NMC Committed to Nuclear Excellence	EVALUATION SCENARIO GUIDE (ESG)

SITE: **DAEC**

LOW POWER, ROD PULL TO PERFORM SRV CYCLING STP, IRM FAIL UPSCALE, FEED REG VALVE LOCK UP AND RESET, INADVERTANT INITIATION OF EDG AND SECURING OF THE SAME EDG, STUCK OPEN SRV WHICH RECLOSES, FEED WATER RUPTURE IN CONTAINMENT.

ESG ILC 17 REV. 0

PROGRAM: **OPERATIONS** **#:**

COURSE: **ILC** **#:** **50007**

TOTAL TIME: **80 MINUTES**

Developed by:		
	Instructor	*Date*
Validated by:		
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Reviewed by:		
	Operations Manager	*Date*
Approved by:		
	Training Supervisor-Operations	*Date*

ESG 17, ILC NRC Exam, Rev. 0

GUIDE REQUIREMENTS

Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	IPOI 2 Rev.80 STP 3.8.1-04, Rev. 14 STP 3.6.2.1-01, Rev. 2 ARP 1C05A C-3 Rev. 6 ARP 1C05A A-2 Rev. 9 STP 3.4.3-03 Rev. 5 ARP 1C05A F-1 Rev.9 ARP 1C94 A-4 Rev.9 AOP 683 Rev. 2 EOP 1 Rev. 11 EOP 2 Rev.12 EPIP
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None

ESG 17, ILC NRC Exam, Rev. 0

SCENARIO SUMMARY:

Current plant operating status:

- Reactor start up is in progress. The plant was shut down due to PSV 4407 leaking. It has been fixed. We are currently at 150 psig and holding.
- STP 3.4.3-03, MANUAL OPENING AND EXERCISING OF THE ADS AND LLS RELIEF VALVES, for LLS PSV 4407 must be run prior to raising reactor power.
- Currently one bypass valve is open 75%. The STP requires that one bypass valve be opened 100% and the second be open 15%. Control rods will have to be withdrawn to achieve the STP conditions. When he STP is complete begin pulling control rods to start up the plant.
- Torus Cooling has been placed in service preparation of the STP, and TS 3.5.1 Condition B has been entered.
- STP 3.6.2.1-01, Suppression Pool Water Temperature Surveillance, is available for when you open the SRV.
- STP 3.8.1-04, Standby Diesel Generators Operability Test, (Slow Start From Norm Start Air) is in progress. The "A" EDG has been tested satisfactorily. The "B" EDG test is in progress. The STP is complete through step 7.2.25. It is currently in it's one hour run for TS, and the 2 hour run for stabilization of the Generator Stator and Main Bearing temperatures.
- During the start up the Start Up Feed Reg Valve was sticking. It was decided that the Start Up Feed Reg Valve be isolated and level be controlled via the "B" Feed Reg Valve. At the beginning of your shift, there are 2 I & C Techs are looking at the operator. They may call for your assistance to cycle the valve.
- I & C has asked that the "A" IRM be bypassed for a short time. They are working near the "A" IRM Preamp and do not want to generate any half scrams. The work should take about 45 minutes, and then the "A" IRM can be unbypassed.
- There is a severe thunderstorm warning for the next 2 hours for the Linn and Benton Counties.

Scenario segments:

Event 1 (R-RO)

- Control rods will be pulled to achieve one bypass valve 100% open and the second bypass valve 15% open.

Event 2 (I-RO)

- During the rod pull, the “C” IRM will fail upscale. This will result in a rod block and half scram. The SRO will consult TS and determine that for a short time, until the “A” IRM is unbypassed, they were not in compliance with TS 3.3.1.1 Condition A. This is because there were not 2 operable IRMs. The crew will unbypass the “A” IRM and bypass the “C” IRM, reset the half scram, consult TS and continue with the rod pull.

Event 3 (N)

- When the conditions of STP 3.4.3-03, MANUAL OPENING AND EXERCISING OF THE ADS AND LLS RELIEF VALVES, are met, the BOP will cycle PSV 4407.

Event 4 (C-RO)

- Shortly after the completion of STP 3.4.3-03, the “B” Feed Reg Valve will receive a Lock Up. The control room will receive a call from the I & C Techs that are looking at the Start Up Feed reg Valve, they will inform the control room that they were comparing parts of the Start Up Feed Reg Valve to the “B” Feed Reg Valve and inadvertently tripped the lock out of the “B” Feed Reg Valve.

- With this information, the crew will be able to reset the lock out and restore the “B” Feed Reg Valve to service.

Event 5 (C-BOP)

- The EDG will develop a jacket cooling water leak that will require the EDG to be unloaded and removed form service.

- The SRO will declare the EDG inoperable and TS 3.8.1 Condition B will be entered.

Event 6 (C-BOP)

- Shortly after the EDG is declared inoperable, PSV 4407 will fail open again. The Crew will enter AOP 683 and cycle the hand switch for PSV 4407 in attempts to close the SRV. The cycling of the hand switch will not close the PSV.

Event 7 (M- ALL)

- Shortly after scramming the reactor, a feedwater leak will begin inside the primary containment. The leak will propagate and entry into EOP 1 and 2 will be required.

- On the 2 psig signal, bus 1A 3 will receive a lockout due to a fault in the “A” CS pump motor

- The “B” CS pump will trip

- HPCI will trip on its start.
- The crew may not diagnose the problem to be a feedwater line rupture. If this occurs, they will be able to maintain RPV level with Feedwater, but the torus level will rise. They will be forced to remove feedwater injection based on either torus level, or when the entire Hotwell is pumped to the torus, the condensate pumps will trip on low suction pressure.
- Per EOP 2 the crew will spray the torus and the drywell and take actions to lower the torus level.

Event 8 (C-BOP)

- The RHR inject valve will **not open** automatically, requiring the operator to manually open the valve to maintain RPV level. Being able to inject into the RPV with RHR is a **critical task**.

The End

- When feedwater is secured, the RPV depressurized and RPV level being maintained with RHR, the scenario will be complete

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ RO (NSOE, ANSOE)

- ♦ 1.07 Perform Surveillance Test Procedures
- ♦ 19.06 Shutdown the SBDG
- ♦ 72.07 Withdraw control rods using group notch
- ♦ 79.01 Operate the IRM system during a plant startup
- ♦ 45.21 Reset A/B or Startup Feed Regulating Valve Lockup
- ♦ 94.51 Respond to Abnormal Safety Relief Valve Operation
- ♦ 93.22 Perform immediate operator responses to a reactor scram.
- ♦ 95.14 Perform EOP Defeat 4.
- ♦ 95.21 Perform EOP Defeat 11.
- ♦ 95.26 Perform EOP Defeat 16.
- ♦ 95.44 Perform the actions of RC/L of EOP-1.
- ♦ 95.59 Perform T/L leg of EOP 2 for a rising torus level
- ♦ 95.63 Perform the DW/T leg of EOP-2
- ♦ 95.64 Perform the DW/P leg of EOP-2

⇒ Shift Supervisor (SS)

- ♦ 1.01 Direct routine crew and control room activities.
  - 1.01.02 Coordinate operator activities.
  - 1.01.03 Ensure control room activities conform to ACP 1410.1, Conduct of Operations.
- ♦ 1.02 Determine operability of Tech Spec required components.
  - 1.02.02 Determine if the instrument, component, or system is operable.
  - 1.02.03 Declare the instrument, component, or system is inoperable, enter the correct LCO, and determine and direct performance of the LCO STP.
- 1.21 Direct crew response to too normal events/accidents
  - 1.21.01 Evaluate the event or accident to determine its cause and develop mitigation strategies.
  - 1.21.02 Recognize and prioritize data relevant to the accident or event.
  - 1.21.03 Direct appropriate conservative actions to mitigate the accident or event and stabilize plant parameters.
  - 1.21.06 Analyze results and direct alternate mitigation actions.

- ♦ 3.01 Implement the Emergency Plan
  - 3.01.01 Declare the appropriate EAL
- 4.05 Direct crew actions to increase reactor pressure from approximately 80-90 psig to one bypass vale is open
  - ♦ 4.05.01 Supervise crew withdrawing control rods.
- ♦ 5.51 Direct crew response to Abnormal Safety Relief Valve Operation
  - 5.49.01 Direct crew response to perform the Immediate and Follow-up Actions of TURBINE LUBE OIL TROUBLE tab of AOP 693.
- ♦ 6.14 Direct Crew response to perform EOP Defeat 4.
  - 6.14.01 Direct operator actions to perform EOP Defeat 4.
- ♦ 6.21 Direct Crew response to perform EOP Defeat 11.
  - 6.21.01 Direct operator actions to perform EOP Defeat 11.
- ♦ 6.26 Direct Crew response to perform EOP Defeat 16.
  - 6.26.01 Direct operator actions to override the containment sample valves Group 3 isolation using EOP Defeat 16.
- ♦ 6.44 Direct crew response for performance of the RC/L leg of EOP-1.
  - 6.44.01 Direct operator actions to maintain RPV level between 170″ and 211″ using the Table 1 injection systems.
- ♦ 6.59 Direct Crew response for performance of the T/l leg of EOP-2 for a slow rising torus level
  - 6.59.01 Direct operator actions to lower torus water level with RHR system using Defeat 13 as necessary.
- ♦ 6.62 Direct Crew response for performance of the T/T leg of EOP-2.
  - 6.62.01 Direct operator actions to place RHR in the Torus cooling mode.
- ♦ 6.63 Direct Crew response for performance of the DW/L leg of EOP-2.
  - 6.63.01 Direct operator actions to maintain drywell temp <150° using drywell-cooling systems and bypassing the main intake coils if necessary.
  - 6.63.03 Direct operator actions to secure the running Recirc pumps, initiate drywell sprays using RHR pumps not required continuously for adequate core cooling and verify drywell cooling fans have tripped.
- ♦ 6.64 Direct Crew response for performance of the DW/P leg of EOP-2.
  - 6.64.02 Direct operator actions to Initiate Torus sprays using RHR pumps not required continuously for adequate core cooling.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP:

1.1 General Instructions

a. Reset to IC 7. This places you at approximately 100 psig; you need to get to 150 psig with one bypass valve open approximately 75%. You do this by:

(1) Establish condenser vacuum by starting the Mechanical Vacuum Pump and closing the main condenser vacuum breakers.

(2) Bypass the "A" IRM.

(3) Place the steam loads in the proper condition per OI 683, IAW Section 3.2 through step 3.

a) This OI has you close some steam line drains. It should b done prior to pulling the control rods in the next step.

