40px;">Check:
AFW flow to ALL Steam Generators</p> <p style="margin-left: 40px;">Note:
Feed flow to 24 SG should be isolated.</p> | <p>_____</p> <p>_____</p> |
| <p>_____</p> | <p>25. Align Service Water System</p> <p style="margin-left: 40px;">Check:
Service Water System aligned for THREE HEADER
OPERATIONS</p> <p style="margin-left: 40px;">Ensure closed SWN-4 & SWN-5</p> | <p>_____</p> |

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

_____ 26. Check RCS Temperatures

Expected:

RCS Average Temp Stable or Trending to 547 F
RCS Cold Leg Temp Stable or Trending to 547 F

If temperature less than 547 F and decreasing

Performs:

Stop dumping steam
Isolate unnecessary steam loads
If cooldown continues reduce AFW flow as required
If cooldown continues close MSIVs

If temperature greater than 547 F and increasing

Performs:

Dump steam

_____ 27. Check PZR PORVs

Expected:

PORVs Closed

_____ 28. Check Normal PZR Spray Valves

Expected:

Normal Spray Valves Closed

_____ 29. Check Auxiliary Spray Valve

Expected:

Auxiliary Spray Valve Closed

Comments:

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

____ 30. Check if RCP Should be Stopped

Check:

SI Pumps - AT LEAST ONE RUNNING
RCS subcooling based on Core Exit TCs LESS THAN 24F
(31F FOR ADVERSE CONTAINMENT)

Performs:

Stops all Reactor Coolant Pumps

____ 31. Check if Any SG Secondary Pressure Boundary is Faulted

Check:

Any SG Press decreasing in uncontrolled manner
Any SG completely depressurized

Note:

Transition to E-2 Faulted Steam Generator Isolation is
required due to 24 Steam Generator Safeties failed open

Comments:

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
	E-2 Faulted Steam Generator Isolation					
___ 40.	Check affected MSIV CLOSED					
	Performs: Close affected MSIV					—
___ 41.	Check if any S/G Secondary Pressure Boundary is Intact					
	Checks: Any S/G pressure stable or increasing				—	
___ 42.	Identify Faulted S/G					
	Checks: Any S/G pressure decreasing in uncontrolled manner or is completely depressurized				—	
___ 43.	Isolate Main Feed Line					
	Checks: Main & Low Flow Reg Vlv's Closed				—	
___ 44.	Isolate AFW Flow					
	Performs: CLOSES affected S/G AFW Reg Valve					—
___ 45.	Isolate Flow to 22 AFW Pump if necessary					
	Performs: Directs NPO to Shut MS-41 or 42 if #22 or #23 S/G was determined to be Faulted				—	
___ 46.	Verify S/G Atmospheric Steam Dump Closed					
	Checks: Affected S/G Atmospheric Steam Dump Closed				—	

Comments:

ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

TIME EVENT/EXPECTED OPERATOR RESPONSE:**SM WE CRS RO BOP**

___ 47. Verify S/G Blowdown Valves Closed

Checks:

Check both B/D Valves for affected S/G Closed

___ 48. Direct Local Isolation of affected S/G:
Steam Traps upstream of MSIVs
MSIV bypass valves

CT #3 Complete**E-2-A Isolate the faulted SG before transition out of E-2**

___ 49. Check CST Level Greater Than 2 FT

___ 50. Check CCW Pump status

Check:

CCW Pumps running

Performs:

Places CCW pump control switches in pullout if not running

___ 51. Place controls for main feedwater and bypass feedwater regulating valves in CLOSE

Performs:

Place controls for main feedwater and bypass feedwater regulating valves in CLOSE

___ 52. Ensure Automatic Safeguards Actuation Key switches on Panel SB-2 in DEFEAT

Performs:

Places key switches to DEFEAT

53. Depress Safety Injection Reset Pushbutton (Panel-SB2)
Train A
Train B

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT SCENARIO ES-500-0104 ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD

<u>TIME</u>	<u>EVENT/EXPECTED OPERATOR RESPONSE:</u>	<u>SM</u>	<u>WE</u>	<u>CRS</u>	<u>RO</u>	<u>BOP</u>
___	54. Verify SI Reset					
___	55. Place IVSW switches to OPEN					___
	Performs: Place IVSW switches to OPEN					___
___	56. Place Containment Rad Monitor WCPS Valve switch to OPEN					
	Performs: Places CNTMT RAD MON WCPS valves to open					___
___	57. Personnel and Equipment Hatch Solenoid switches to INCIDENT					
	Performs: Places Personnel and Equipment Hatch Solenoid switches to the INCIDENT mode.					___
___	58. Place ALL remaining phase "A" Valves switches in CLOSE					
	Performs: Places ALL remaining Phase "A" valves switches to CLOSE					___
___	59. Reset Phase "A" Containment Isolation					
	Performs: Depress Phase "A" Containment Isolation reset pushbuttons Train A Train B					___
___	60. Verify Train A and B Reset					
	Checks: Phase "A" Containment Isolation Train A and Train B reset					___