(4) When you reset the simulator you will be on pull sheet step 10, you must pull control rods until step 16 rods are at their withdrawal limits.

a) NOTE that the first set of rods that you reset into get pulled to 48. These can be pulled continuously by bypassing the RWM.

b) When they get to 48, place the RWM back in operate and continue the pull until step 16, then assess the position of the #1 bypass valve.

c) When the bypass valve is at 75%, Mark up the rod pull sheet to reflect the current rod positions. [Note that it should be through Step 16 on the pull sheet.]

(5) Verify that IPOI 2 Section 4.1 is and you are just waiting for the STP on PSV 4407.

(6) Place RHR in Torus Cooling IAW OI 149, Section 5.4 through step 12

(7) Per OI 573, section 5.2 verify that steps complete through step 13. This is for the air purge of the containment.

(8) Place HPCI and RCIC in stand by readiness.

(9) Per OI 261, Section 7.1, start a vessel drain to the main condenser via RWCU. This will place you at step 6 of the OI

(10) Per OI 691, mark up section 3.2 for starting the Mechanical Vacuum Pump. Be ready to start the JETS.

(11) OI 693.3, Turbine Lube Oil, section 3.2 is complete. Waiting to roll the turbine

b. Verify event trigger definition for event trigger # 5 is **pcpdwg .gt. 2.0**.

c. Type in the **malfunctions** as listed on the Malfunction table in this ESG.

d. Type in the **overrides** as listed on the override table in this ESG.

e. Have a copy of **STP 3.4.3-03, MANUAL OPENING AND EXERCISING OF THE ADS AND LLS RELIEF VALVES**. Mark it up as follows:

(1) On the Prerequisites page initial step 6.1.

(2) N/A pages 10 thorugh19
(3) On page 20, N/A steps 8.3.2 through 8.3.6
(4) ON page 21, N/A steps 8.4.2 through 8.4.6
(5) This will leave only section 7.1 to complete for PSV 4407.

f. Reset all SRM and IRM alarm lights at 1C-36.
g. Place the "A" IRM in bypass.
h. Have a copy of **STP 3.8.1-04, STANDBY DIESEL GENERATORS OPERABILITY TEST (SLOW START FROM NORM START AIR),** and mark up as follows:
(1) Remove all of the "A" EDG paperwork.
(2) For Section 6.0, PREREQUISITES;
a) X and initial the "B" EDG, N/A the others
b) For 6.1.2, initial and list the following as Risk Significant;
(1) RED: "A ESW, "A" EDG, and Startup Transformer.
(2) Orange: RCIC, 125 VDC Swing Charger, 1D120, HPCI, and Div 2 250 charger 1D44.
c) For 6.1.3, initial the Note and all of the steps as the CRS.
(3) For Section 7.2 1G-21 OPERABILITY;
a) Initial all notes and steps up to and including the NOTE at the top of page 29. DO NOT initial step 7.2.29, the EDG load time requirements.
(1) For step 7.2.7, write in **Today** for the date, and about **25 min. ago** for the time.
(2) For step 7.2.25.c write in 4250 Volts.
(3) For step 7.2.25.d write in the 4250 volts and 484 amps.
(4) For step 7.2.25.e write in 484 amps.
(5) For step 7.2.25.f write in **10minutes before turnover**.
b) Step 7.2.70, sign the performed by, place today as the date, place turnover for the time, and initial.
i. Pump the drywell equipment and floor drain pumps.
j. Have a copy of STP 3.6.2.1-01, SUPRESSION POOL WATER TEMPERATURE SURVEILLANCE. Nothing needs to be signed on this copy.
k. LCO and Safety Function Determination paperwork, for any outstanding LCOs

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
5	Pcpdwg .gt. 2.0	Drywell pressure at 2 psig
Event Triggers1-4 will be inserted per the driving instructions in the body of the scenario		

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
T=0	CS01B	B CS pump will trip on start					
T=0	STRH02	RHR inject valve fails to automatically open					
T=0	ED08C	Lock out of 1A3	5		5		
T=0	HP02	HPCI turbine trip	10		5		
As dir	NM04C	“C” IRM fails up scale			1	As is	100
As dir	AN1C08B(26)	B Diesel Gen 1G-21 Panel 1C-94 Trouble			3		ON
As dir	AD01H	PSV 4407 leak			6	As is	100
As dir	FW17A	Rupture of feed water inside PC		500	4	As is	50
As dir	FW20A	Rupture of feed water inside PC		500	4	As is	50

1.4 OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
As dir	LO FWHSS-1621	Lock up of the “B” feed reg valve			2		
T=0	AO MCFR1374(1)	Offgas flow (0-150 cfm)					0
T=0	AO MCFR1374(2)	Offgas flow (0-150 cfm)					0

1.5 REMOTE FUNCTIONS:

None

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

2 Conduct pre-scenario activities in accordance with the following procedures:

3.1 If this scenario is used in training mode: OTI 101

4 TURNOVER INFORMATION

⇒ Day of week and shift

- ♦ Wednesday
- ♦ Day shift

⇒ Weather conditions

- ♦ Warn
- ♦ Severe thunder storm warnings for Linn and Benton Counties for the next 2 hours

⇒ (Plant power levels) Start up, 150 psig in the RPV

- ♦ MWT N/A
- ♦ MWE N/A
- ♦ CORE FLOW N/A

⇒ Thermal Limit Problems/Power Evolutions

- ♦ Rod pull to achieve one bypass valve 100% open, and the second 15% for STP 4.3-03, MANUAL OPENING AND EXERCISING OF THE ADS AND LLS RELIEF VALVES.
- ♦ You are currently ready to begin the rod pull at **step 17** of the rod pull sheet.

⇒ Plant Risk Status

- ♦ CDF
- ♦ Color

⇒ Existing LCOs, date of next surveillance

- ♦ TS 3.5.1 Condition B for RHR being in Torus Cooling Mode of Operation. Currently in Day 1 of 7.

⇒ STPs in progress or major maintenance

- ♦ Making preparations for running STP 3.4.3-03, MANUAL OPENING AND EXERCISING OF THE ADS AND LLS RELIEF VALVES, for LLS PSV 4407.
- ♦ STP 3.8.1-04, Standby Diesel Generators Operability Test, (Slow Start From Norm Start Air) is in progress. The STP is only for the “B” EDG. The STP is complete through step 7.2.25. It is currently in it’s one hour run for TS, and the 2 hour run for stabilization of the Generator Stator and Main Bearing temperatures.

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- ♦ Start up in progress currently in IPOI 2 Section 4.1 is complete with the exception of step 20 C. The plant shut down 1 week ago to repair PSV 4407. It has been fixed and STP 3.4.3-03 must be run to prove operability of PSV 4407 prior to continuing on with the start up.

- ♦ Torus Cooling has been placed in service to support the STP
- ♦ The Start up Feed Reg valve was sticking and not controlling RPV level very well. It was determined that the Start up Feed Reg valve be isolated and level be controlled on the "B" feed Reg Valve.
  - Right after shift turnover 2 I & C Techs are going to go out and look at the operator of the valve and try to determine what the problem is.

⇒ Comments, evolutions, problems, core damage frequency, etc.

- ♦ RHR has been placed in Torus cooling per OI 149 section 5.4. This procedure is currently waiting at step 13.
- ♦ The Mechanical Vacuum Pump has been started IAW OI 691 section 3.2.
- ♦ Vessel drain to the main condenser via RWCU is established via OI 261, Section 7.1. You are currently on step 6 of this section.
- ♦ HPCI and RCIC have been placed in stand by readiness IAW their respective procedures.
- ♦ Air purge of the containment is in progress IAW OI 573 section 5.2. You are currently waiting to perform step 13.
- ♦ OI 693.3, Turbine Lube Oil, section 3.2 is complete. Waiting to roll the turbine.
- ♦ I & C has asked that the "A" IRM be bypassed for a short time. They are working near the "A" IRM Preamp and do not want to generate any half scrams. The work should take about 45 minutes, and then the "A" IRM can be unbypassed.
- ♦ The WCC is fully staffed with 2 extra NSPEOs.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	• Provide Shift Turnovers to the **SRO** and **RO**s.	• Get familiar with plant conditions. **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover. (SRO 1.01)
Pull control rods to achieve 1 bypass valve full open and the second to 15% **EVENT #1**	NOTE that this brief may be preformed prior to the scenario starting.	**SRO** will perform a Control Rod pull brief IAW IPOI 2. He will discuss the following topics: (1.01) • The Operations Shift Manager/Supervisor and Control Room Operator shall review the rod group and their insert/withdraw limit. • The Operations Shift Manager/Supervisor shall conduct a pre-rod movement briefing, which should include discussion about. • Operations Shift Manager/Supervisor's responsibility and authority with respect to control of the reactor core and reactivity changes. • Purpose of the rod movement. • Monitoring thermal limits. • Status of the Rod Worth Minimizer. • Attention to detail. • Causes of previous rod mispositioning events. • Operator alertness. • Expected alarms and proper responses. • Approval of changes to evolutions, if needed. • Communications from Reactor Engineers regarding the reactor core shall not explicitly direct Operations actions. Operator actions shall be directed by Operations Shift Manager/Supervisor. **RO** will pull control rods to achieve one bypass valve 100% open and th second bypass valve 15% open to establish the conditions for the cycling of PSV 4407. (72.07)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
"C" IRM failing upscale. **EVENT #2**	**BOOTH INSTRUCTOR** after the RO has pulled a round of control rods, perform the following: **IMF NM04C by setting event trigger 1 to true.** This will result in the "C" IRM failing up scale. This will cause a rod out block and half scram	**ATC operator** will respond to annunciator 1C05A C-3, IRM UPSCALE, and perform the following: • Announce the alarm to the SRO. • Determine that "C" IRM has failed upscale (Step 3.4). • Inform the CRS to comply with TS (Step 3.4.a). • Ask for permission to unbypass the "A" IRM and to bypass the "C" IRM. (3.4.b **(critical for the event)** (79.01) **SRO** will: • Call I & C and inform them that you must unbypass the "A" IRM • Grant permission to bypass the "C" IRM. • Consult TS to determine if there are any TS considerations. o He will determine that that until the "A" IRM is unbypassed they are not in compliance with TS 3.3.1.1 Condition A. o The condition of "A' is already met as the half scram is in. o When "A" is unbypassed and "C" is bypassed, TS 3.3.1.1 can be exited. o A total of 4 IRMs are required for the TRM rod block. This is met the entire time. (1.02) **ATC operator** will respond to annunciator 1C05A A-2, "A" RPS AUTO SCRAM, and perform the following; • Determine that the cause of the scram has been corrected by bypassing the IRM (step 3.4 and 3.9) • Reset the half scram (step 3.10 **(critical for the event).** **Crew** will write a work request card and submit it to the Work Control Center.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Rod pull to achieve the conditions for the STP continued **EVENT #1 Continued**		**SRO** will direct that the rod pull to achieve one bypass valve full open and the second one 15% open continue. **ATC operator** will continue to pull control rods to achieve one bypass valve full open and the second one 15% open • The ROs will in form the CRS when the conditions of the STP are met

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Performance of STP 3.4.3-03. **EVENT #3**	NOTE that this brief may be preformed prior to the scenario starting.	**SRO** will perform an evolution brief with the crew to perform STP 3.4.3-03. The brief should contain the following major topics: (1.02) • Equipment to be tested • Description • Sequence of events • Expected Trends or Results • Acceptance or Success Criteria • STAR techniques • Participants • Communication methods • Worker experience • Need for exercising caution and conservatism • Anticipated health hazards • 10 human performance traps • ALARA • TS • Criteria and method of stopping the evolution • DAEC lessons learned • Industry events. **ATC operator** will perform the step of Section 7.1 for STP 3.4.3-03. (1.07) When the STP section is complete, he will inform the CRS.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Lock up of the "B" Feed Reg Valve, **EVENT #4**	**Booth Instructor** When the SRV has been cycled: The BOP operator is waiting for the Tail Pipe high temp/pressure alarm to clear And RPV level has about returned to the middle of the green band, or at the direction of the lead evaluator, perform the following: **IOR FWHSS1621 by setting event trigger 2 to true.** This will lock up the "B" Feed Reg Valve. As soon as the lock up occurs, **DOR FWHSSS1621** This will allow the crew to reset the lockout. **Booth Instructor** shortly after the removal of the lock up, call the control room and state the following: You're one of the I & C Techs, (Scott West). You were working on the Start up feed reg valve. You wanted to isolate the air to the Start up feed reg valve and you realized that you closed the air to the wrong feed reg valve. You have restored the air feed reg valve. Also tell them that you are going to gather up the facts for the upcoming fact finding meeting for the event.	**ATC operator** will respond to annunciator 1C05A F-1 and perform the following: • Announce the alarm to the SRO. • Determine that level is relatively stable and the reactor need not be scrammed. NOT scramming is **(critical for the event)** o If level is rising, they may decide to throttle the block valve to stop the rise. o If level is going down, they may augment level control by opening the "A" feed reg valve. • Determine that the lock up is due to something local and send an operator. **Crew** • Will receive the phone call from the I & C Tech and determine that the feed reg valve can be reset. **SRO** Based on the information from the I & C Tech, will direct that he B feed reg valve lock up be reset. (1.21)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Lock up of the "B" Feed Reg Valve, **EVENT #4 continued**	**Booth Instructor** if asked as the Aux man, to verify that the B feed reg valve looks ok report the following: You have looked at the valve and talked with the I & C Techs. You are confident that what they did is reset and there is no other reason for a lock out at the feed reg valve that you can see.	**ATC operator** will reset the B feed reg valve as follows: • Place the controller in manual **(critical for the event)** • Select the Y on the display • Adjust the Y bias to zero • Obtain the current valve position for the B feed reg valve. • Using attachment 2 determine the appropriate M/A station controller output signal V. • On HC 1621, adjust V to the value obtained form attachment 2 **(critical for the event)** • Reset the lockout relay **(critical for the event)** • Transfer CV1621 back to auto IAW OI 644 section 3.7 (45.21)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Inop EDG **EVENT #5**	**Booth Instructor** shortly after the feed reg valve is restored to operation, or at the direction of the Lead evaluator, perform the following: **IMF AN 1C08B(26) by setting event trigger 3 to true.** This will give the “B” EDG trouble alarm. **Booth instructor** when sent to the B EDG room to investigate, wait about 2 minutes and report the following: • There are 2 abnormal alarms, o 1C94 A-3, Jacket Coolant Level Low, and o 1C94 A-4, Jacket Coolant Temperature High or Low • On your initial first glance your didn’t see any coolant on the floor, • the expansion tank is empty, • and the jacket coolant temperature is 195 degrees and going up slowly.	**RO** will respond to annunciator 1C08B C-3, “B” EDG trouble alarm and perform the following: • Announce the alarm to the SRO. • Send an operator to the B EDG room to investigate. **RO,** with the SROs concurrence, will respond to ARP 1C94 A-4 and perform the following: • Determine that there is no LOOP or LOCA emergency occurring. • With the report that the jacket cooling temperature is above 195. • Unload the SBDG. (19.06) **(Critical for segment)** • Trip the SBDG and notify the CRS. (19.06) **(Critical for segment)**

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Inop EDG **Event #5**		**SRO** will determine the following: • With the jacket cooling problem and the EDG in PTL. • The EDG must be declared inoperable. • TS section 3.8.1 Condition B must be entered and the following steps taken o Perform SR 3.8.1.1 for operable offsite circuits. o Within 4 hours declare required features supported by the inoperable EDG inoperable when the redundant required features are inoperable o Determine that the fault is not a common cause failure. o Perform SR 3.8.1.2 for the operable EDG once per 72 hours, o Restore the inoperable EDG to operable with in 7 days (1.02)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
SRV 4407 fails open **EVENT #6**	**Booth Instructor** when the "B" EDG is secured and/or at the direction of the lead evaluator, perform the following: **IMF AD01H by setting event trigger 6 to true** This will result in PSV 4407 failing full open. **Booth Instructor;** **Immediately AFTER the scram**, perform the following: **DMF ADO1H**	**BOP operator** will respond to annunciator 1C03A C-5 by performing the following: • Announce the alarm to the SRO. • Inform the SRO that AOP 683 must be entered. **SRO** will enter AOP 683. Per AOP 683, between the **SRO** and **BOP operator,** they will determine the following: (6.51) • Determine that he SRV is open per the checks of the AOP • Determine that power is less than 75%. **BOP operator** will • Cycle the affected Safety Relief Valve's handswitch. **(critical for the event)** • Determine that the SRV has closed based on the Amber light above the handswitch going out. • Report to the SRO that SRV 4407 has NOT closed. **(critical for the event)** (94.51) **SRO** will • Per the AOP, based on the SRV not closing, the CRS will direct that the reactor be scrammed

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Feedwater line break in the Primary containment **EVENT #7**	**Booth Instructor** IMMEDIATELY after the scram or at the direction of the Lead evaluator, perform the following: **IMF FW17A at 50 over 600** **and** **FW20A at 50 over 600 by setting event trigger 4 to true.** This will start a leak from the feedwater system and the reactor into the primary containment	**Crew** will respond to any of the following: • An increase of feedwater flow. • DW pressure rising as indicated by either of the following: o Pressure indicators on 1C03 or 1C09 o Annunciator 1C05B B-1 clearing **SRO** will direct and the **Crew** will perform: • Before the DW reaches 2 psig, will direct a manual scram. • Direct the actions of IPOI 5 be completed (93.22) **SRO** when the DW reaches 2 psig the SRO will direct and the crew will perform the following: • Enter EOP 1 o Verify all rods fully inserted. o RC/L ▪ Maintain RPV level 170 to 211” with available inject sources. (95.44, SRO 6.44) o RC/P ▪ Override CV 4371A, (Defeat 11) (95.21, SRO 6.21) ▪ Stabilize RPV pressure below 1055 psig

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Feedwater line break in the Primary containment **EVENT #7 Continued**	**Booth Instructor** verify the following when the DW reaches 2 psig: Event trigger 5 comes true. This will result in the following: • Lock out of 1A3, due to the starting current of the A CS pump. • HPCI trip	• Enter EOP 2 o PC/H ▪ Install defeat 16 to restore sampling. (95.26, SRO 6.26) o T/L ▪ Maintain torus level between 10.1 and 13.5 feet. (95.59, SRO 6.59) o T/T ▪ Maintain below 95°F by starting torus cooling if necessary. o DW/T ▪ Attempt to maintain below 150°F. ▪ As temperatures rise install defeat 4. (95.14, SRO 6.14) • Note that if Defeat 4 maintains the D/W air temperature below the spray limits, this will fulfill the **critical task**. ▪ When out of the hatched region of Graph 7, Drywell Spray Initiation Limit, spray the D/W. (**Critical)** (95.63, & 6.63) o PC/P ▪ When torus pressure rises above 2 psig, Spray the Torus. (95.64, SRO 6.64) **Crew** will identify the following as the scenario continues: • Essential Bus 1A 3 will lock out. o This will result in a loss of A CS and A and C RHR pumps. • HPCI will trip shortly after initiation and will not be able to be reset • The B CS pump will trip on its start signal. • Torus Water level rising.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Manual operation of the RHR Inject Valve. **EVENT # 8**		**BOP** operator will determine that the RHR inject valve did not open on the RHR initiation signal. • Will open the MO using it's handswitch and regain injection into the RPV. **(Critical)** • Will control injection to maintain the directed level band.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Feedwater line break in the Primary containment **EVENT #7 Continued**	**Booth Instructor,** when the DW has been sprayed, or cooled by defeat 4, and RPV level is being maintained by RHR, with the concurrence of the Lead Evaluator, the scenario can be terminated Freeze the simulator and announce: **The Scenario is complete.**	**SRO** will direct the following from EOP 1: • Attempt to restore and maintain level with systems form TABLE 1A o RCIC will be initiated to inject o Condensate will be used to inject. o Both CRD pumps will be started o SBLC will be started **Crew** will diagnose either of the following: • One of the sources of the leak in the DW is from Feedwater, **OR** • As torus level goes up, injection will have to be from some source that takes a suction on the torus. • Also determine that if torus level rises to 13.5' that DW sprays must be removed form service. **IF torus level rises to 13.5',** securing Drywell Sprays is **critical.** **SRO** will direct and the **crew** will perform the following: • Condensate be secured from injection. • RHR be lined up to inject and maintain RPV water level and Condensate must be secured to protect the Torus. **Maintaining RPV level with RHR is critical for this scenario**