Comments:

EXERCISE: ATWAS, LOSS OF SECONDARY COOLANT	SCENARIO ES-500-0104
ATTACHMENT 2 - SIMULATOR DOCUMENTATION RECORD	

TIME EVENT/EXPECTED OPERATOR RESPONSE:

SM WE CRS RO BOP

- | | | | |
|--------------|------------|--|--------------|
| <p>_____</p> | <p>61.</p> | <p>Check Phase "B" Actuated</p> <p>Checks:
Check Containment Isolation Phase "B" actuation</p> <p>Expected:
Operator proceeds to next step as Phase "B" should not have actuated</p> | <p>_____</p> |
| <p>_____</p> | <p>62.</p> | <p>Establish Instrument Air to Containment</p> <p>Required Actions:
Open PCV-1228</p> | <p>_____</p> |
| <p>_____</p> | <p>63.</p> | <p>Check Secondary radiation</p> <p>Checks:
Request periodic activity samples
R-28, 29, 30, & 31 recorder
R-45 recorder
R-49 recorder</p> | <p>_____</p> |
| <p>_____</p> | <p>32.</p> | <p>Transition to E-1 Loss Of Reactor Or Secondary Coolant</p> <p>Terminate the Drill once E-1 Loss Of Reactor Or Secondary Coolant has been entered.</p> | <p>_____</p> |

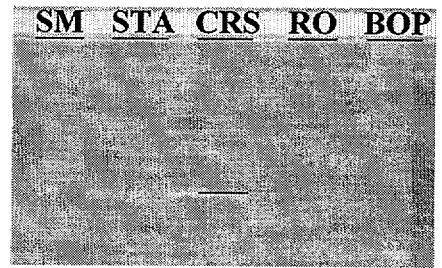
Comments:

TIME EVENT/EXPECTED OPERATOR RESPONSE:

EMERGENCY PLAN

Evaluated by job performance measure.

1. Classifies event as a Site Area Emergency (1.1.2)



Comments:

ATTACHMENT 3 – SCENARIO OBJECTIVES

TERMINAL OBJECTIVES

1083 Demonstrate the ability to perform the required actions for a response to nuclear power generation/ATWAS (FR-S.1).

ENABLING OBJECTIVES

2895 Demonstrate the ability to perform the required actions for an uncontrolled reactivity addition.

2956 Demonstrate the ability to perform the required actions for a loss of an RCP (locked rotor)

2987 Demonstrate the ability to perform the required actions for a steam break upstream of the MSIVs.

2994 Demonstrate the ability to perform the required actions for a reactor trip or safety injection (E-0)

Watch Crew Turnover Sheet:

Date/Time:	TODAY	Condition:	Power Ops
RCS Temp:	558F	% Power:	91.0%
RCS Press:	2235 psig	MW Gross:	900
PZR Level:	44%	River Water:	66F
RCS Total Leakage:	0.4 gpm	Boron Conc:	850 ppm
RCS Unidentified Leakage:	0.4 gpm	Rod Position:	212 CBD
Xenon:	Equilibrium	RCS Total Act:	2.85E ⁻¹ μ Ci/cc
EFPD:	30	Air In-Leakage:	19 SCFM
PZR Press Control:	Channel 1		
PZR Level Control:	Channel 2		
Service Water:	3 Header Ops		
Risk Assessment:	YELLOW	Daily Risk Factor:	10.8

Plant Equipment Status:

1. 23 Emergency Diesel Generator, Out of Service, 6 hours ago, Mechanical Maintenance and FIN troubleshooting high differential pressure on the fuel oil duplex strainers. Fuel oil supply system disassembled. Tech Spec 3.7.B.1.a (7 day LCO) entered.
2. 23 Motor Driven Auxiliary Feedwater Pump, Out of Service, 48 hours ago, pump disassembled, excessive leakage on the inboard seal package, Mechanical Maintenance working, expected back for surveillance test within 12 hours. Tech Spec 3.4.B.1.(1).a (72 hour LCO) entered.
3. 21 Charging Pump, Out of Service, 3 weeks ago, needs replacement of hydraulic coupling vane packages, awaiting qualification of parts from manufacturer.
4. 23 S/G has 5 gallon per day steam generator tube leakage by Chemistry report.
5. 11 Centac Air compressor Out of Service, awaiting parts for inner cooler.
6. 22 Condenser - Increased air in-leakage, Vendor to inspect later today.
7. From the Con Edison System Operator - "A thunderstorm warning is in effect for the next 4 hours for the Greater New York City Metropolitan Area and the lower Hudson Valley Regions."

Instructions to the Shift:

1. Increase power to 100% using POP-1.3 beginning at step 4.73. All prior steps have been completed in POP-1.3. A Heat balance has just been completed, and the NIs have been adjusted.