***** END OF SCENARIO *****

*** REVIEW SCENARIO OBJECTIVES WITH THE OPERATORS ***

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Pull control rods to achieve 1 bypass valve full open and the second to 15% **EVENT #1 (R-RO)**	**SRO** reviews the rod group and their insert/withdrawal limits. • Conduct a Pre-Rod-Movement Brief o Announce that the crew brief is starting. o Conduct the rod brief IAW IPOI 2. o Solicit additional comments form each crewmember. o Announce that the brief is complete. **RO** • Withdraw control rods to achieve one bypass valve full open and the second 15% open.	IPOI 2 Rev.80 P&L #6 IPOI 2 Step 4.2 (20 c) for STP preparation	Rod pull brief conducted IAW IPOI 2 P&L #6 or equivalent procedure reference. Sat_____ Unsat_____ Conduct Rod Withdrawal performed IAW IPOI 2 Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
"C" IRM failing upscale. **EVENT #2 (C-RO)**	**ATC operator** will respond to annunciator 1C05A C-3, IRM UPSCALE, and perform the following: • Ask for permission to unbypass the "A" IRM and bypass the "C" IRM. **(Critical for the event)** **SRO** grants permission to unbypass "A" and to bypass the "C" IRM. • Determines that until the A IRM is unbypassed, they are in TS 3.3.1.1 Condition A for less than 2 operable IRM channels. They have 12 hours to trip the RPS channel, which is already met. **ATC operator** will respond to annunciator 1C05A A-2, "A" RPS AUTO SCRAM, and perform the following; • Reset the half scram **(critical for the event)**	ARP 1C05A C-3 Rev. 6 Step 3.4b ARP 1C05A A-2 Rev. 9 Step 10	Bypassing the "C" IRM IAW ARP 1C05A C-3 Sat_____ Unsat_____ SRO determines the TS for less than 2 IRMs is an entry into 3.3.1.1 Condition A Sat_____ Unsat_____ Reset the half scram IAW ARP 1C05A A-2 Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Performance of STP 3.4.3-03. **EVENT #3 (N-BOP)**	**SRO** will perform a pre-evolution brief for the performance of STP 3.4.3-03 **ATC operator** will perform the step of Section 7.1 for STP 3.4.3-03. • Place LLS PSV handswitch to OPEN. **(critical for the event)**	STP 3.4.3-03 Rev. 5 Step 7.1.4.b	Performance of STP 3.4.3-03, Step 7.1.4.b Sat_____ Unsat_____
	• At 1C03, Place LLS PSV handswitch to AUTO. **(critical for the event)**	Step 7.1.6	Performance of STP 3.4.3-03, Step 7.1.6 Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Lock up of the “B” Feed Reg Valve, **EVENT #4 (C-RO**	**SRO** Based on the information from the I & C Tech, will direct that the B feed reg valve lock up be reset. **ATC operator** will reset the B feed reg valve as follows: • Place the controller in manual **(critical for the event)** • On HC 1621, adjust V to the value obtained form attachment 2 **(critical for the event)** • Reset the lockout relay **(critical for the event)**	ARP 1C05A F-1 Rev.9 Step 4.2.a.1 Step 4.2.d.2 Step 4.2.e	ARP 1C05A F-1 step 4.2a.1 place the controller in manual Sat_____ Unsat_____ ARP 1C05A F-1 step 4.2d.2 adjust to the value of attachment 2 Sat_____ Unsat_____ ARP 1C05A F-1 step 4.2e reset the lock out relay Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Inop EDG **EVENT #5 (C-BOP)**	**RO** will respond to ARP 1C94 A-4 Jacket Coolant Temperature High or Low and perform the following: • He will unload the EDG. **(Critical)** • He will trip the EDG. (**Critical**) **SRO** will determine the following: • The EDG must be declared inoperable and TS section 3.8.1 Condition B must be entered and the following steps taken o Perform SR 3.8.1.1 for operable offsite circuits. o Within 4 hours declare required features supported by the inoperable EDG inoperable when the redundant required features are inoperable o Determine that the fault is not a common cause failure. o Perform SR 3.8.1.2 for the operable EDG once per 72 hours, o Restore the inoperable EDG to operable with in 7 days	ARP 1C94 A-4 Rev.9 Step 3.2 TS Section 3.8.1	Unloading the EDG IAW ARP 1C94 A-4 step 3.2 Sat_____ Unsat_____ Tripping the EDG IAW ARP 1C94 A-4 step 3.2 Sat_____ Unsat_____ SRO TS call for an inoperable EDG. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
SRV 4407 fails open **EVENT #6 (C-BOP)**	Per AOP 683, between the **SRO** and **BOP operator,** that the SRV is OPEN and perform the following: **BOP operator** will; • Cycle the affected Safety Relief Valve's handswitch. **(critical for the event)** • Report to the SRO that SRV 4407 has not closed. **(critical for the event)**	AOP 683 Rev. 2 Open Safety/Relief Safety Valve Step 3.b Step 3.c	Per AOP 683 the Open Safety/Relief Safety Valve section, cycle the affected SRVs HS per step 3.b. Sat_____ Unsat_____ Per AOP 683 the Open Safety/Relief Safety Valve section, verify the valve is closed step 3.c. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Feedwater line break in the Primary containment **EVENT #7 (M-ALL)**	**SRO** when the DW reaches 2 psig the SRO will perform the following: • Enter EOP 1 o To **maintain RPV water level** and protect the Torus, Condensate will be secured and RHR will be lined up to inject and maintain RPV water level. (**Critical**) • Enter EOP 2 o When out of the hatched region of Graph 7, Drywell Spray Initiation Limit, spray the D/W. (**Critical**) • Note that if EOP Defeat 4 is placed early, it may keep the drywell from exceeding 280 degrees. This means that the crew may not spray the D/W. This would mean that placing Defeat 4 would be Critical for maintaining the DW. o (If Necessary) Determining that if torus level rises to 13.5' that DW sprays must be removed form service. This will severely threaten the containment. **Securing drywell Sprays is critical for this step.**	EOP 1 Rev. 11 Step RC/L-1 EOP 2 Rev.12 DW/T-5 T/L-10	Per EOP 1 maintain RPV water level with RHR, step RC/L-1. Sat_____ Unsat_____ Per EOP 2 when conditions are appropriate, spray the D/W, step DW/T-5. Sat_____ Unsat_____ Per EOP 2 maintain the torus level below 13.5 feet, step T/L-10. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
RHR inject valve **EVENT # 9 (C-BOP)**	Panel awareness; While performing actions via the EOPs, determines that the RHR Inboard Inject Valve Did NOT automatically open and OPENs the valve. **(Critical)**		Per EOP 1 RPV level control, step RC/L-1. Manually open the RHR Inboard Inject Valve. Sat_____ Unsat_____

SEG/ESG Validation Checklist

SEG/ESG ____ESG_17_____ Rev. _____0_____

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

SEG/ESG Validation Checklist

SEG/ESG ____ESG_17_____ Rev. _____0_____

Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

SME/Instructor	Date
SME/Instructor	Date

SEG/ESG Validation Checklist

SEG/ESG ____ESG_17_____ **Rev. _____0_____**

Crew:		Instructors:	
OSM		Booth	
CRS		Floor	
STA		Extra	
1C05			
1C03			
BOP			

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

SEG/ESG Validation Checklist

SEG/ESG ____ESG_17_____ Rev. _____0_____

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

NMC Committed to Nuclear Excellence	EVALUATION SCENARIO GUIDE (ESG)

SITE: **DAEC**

TURBINE STOP VALVE TEST, POWER ASSENTION WITH RECIRC, "B" RECIRC SPEED CONTROLLER RUN AWAY, SPURIOUS GROUP 2 ISOLATION [INCOMPLETE], RUNNING RWS PUMP TRIP, TURBINE LUBE OIL LEAK, AOP 683, GEMAC LEVEL TRANSMITTER FAIL UP SCALE, ELECTRICAL ATWS, POWER LEVEL CONTROL

ESG 18 **REV. 0**

PROGRAM: **OPERATIONS** **#:**

COURSE: **ILC** **#:** **50007**

TOTAL TIME: **90 MINUTES**

Developed by: _____

Instructor *Date*

Validated by: _____

SME/Instructor *Date*

Reviewed by: _____

Operations Manager *Date*

Approved by: _____

Training Supervisor-Operations *Date*

ESG 18, ILC NRC Exam, Rev. 0

GUIDE REQUIREMENTS

Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	NS930002, Rev. 3 IPOI 3 Rev. 66 AOP 255.2, Rev. 24 1C05B B-8, Rev. 7 1C06A B-2, Rev. 5 AOP 410, Rev. 15 ARP 1C07A A-7, Rev. 5 AOP 683, Rev. 4 RIP 101.2, Rev. 3 ATWS, Rev 12 EOP 1, Rev.11 Technical Specifications EPIP
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None

ESG 18, ILC NRC Exam, Rev. 0

SCENARIO SUMMARY:

Current plant operating status:

- Starting at 0200 power has been lowered to 1500 MWTh to perform NS-930002, Turbine Stop Valve and Combined Intermediate Valve Test.
- The "A" CS pump is tagged out for replacement of the lower bearing. TS 3.5.1 Condition B has been entered, and are currently in day 3 of 7 of the LCO. Work is expected to be complete in 2 days.
- Last shift the I & C Techs finished work on the LT-4559, which feeds into the feedwater level control circuit and the "A" GEMAC level indicator. The I & C Techs and System Engineer would like to maintain level control in "A" over night to observe it's response

Scenario segments:

EVENT #1 (N-BOP)

- NS-930002, Main turbine Stop and Combined Intermediate Valve Test is due. The BOP will run and complete the NS.

EVENT #2 (R-RO)

- When the NS is complete, the ATC operator will raise power with recirc.

EVENT #3 (C-RO)

- As power is raised, the speed controller of the "B" Recirc M-G will fail. It will begin ramping up with no operator action. The ATC operator will take actions to lock up the Recirc M-G set speed controller.
- The SRO will assess the Recirc Pump speed mis-match and determine if it is still in compliance with TS Section 3.4.1 Condition C.
- Crew will also enter AOP 255.1 for an abnormal power change

EVENT #4 (C-BOP)

- A spurious Group #2 isolation will occur. While performing the Group 2 ARP, the BOP will determine that a valve did not isolate as expected. He will take action to isolate the malfunctioning valve.
- The SRO will assess TS and determine that they meet the conditions of 3.6.1.3 Condition A.

EVENT #5 (C-BOP)

- The running RWS pump will trip. The BOP operator will respond to the appropriate annunciator and start another RWS pump. The crew may momentarily enter AOP 410 Loss of River Water Supply.

EVENT #6 (C-BOP)

- A slow turbine lube oil leak will develop resulting in a lowering of the main turbine lube oil pressure.
- When the turbine lube oil low-pressure alarm sounds, the BOP will determine that some automatic pump starts did not occur. He will start these pumps that did not automatically start. Turbine lube oil pressure will momentarily respond to the additional pump starts

EVENT #7 (I-RO)

- The "A" GEMAC level transmitter will slowly fail up scale. This will result in actual level lowering, the ATC operator will have to diagnose this and select B for level control.
- The SRO will also check TRM section 3.3.1 for narrow range level indication.

EVENT #8 (M-ALL)

- . The turbine lube oil leak will continue to get bigger. The crew will enter AOP 693, Main Turbine/EHC Failures. This will result in the crew inserting a manual scram.
- On the manual scram the crew will determine that the plant is in an Electrical ATWS.
- With the electrical ATWS, the crew will momentarily forgo the remaining actions of AOP 693 and attempt to place the plant in a safe condition IAW the ATWS EOP
- Based on plant conditions, the crew will enter the Power Level Control Contingency of the ATWS EOP.
- When all of the rods are fully inserted, the crew will continue with the actions of AOP 683 to stop the rolling of the Main Turbine

EVENT #9 (C-BOP)

- The crew will perform the Electrical ATWS RIPs and find that pulling of the RPS fuses will result in all of the control rods inserting.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ RO (NSOE, ANSOE)

- ♦ 1.04 Respond to annunciators
- ♦ 1.05 Perform GEMAC Control Functions
- ♦ 1.07 Perform Surveillance Test Procedures
- ♦ 6.02 Perform manual startup/initiation (SBLC)
- ♦ 8.11 Manually delay or interrupt ADS auto initiation
- ♦ 93.11 Raise power by 10% with Recirc flow when above 35% power.
- ♦ 93.22 Perform immediate operator responses to a reactor scram.
- ♦ 94.03 Respond to power/reactivity abnormal change condition
- ♦ 94.49 Respond to main Turbine and EHC failures
- ♦ 95.03 Perform reactor scram using the RPS Trip Test switches
- ♦ 95.04 Perform reactor scram using the RPS Fuse removal
- ♦ 95.08 Insert control rods by increasing CRD cooling flow and pressure
- ♦ 95.09 Insert control rods by manually driving control rods
- ♦ 95.21 Perform EOP Defeat 11
- ♦ 95.25 Perform EOP Defeat 15
- ♦ 95.45 Perform initial EOP 1 actions (RC)
- ♦ 95.50 Perform /L to control RPV level during an ATWS
- ♦ 95.51 Perform Power/Level control
- ♦ 95.56 Perform /P to control RPV pressure during an ATWS
- ♦ 95.57 Perform /Q to reduce reactor power or scram the reactor
- ♦ 99.04 Respond to a “B” RWS Pump 1P117B trip

⇒ Shift Supervisor (SS)

- ♦ 1.01 Direct routine crew and control room activities.
  - • 1.01.02 Coordinate operator activities.
  - • 1.01.03 Ensure control room activities conform to ACP 1410.1, Conduct of Operations.

- ♦ 1.02 Determine operability of Tech Spec required components.
  - 1.02.02 Determine if the instrument, component, or system is operable.
  - 1.02.03 Declare the instrument, component, or system is inoperable, enter the correct LCO, and determine and direct performance of the LCO STP.
- ♦ 1.21 Direct crew response to too normal events/accidents
  - 1.12.01 Evaluate the event or accident to determine its cause and develop mitigation strategies.
  - 1.12.02 Recognize and prioritize data relevant to the accident or event.
  - 1.12.03 Direct appropriate conservative actions to mitigate the accident or event and stabilize plant parameters.
  - 1.12.06 Analyze results and direct alternate mitigation actions
- ♦ 1.22 Determine operability for TRM Components
- ♦ 3.01 Implement the Emergency Plan
  - 3.01.01 Declare the appropriate EAL
- ♦ 4.21 Direct crew actions to perform the immediate operator responses to a reactor scram
- ♦ 5.03 Direct crew response to power/reactivity abnormal change condition
  - 5.03.02 Direct immediate operator actins to prevent exceeding any plant/reactor limits.
  - 5.03.04 Direct operator actions to control the malfunctioning system or component.
  - 5.03.05 Confirm the rod pattern, thermal limits and reactor power are within the allowed range
- ♦ 5.49 Direct crew response to a Main Turbine /EHC failures
  - 5.49.01 Direct crew response to perform the Immediate and follow-up actions of Turbine Lube Oil Trouble tab of AOP 693.
- ♦ 6.04 Direct crew response to perform reactor scram by RPS fuse removal
  - 6.04.01 Direct operator actions to insert control rods using RIP 101.2
- ♦ 6.08 Direct crew response to insert control rods by increasing CRD cooling flow and pressure.
  - 6.08.01 Direct operator actions to perform RIP 103.2
- ♦ 6.09 Direct crew response to insert control rods by manually driving control rods
  - 6.09.01 Direct operator actions to insert control rods using RIP 103.3.
- ♦ 6.21 Direct Crew response to perform EOP Defeat 11.
  - 6.21.01 Direct operator actions to perform EOP Defeat 11

- 6.25 Direct Crew response to perform EOP Defeat 15.
  - 6.25.01 Direct operator actions to perform EOP Defeat 15.
- 6.45 Direct Crew response for performance of initial EOP 1 actions (RC)
  - 6.45.04 Direct operator actions to initiate any of the following which should have initiate but did not , isolations, ECCCS initiations, SBDG initiation
  - 6.45.05 Exit EOP 1 and enter ATWS
- 6.50 Direct crew response to perform /L to control level during an ATWS
- 6.51 Direct crew response to perform Power/Level control
  - 6.51.01 Direct operator actions to terminate and prevent injection into the RPV from: Condensate/Feedwater, HPCI, RHR, and Alternate ATWS Injection systems (Table 2B).
  - 6.51.03 Direct operator actions to continue to lower RPV level until reactor power drops below 5% or RPV level reaches +15", or all SRVs remain closed and drywell pressure remains below 2.0 psig
- 6.56 Direct crew response to perform /Q to reduce reactor power or scram the reactor during an ATWS
- 6.57 Direct crew response to perform /P to control RPV pressure during an ATWS

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP:

1.1 General Instructions

a. Reset to IC 20, then perform the following:

(1) Run the recirc controllers down to about 28 on the milli amp readings. Allow to settle out and see if the MWTh are below 1500. This is the starting point for the turbine valve testing NS.

b. Set event trigger 11 to **zdituhs3150(4) .gt. 1**.

c. Type in malfunctions that are listed in the below **MALFUNCTION** Table.

d. Type in overrides that are listed in the below **OVERRIDE** Table

e. Call up the **REMOTE** functions from the drivers station as they are directed from the body of the ESG.

f. Have a copy of NS 930002 Turbine Stop Valve and Combined Intermediate Valve Test available for the crew. **Nothing** has to be marked up in the NS prior to handing to the crew to perform.

g. Need **SFDP paperwork** for the "A" CS system being tagged out for the replacement of the lower motor bearing. The LCO is currently in day 3 of 7

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
11	Zdituhs3150(4) .gt. 1	TGOP HS in Start activates event trigger **RED**. This means that it is ok to Delete malfunction1C07A[7] and override AOTUPU-3106
Event triggers 1-4, 6-10 will be called out in the body of the scenario.		

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
T=0	RP05A	Auto scram failure					
	RP05B	Manual scram failure					
	RP05C	ARI failure					
	RP05E	Individual scram test switches					
As dir	RR17B	B recirc speed controller run away		350	1	As is	100
As dir	MS21B	Spurious group 2 isolation			2		
T=0	MS22F	Failure of CV 3729 to isolate					
As dir	RR20A	A GEMAC failing upscale		800	3	As is	100
As dir	SW19C	C RWS pump trip			4		
As dir	AN1C07A [7]	Annunciator for low turbine lube oil pressure	195		10	As is	ON
As dir	TU04	Turbine Lube oil leak		200	6	As is	80
As dir	RD11A	Trip of the A CRD pump			7		
As dir	RD11B	Trip of the B CRD pump			8		
As dir	Rd13	Vent of the SAH		100	9	As is	100
T=0	CS01	A CS Pump Trip					

1.4 OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
As dir	AO TUPI-3106	Turbine lube oil pressure		200	10	As is	.15
T=0	SW HS 1P117A	“A” RWS pump				As is	Auto
T=0	LO CSHS-2103(1)	1P-211A White light				As is	Off
T=0	LO CSHS-2103(2)	1P-211A Green light				As is	Off
T=0	LO CSHS-2103(3)	1P-211A Amber light				As is	Off
T=0	LO CSHS-2103(4)	1P-211A Red light				As is	Off

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
T=0	DI CSHS-2103	1P-211A Handswitch				As is	Stop

1.5 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	Delay	Ramp	ET	Initial Value	Final Value
As dir	MC01	Condenser vacuum breakers					OPEN
As dir	MC02	Condenser vacuum breakers					OPEN

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

2 Conduct pre-scenario activities in accordance with the following procedures:

3.1 If this scenario is used in training mode: OTI 101

4 TURNOVER INFORMATION

⇒ Day of week and shift

- ♦ Wednesday
- ♦ Day shift

⇒ Weather conditions

- ♦ Warm
- ♦ Dry

⇒ (Plant power levels) Pwr 75%

- ♦ MWT 1447
- ♦ MWE 474
- ♦ CORE FLOW 30.00

⇒ Thermal Limit Problems/Power Evolutions

- ♦ Beginning at 0200,power was lowered to approximately 1500 MWTh to perform NS 93002, Turbine Stop Valve and Combined Intermediate Valve Test.
- ♦ After the test, power may be returned to 80% with recirc at 3 to 5 MWE per minute. The RE's want to hold power here for a few hours to monitor thermal limits.

⇒ Plant Risk Status

- ♦ CDF 9.158E-6
- ♦ Color Green

⇒ Existing LCOs, date of next surveillance

- ♦ Day 3 of 7 for the "A" CS system. "A" CS pump is tagged for the replacement of the lower motor bearing. The work is expected to be complete in 2 days.

⇒ STPs in progress or major maintenance

- ♦ NS 930002, Turbine Stop Valve and Combined Intermediate Valve Test, needs to be run this shift.

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- ♦ Our shift, the I & C Techs worked on Level Transmitter LT-4559. This feeds into the feedwater level control circuit, and the "A" GEMAC. "A" level control has been selected, and the I & C Techs would like to maintain level control in "A" for the next 24 hours to observe its response.

⇒ Comments, evolutions, problems, core damage frequency, etc.

- ♦ The WCC is staffed with 1 extra NSPEO.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	• Provide Shift Turnovers to the **SRO** and **RO**s.	• Get familiar with plant conditions. **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover. (SRO 1.01)
NS 93002 Turbine Stop Valve and Combined Intermediate Valve Test. **EVENT #1**		**SRO** will perform a pre-job brief for the performance of NS 930002, Turbine Stop Valve and Combined Intermediate Valve Test. The brief will contain the following major topics. (1.02) • Equipment to be tested • Description • Sequence of events • Expected Trends or Results • Acceptance or Success Criteria • STAR techniques • Participants • Communication methods • Worker experience • Need for exercising caution and conservatism • Anticipated health hazards • 10 human performance traps • ALARA • TS • Criteria and method of stopping the evolution • DAEC lessons learned • Industry events. **BOP operator** will perform NS 930002, Turbine Stop Valve and Combined Intermediate Valve Test. When he is finished he will inform the SRO. (1.07)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Power ascension with recirc. **EVENT #2**		**SRO** When NS 930002 is complete, • Hold a short brief outlining the power change. At a minimum, the brief will discuss the following: (1.01) o Increasing reactor power after short-term power reductions causes local xenon concentrations to decrease. This causes MFLCPR, MFLPD, and MAPRAT to increase more rapidly than during power increases with steady or increasing xenon concentration o Per the REs, raise power at 3 to 5 MWE/min from the current power to 80%, then hold for an hour to monitor the thermal limits. o From IPOI 3 section 3.0, Power Change Guidelines: ▪ When changing power above 1500 MWth (≈78%), send an operator to monitor and maintain LP Heater 1E-5A and B Drain Discharge Flow below 16.4" wg to prevent flow induced vibration in the heater tube bundles. ▪ Monitor core total power as indicated by the APRM, Steam Flow, and Feedwater Flow recorders on Panel 1C05 o Use human performance prevention tools like, Peer checking, STAR **ATC operator** will begin raising power with recirc by manually adjusting the Recirc Flow Controllers. At a minimum, he will monitor the following: • Reactor Recirc parameters: • APRMs • Feed flow/steam flow. (93.11)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
"B" Recirc speed controller run away. **EVENT #3**	**Booth Instructor,** after a measurable power rise, and at the direction of the Lead Evaluator begin the recirc flow controller run away by performing the following" **IMF RR17B to 100 over 350 sec by setting event trigger 1 to true** This will cause the "B" recirc M-G speed controller to run away. **Booth Instructor** respond a plant personnel and respond as necessary: As the I & C shop, respond that you will look at the MOORE controller logic for speed control and get back to them soon. As the WCC, report that you will call in a licensed operator to take manual control of the locked up recirc scoop tube and manually control it as the crew request, but it will be about an hour. As the ERT, go along with what the crew wants to do, and tell them that they will take over the repairs of the "B" speed control problem	**ATC operator** will determine that power is going up by itself, and determine that the "B" recirc M-G speed controller is ramping up by itself. He will take the following actions to stop the run away: • Lock the scoop tube of the "B" recirc M-G speed controller. [**Critical**] • Enter AOP 255.2, Power/Reactivity Abnormal Change. (94.03) **SRO** will direct and the **ROs** will perform the following actions per AOP 255.2: (94.03, & SRO 5.03) • Take any necessary steps to bring the reactor power/reactivity transient under control, including, but not limited to: o The Scoop Tube Lockup stopped the event • Monitor for undamped oscillations. • Verify thermal limits on the Official 3D Case. • Plot the current position on the power to flow map. **SRO** will determine if the recirc pump speed mis-match will put them out of compliance with the LPCI Loop Select limits. • TS SR 3.4.1.1 states that the Speed of the faster pump shall be ≤ 122% of the speed of the slower pump when operating at ≥ 69.4% RTP. • Based on the calculation, the SRO will determine if he is in compliance with TS 3.4.1 Condition C. o If he is not in compliance, then he has 2 hours to restore the mis-match within limits, or Trip one of the recirc pumps 1.02 **SRO** will activate the Event Response Team to help mitigate the event. (1.01)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Spurious Group 2 isolation with a failure of a valve to isolate. **EVENT#4**	**Booth Instructor** when the recirc scoop tube is locked, and official case is run, and the TS has been addressed, or at the direction of the Lead Evaluator, perform the following: **IMF MS21B by setting event trigger 2 to true.** This will result in a spurious group 2 isolation. From another malfunction, CV 3729 will not close	**Crew** will respond to Annunciator 1C05B B-8, PCIS GROUP "2" ISOLATION INITIATED. • Will determine that the group 2 is spurious. • The ARP should be handed off from the ATC operator to the BOP operator. **BOP operator** will perform the following IAW ARP 1C05B B-8: (1.04) • Check the amber lights on the PCIS status board on Panel 1C04 to determine if a half or a full Group 2 Isolation has occurred. • If only half Group 2 Isolation has occurred and any Group 2 Isolation setpoint has been reached or exceeded with a failure to isolate, manually close the Group 2 valves from Section 2.0 AUTOMATIC ACTIONS. o Will determine that CV 3729 OUTBD DW EQUIP DRAIN ISOL valve has not closed. [**Critical**] o Take the hand switch of CV 3729 to close and verify that the valve closes. [**Critical**] • Verify completion of the Group 2 Isolation by one of the following means: o CIMs board o Verifying all valves in proper position by section 2.0 of this ARP. **SRO** will consult TS and determine the following: • TS 3.6.1.3 Condition A must be entered due to the failure of the CV to isolate on its Group 2 signal. (1.02) • Determine that this is an 8 hour reportable.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Trip of the running RWS pump. **EVENT #5**	**Booth Instructor** when the TS determination has been made for the failure of the primary containment isolation valve, or at the direction of the Lead Evaluator, perform the following: **IMF SW19C by setting event trigger 4 to true.** This will trip the running RWS pump.	**BOP operator** will respond to annunciator 1C06A B-2, "C" RWS PUMP 1P-117C TRIP, by performing the following: (99.04) • Confirm RWS PUMP 1P-117C tripped or secured on Panel 1C-06. • Start or verify running RWS PUMP 1P-117A [**Critical**] o The BOP will determine that the "A" RWS pump did not start. • Start both RWS pumps in the B RWS loop. [**Critical]** • Determine that only one is needed, and secure one. **SRO** will consult TS based on one RWS pump failing, and determine that the "A" Loop RWS is inoperable and enter TS 3.7.2 condition A **SRO** may momentarily enter AOP 410, Loss of River Water Supply because before the A RWS pump was started, there were no river water pumps running. Once in the AOP the crew will verify the following: • There are RWS pumps running and the AOP can be exited.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Turbine Lube Oil leak. **EVENT # 6**	**Booth Instructor** when the A RWS pump is running and it is determined that there are no TS for the loss of one RWS pump, or at the direction of the Lead Evaluator, perform the following: **IOR TUPI-3106 to .15 over 200 sec,** **And** **IMF AN1C07A [7] to on at 195 sec, by setting event trigger 10 to true.** This will lower the meter for turbine lube oil pressure on the main turbine to below 15 psig. **Booth Instructor**, (there is no leak, but the indications will make it look as if there is). When the BOP operator starts the TGOP, verify **event trigger 11 comes true.** This allows deleting the malfunction to turn off the low lube oil pressure annunciator and the override to return the lube oil pressure back to it's pre-event pressure. When **Event Trigger 11 is true**, perform the following: **Delete** **DOR TUPI-3106**, and **DMF AN1C07A [7]**	**BOP** will determine that turbine lube oil pressure is lowering and perform the actions of ARP 1C07A A-7, TURBINE LUBE OIL BEARING HEADER LO PRESSURE, and perform the following; • Verify TGOP 1P-38 running. If not, enter AOP 693 o Will manually start the TGOP. **[Critical]** • When the TGOP is started, relays that turbine lube oil pressure has returned to normal

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Failure of the "A" GEMAC level transmitter. **EVENT #7**	**Booth Instructor** when the turbine lube oil has been restored by the starting of the TGOP, or at the direction of the Lead Evaluator, perform the following: **IMF RR20A by setting event trigger 3 to true.** This will result in the A GEMAC level transmitter failing upscale.	**ATC operator** will notice level on the B and C GEMACs going low and perform the following: (1.05) • Notify the SRO of the condition. • Determine that cause of the error is the A GEMAC. • Transfer level control over to the "B" level control. [**Critical**] **SRO** will consult the TRM for the variation in the narrow range level indicators on 1C05 and declare the following: (1.22) • Per TRM 3.3.3, enter condition A for the narrow range level indicators being out of their tolerance for daily instrument checks

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major turbine lube oil break to ATWS. **EVENT #8**	**Booth operator** when TRM issue is addressed for the GEMAC, or at the direction of the Lead Evaluator, perform the following: **IMF TU04 at 80 over 200 sec. by setting event trigger 6 to true.** This will result in turbine lube oil pressure lowering to the point where reactor scram will have to be inserted. **Booth Instructor** role play as follows: IF called as the second to vent the scram air header, acknowledge the call, **BUT do not** vent the scram air header. Until all control rods are fully inserted. **Booth Instructor** When the plant is scrammed, the rods will not go in. When the RIPS are performed, the ATC operator will raise CRD cooling water DP and CRD flow. **When** the rods begin to drift in, trip one or both of the CRD pumps, as necessary, to stop the movement of the control rods. Do this by performing the following: **IMF RD11A by setting event trigger 7 to true to trip the A CRD pump and if necessary.** **IMF RD11B by setting event trigger 8 to true to trip the B CRD pump.**	**Crew** will report that the turbine lube oil pressure is again lowering. • From ARP 1C07A A-7, TURBINE LUBE OIL BEARING HEADER LO PRESSURE, (1.04) o When Lube Oil pressure lowers to > 15 psig, the **BOP operator** will inform the SRO of the following: ▪ Monitor Turbine Lube Oil Pressure Gauge PI-3106 on 1C07. If pressure cannot be maintained >15 psig, enter AOP 693. **SRO** will direct and the **crew** will perform the following actions IAW AOP 693 MAIN TURBINE/EHC FAILURES, section TURBINE LUBE OIL TROUBLE. (94.49, SRO 5.49) • Verify TGOP and EBOP is running. • **If** Bearing Header pressure is < 12 psig or is dropping and cannot be controlled, o If time permits, reduce power per IPOI 4 Section 6.0 (Fast Power Reduction. o Manually scram the Reactor per IPOI 5 (Reactor Scram). o Verify the Main Turbine is tripped. o Close the MSIVs o Break condenser vacuum by opening vacuum breakers V03-0067 and V03-0073 o Place TURNING GEAR DRIVE MOTOR handswitch HS-3153 in PULL-TO-LOCK o Place the Bearing Lift Pump handswitches in PULL-TO-LOCK

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major turbine lube oil break to ATWS. **EVENT #8 continued**	**[Critical]** **IF a scram is required and Reactor power is above 5%,** **THEN reduce power below 5% using one or more of the following methods:** ▪ **Manual scram signal** ▪ **Inserting control rods using RIPs** ▪ **Manual ARI signal** ▪ **Injection of Boron** **[REPEAT OF INSTRUCTIONS]** **Booth Instructor** **When** the rods begin to drift in trip on or both of the CRD pumps, as necessary, to stop the movement of the control rods. Do this by performing the following: **IMF RD11A by setting event trigger 7 to true to trip the A CRD pump and if necessary.** **IMF RD11B by setting event trigger 8 to true to trip the B CRD pump.**	**SRO** will direct and the **crew** will perform the following actions IAW AOP 693 MAIN TURBINE/EHC FAILURES, section TURBINE LUBE OIL TROUBLE. (94.49, SRO 5.49) • When Turbine lube oil lower to <12 psig, o **ATC operator** will insert a manual reactor scram. ▪ The **ATC operator** will inform the SRO that the plant is in an Electrical ATWS. **SRO** will direct and the **crew** will perform the following actions: • ENTER EOP 1 and transition to ATWS (95.45, SRO 4.21, 6.45) • Lock out ADS (RO 8.11) • Install defeat 15 (RO 95.25, SRO, 6.25) • Per the /Q leg: (RO, 95.57, SRO, 6.56) o Mode switch to shutdown o Recirc to minimum o Initiate ARI o Initiate SBLC o Initiate the RIPs ▪ Pull the RPS Fuses (**critical [see event 9)** (95.04,SRO 6.04) (RO, 6.02, 95.03, 95.08, 95.09 SRO, 6.08, 6.09)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major turbine lube oil break to ATWS. **EVENT #8 continued**	**[Critical]** **IF a reactor scram is required, and Reactor power is >5%, and Power/level control is required,** **THEN terminate and prevent injection until conditions allow reinjection** **Booth Instructor,** when all of the rods are fully inserted perform the following: **IMF RD13 at 100 by setting event trigger 9 to true,** This will vent the scram air header. **Booth Instructor** when RD13 is in, call the control room and inform them that you have vented the scram air header. **Booth Instructor** when told to restore the scram air header, perform the following: **DMF RD13.**	• Per the /L leg: (RO 95.50, SRO 6.50) o Assess power greater than 5% o Enter power level control. **(Critical)** (RO 95.51) (SRO 6.51) • Secure and prevent injection from: • Condensate and feed • HPCIRCIC • Core Spray • Per the /P leg (SRO6.57, STA, 4.07 o Install defeat 11. (RO 95.21) (SRO 6.21) • RO informs the SS that the override did not work. • Maintain pressure stable. (RO 95.56, SRO 6.57) When all of the control rods are inserted, **SRO** will direct and the **crew** will perform the following: • Exit ATWS and re-enter EOP 1 o Remove the Defeat 15 and leave the defeat 17 portion of the package in place. o When called that the scram air header is vented, have the second restore the scram air header. • Enter EOP 1 and perform the following: o Maintain level 170 to 211 o When all is stable, begin a cooldown. • **Re-enter** AOP 683 for the Turbine problems that initiated this event.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Pulling RPS fuses. **EVENT # 9**		The BOP will insert all of the control rods by pulling the RPS fuses per RIP 101.2. **(Critical)** • At 1C15; o Fuse C71-F18A Terminal CC-F3 o Fuse C71-F18C Terminal CC-F4 o Fuse C71-F18E Terminal CC-F5 o Fuse C71-F18G Terminal CC-F6 • At 1C17; o Fuse C71-F18B Terminal CC-F3 o Fuse C71-F18D Terminal CC-F4 o Fuse C71-F18F Terminal CC-F5 o Fuse C71-F18H Terminal CC-F6

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Turbine Lube Oil leak. **EVENT # 7 returned**	**Booth Instructor** when called as the Aux to break vacuum, perform the following: **IRF MC01 and set to OPEN** **IRF MCO2 and set to OPEN** The Scenario may end when the remainder of the immediate actions of AOP 683 are performed and the plant is stable, or at the direction of he lead evaluator. When the scenario is over, **place the** simulator in **Freeze,** and announce that the scenario is complete	**SRO** will direct and the **crew** will perform the following to continue with taking care of the main turbine IAW AOP 683; • Crew will discuss how they want to cool down the reactor with the condenser unavailable, except for drains. • Verify the Main Turbine is tripped. • Close the MSIVs • Break condenser vacuum by opening vacuum breakers V03-0067 and V03-0073 • Place TURNING GEAR DRIVE MOTOR handswitch HS-3153 in PULL-TO-LOCK • Place the Bearing Lift Pump handswitches in PULL-TO-LOCK

***** END OF SCENARIO *****

*** REVIEW SCENARIO OBJECTIVES WITH THE OPERATORS ***

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
NS 93002 Turbine Stop Valve and Combined Intermediate Valve Test. **EVENT #1 (N-BOP)**	**SRO** will perform a pre-job brief for the performance of NS 93002, Turbine Stop Valve and Combined Intermediate Valve Test. The brief will contain the following major topics. (1.02) **BOP operator** will perform NS 93002, Turbine Stop Valve and Combined Intermediate Valve Test. When he is finished he will inform the SRO. (1.07)	NS 93002, Rev. 3	Performance of NS 93002. Sat _____ Unsat _____
Power ascension with recirc. **EVENT #2 (R-RO)**	**SRO** Hold a short brief outlining the power change. At a minimum, the brief will discuss the following: (1.01) **ATC operator** will begin raising power with recirc by manually adjusting the Recirc Flow Controllers. At a minimum, he will monitor the following: (93.11)	IPOI 3, Rev. 66	Reactivity evolution Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
"B" Recirc speed controller run away. **EVENT #3 (C-RO)**	**ATC operator** will determine that power is going up by itself, and determine that the "B" recirc M-G speed controller is ramping up by itself. He will take the following actions to stop the run away: Lock the scoop tube of the "B" recirc M-G speed controller. [**Critical**] **SRO** will determine **if the recirc pump speed mis-match** will put them out of compliance with the LPCI Loop Select limits. • TS SR 3.4.1.1 states that the Speed of the faster pump shall be less than or equal to122% of the speed of the slower pump when operating at greater than or equal to 69.4% RTP. • Based on the calculation, the SRO will determine if he is in compliance with TS 3.4.1 Condition C. o If he is not in compliance, then he has 2 hours to restore the mis-match within limits, or Trip one of the recirc pumps 1.02	AOP 255,2 Rev. 24 Technical Specifications	Run away recirc speed control. Sat _____ Unsat _____ Recirc Mismatch TS determination (if necessary) Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Spurious Group 2 isolation with a failure or valve to isolate. **EVENT#4 (C-BOP)**	**BOP operator** will perform the following IAW ARP 1C05B B-8: (1.04) • Will determine that CV 3729 OUTBD DW EQUIP DRAIN ISOL valve has not closed. [**Critical**] • Take the hand switch of CV 3729 to close and verify that the valve closes. [**Critical**] **SRO** will consult TS and determine the following: TS 3.6.1.3 Condition A must be entered due to the failure of the CV to isolate on its Group 2 signal. (1.02)	ARP 1C05B B-8 Rev. 7 Technical Specifications	Spurious Group 2 isolation not complete. Sat _____ Unsat _____ Closing CV3729 due to it failing to auto close. Sat _____ Unsat _____ TS determination on failed PCIS valve. Sat _____ Unsat _____
Trip of the running RWS pump. **EVENT #5 *(C-BOP)**	**BOP operator** will respond to annunciator 1C06A B-2, "C" RWS PUMP 1P-117C TRIP, by performing the following: (99.04) • Start RWS PUMP 1P-117A and determine that it did not start. [**critical**] • Start both RWS pumps in the B RWS loop. [**critical]** **SRO** will consult TS based on one RWS pump failing, and determine that the “A” Loop RWS is inoperable and enter TS 3.7.2 condition A	ARP 1C06A B-2, Rev 5 Step 3.2 Step 3.3	Restoration of River Water Supply operation. Sat _____ Unsat _____ Declare the proper TS for the loss of one RWS loop Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Turbine Lube Oil leak. **EVENT # 6 (C-BOP)**	**BOP** will determine that turbine lube oil pressure is lowering and perform the actions of ARP 1C07A A-7, TURBINE LUBE OIL BEARING HEADER LO PRESSURE, and perform the following; • Verify TGOP 1P-38 running. If not, enter AOP 693 o Will manually start the TGOP. **[Critical]**	ARP 1C07 A-7 Rev. 5 Step 3.1	Restoration of turbine lube oil. Sat _____ Unsat _____
Failure of the "A" GEMAC level transmitter. **EVENT #7 (I-RO)**	**ATC operator** will notice level on the B and C GEMACs going low and perform the following: (1.05) • Transfer level control over to the "B" level control. [**Critical**] **SRO** will consult the TRM for the variation in the narrow range level indicators on 1C05 and declare the following: (1.22) • Per TRM 3.3.3, enter condition A for the narrow range level indicators being out of their tolerance for daily instrument checks	Technical Requirements Manual	Transfer of level control due to a malfunctioning level transmitter. Sat _____ Unsat _____ TRM determination for narrow range level instruments Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Major turbine lube oil break to ATWS. **EVENT #8 (M-ALL)**	When the scram is initiated, the **ATC operator** will inform the SRO that the plant is in an Electrical ATWS. **SRO** will direct and the **crew** will perform the following actions: • ENTER EOP 1 and transition to ATWS (95.45, SRO 4.21, 6.45) • Lock out ADS (RO 8.11) • Install defeat 15 (RO 95.25, SRO, 6.25) • Per the /Q leg: (RO, 95.57, SRO, 6.56) o Mode switch to shutdown o Recirc to minimum o Initiate ARI o Initiate SBLC o Initiate the RIPs ▪ Pull the RPS Fuses (**critical)** (95.04,SRO 6.04) **The pulling of RPS fuses will work there for it is CRITICAL.** **IF a scram is required and Reactor power is above 5%,** **THEN reduce power below 5% using one or more of the following methods:** ▪ **Manual scram signal** ▪ **Inserting control rods using RIPs** ▪ **Manual ARI signal** ▪ **Injection of Boron**	EOP 1, Rev. 11 ATWS Rev. 12 RIP 101.2, Rev.3	Determination of the ATWS condition. Sat _____ Unsat _____ Transition from EOP 1 to ATWS. Sat _____ Unsat _____ Installations of RIP 101.2 to remove the RPS fuses and insert all of the control rods. [**Critical**] Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Major turbine lube oil break to ATWS. **EVENT #8 (M-ALL) Continued**	• Per the /L leg: (RO 95.50, SRO 6.50) o Assess power greater than 5% o Enter power level control. **(Critical)** **IF a reactor scram is required, and Reactor power is >5%, and Power/level control is required,** **THEN terminate and prevent injection until conditions allow reinjection** (RO 95.51) (SRO 6.51) • Secure and prevent injection from: • Condensate and feed • HPCI • Core Spray • Per the /P leg (SRO6.57, STA, 4.07 o Install defeat 11. (RO 95.21) (SRO 6.21)	ATWS Rev. 12	Transition from normal level control in an ATWS to Power level control. [**Critical]** Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Pulling RPS fuses **EVENT #9 (C-BOP)**	The BOP will insert all of the control rods by pulling the RPS fuses per RIP 101.2. **(Critical)** • At 1C15; o Fuse C71-F18A Terminal CC-F3 o Fuse C71-F18C Terminal CC-F4 o Fuse C71-F18E Terminal CC-F5 o Fuse C71-F18G Terminal CC-F6 • At 1C17; o Fuse C71-F18B Terminal CC-F3 o Fuse C71-F18D Terminal CC-F4 o Fuse C71-F18F Terminal CC-F5 o Fuse C71-F18H Terminal CC-F6	RIP 101.2, Rev. 3 Step 1. Step 2.	 Pulling of fuses at 1C15. Sat _____ Unsat _____ Pulling of fuses at 1C17. Sat _____ Unsat _____

SEG/ESG Validation Checklist

SEG/ESG ____ESG 18_____ **Rev. 0_____**

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

SEG/ESG Validation Checklist

SEG/ESG ___**ESG 18**_____ **Rev. 0**_____

Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

SME/Instructor	Date
SME/Instructor	Date

SEG/ESG Validation Checklist

SEG/ESG ESG 18 **Rev. 0**

Crew:		Instructors:	
OSM		Booth	
CRS		Floor	
STA		Extra	
1C05			
1C03			
BOP			

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

SEG/ESG Validation Checklist

SEG/ESG ____ESG 18_____ Rev. 0_____

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

NMC Committed to Nuclear Excellence	EVALUATION SCENARIO GUIDE (ESG)

SITE: **DAEC**

APRM FLOW UNIT FAIL DOWNSCALE, "B" RHRSW PUMP MOTOR OVERLOAD, START UP TRANSFORMER FAILURE, CONTROL ROD DRIFT IN, 3A FEEDWATER HEATER LEVEL CONTROL FAIL, CONDENSER TUBE LEAK, REACTOR SCRAM, EOP1, EOP2, ALC ED **ESG 19** **REV. 0**

PROGRAM: **OPERATIONS** **#:**

COURSE: **ILC** **#:** **50007**

TOTAL TIME: **90 MINUTES**

Developed by:		
	Instructor	*Date*
Validated by:		
	SME/Instructor	*Date*
Reviewed by:		
	Operations Manager	*Date*
Approved by:		
	Training Supervisor-Operations	*Date*

ESG 19, ILC NRC Exam, Rev. 0

GUIDE REQUIREMENTS

Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	OI 416, Rev. 38 OI 454, Rev. 44 ARP 1C05A E-2 ARP 1C03B B-8, Rev. 6 ARP 1C08A A-7, Rev. 15 ARP 1C05 A D-6, Rev.10 AOP 255.2, Rev. 24 AOP 255.1, Rev. 26 ARP 1C06B C-7, Rev.2 AOP 639, Rev. 22 OI 304.1 Rev 46 OI 304.2 Rev 52 EOP 1, Rev.11 EOP 2, Rev.12 ALC, Rev.4 ED, Rev.4 Technical Specifications EPIP
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None

ESG 19, ILC NRC Exam, Rev. 0

SCENARIO SUMMARY:

Current plant operating status:

- The plant is operating at 93% thermal power.
- It is a warm summer day.
- RCIC is inoperable due to finding water in the oil. The RCIC turbine has been tripped. The mechanics are down looking at the RCIC turbine. They are working with the WCC on how the tagout should be written. The WCC will inform you when they are ready to tag out the RCIC turbine. Because of RCIC inoperable, TS 3.5.3 Condition A has been entered. Currently in day 1 of 14.
- The "B" RHRSW pump is to be started for chemistry to obtain a sample. You are to start the "B" RHRSW pump, IAW OI 416, and then call the Chemists.
- During the past shift there have been 3 1T136 High-level alarms, 1C07B D-10. Each alarm stayed in for about 90 seconds. The Aux man went into the condenser bay and found nothing out of the ordinary. -

Scenario segments:

EVENT #1 (N- BOP)

- Start the "B" RHRSW Pump IAW OI 416.

EVENT #2 (C-RO)

- The "B" APRM flow unit will fail down scale. This will result in a half scram. The ATC RO will respond to ARP 1C05A E-2 for the flow unit, and 1C05A A2 for the half scram. Per the actions of ARP 1C05A E-2 the RO will remove the B flow unit from service and reset the half scram.

EVENT #3 (C-BOP)

- The "B" RHRSW pump will develop a motor bearing problem and begin to seize up. The BOP operator will have to remove the RHRSW pump from service IAW ARP 1C03B B-8.
- The SRO will enter TS 3.7.1 Condition A.

EVENT #4 (C-RO)

- A control rod will drift in. Per the actions of ARP 1C05A D-6, the RO will stop the drifting by applying an Emergency In signal to the control rod.
- The control rod will be declared inoperable and TS 3.1.3 Condition C will be entered.

EVENT #5 (C-BOP)

- The 1E-3B feed water heater drain valve controller will fail in AUTOMATIC. This will require controlling the feedwater heater drain valve in manual IAW ARP 1C06B C-7.

EVENT #6 (C-BOP)

- The Start up transformer will receive annunciator 1C08A A-7, Start Up Transformer Trouble. When investigated the problem will require the transformer to be removed from service.
- This will require entry into TS 3.8.1 Condition A, for loss of one offsite power source.

EVENT #7 (R-RO)

- Condenser Hot Well conductivity will begin to rise due to a tube leak. The crew will enter AOP 639. This will result in a fast power reduction.
- When recirc flow is reduced to 27-million lbm/hr flow, the reactor will be scrammed.

EVENT #8 (M-ALL)

- Following the reactor scram a LOCA will develop.
- The crew will enter EOP 1 and 2.
- Torus and Drywell sprays will be initiated to protect the containment.
- Due to failure high-pressure injection systems, **ALC** will be entered.
- When RPV level lowers to +15 inches an **ED** will be performed.

EVENT #9 (C-BOP)

- HPCI's flow controller will fail in automatic. The BOP will diagnose the problem and place the flow controller in manual and inject into the RPV for a short period of time.
- HPCI will eventually trip so the ED can occur.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ RO (NSOE, ANSOE)

- ♦ 1.04 Respond to annunciators
- ♦ 1.05 Perform GEMC controller functions
- ♦ 15.01 Transfer an Essential bus from the start up transformer to the standby transformer.
- ♦ 30.01 Start up the RHRSW System
- ♦ 30.03 Manually shut down the RHRSW System
- ♦ 94.02 Respond to abnormal control rod movement/indication
- ♦ 94.03 Respond to power/reactivity abnormal change condition
- ♦ 94.18 Respond to reactor water/condensate high conductivity condition
- ♦ 95.14 Perform EOP Defeat 4
- ♦ 95.44 Perform actions of RC/L of EOP 1
- ♦ 95.45 Perform initial EOP 1 actions (RC)
- ♦ 95.63 Perform DW/T leg of EOP 2
- ♦ 95.76 Perform ALC with 1 Core Spray and 1 other ECCS pump available
- ♦ 95.80 Perform ED using SRVs
- ♦ 99.13 Respond to Rod Drift

⇒ Shift Supervisor (SS)

- ♦ 1.01 Direct routine crew and control room activities.
  - 1.01.02 Coordinate operator activities.
  - 1.01.03 Ensure control room activities conform to ACP 1410.1, Conduct of Operations.
- ♦ 1.02 Determine operability of Tech Spec required components.
  - 1.02.02 Determine if the instrument, component, or system is operable.
  - 1.02.03 Declare the instrument, component, or system is inoperable, enter the correct LCO, and determine and direct performance of the LCO STP.

- ♦ 1.21 Direct crew response to too normal events/accidents
  - • 1.12.01 Evaluate the event or accident to determine its cause and develop mitigation strategies.
  - • 1.12.02 Recognize and prioritize data relevant to the accident or event.
  - • 1.12.03 Direct appropriate conservative actions to mitigate the accident or event and stabilize plant parameters.
  - • 1.12.06 Analyze results and direct alternate mitigation actions
- ♦ 1.22 Determine operability for TRM Components
- ♦ 3.01 Implement the Emergency Plan
  - • 3.01.01 Declare the appropriate EAL
- ♦ 4.21 Direct crew actions to perform the immediate operator responses to a reactor scram
- ♦ 5.03 Direct crew response to power/reactivity abnormal change condition
  - • 5.03.02 Direct immediate operator actins to prevent exceeding any plant/reactor limits.
  - • 5.03.04 Direct operator actions to control the malfunctioning system or component.
  - • 5.03.05 Confirm the rod pattern, thermal limits and reactor power are within the allowed range
- ♦ 6.14 Direct crew response to perform EOP Defeat 4
  - • 6.14.01 Direct operator actions to install defeat 4
- ♦ 6.21 Direct Crew response to perform EOP Defeat 11.
  - • 6.21.01 Direct operator actions to perform EOP Defeat 11
- ♦ 6.63 Direct crew response for performance of the DW/T leg of EOP 2
  - • 6.63.01 Direct operator actions to maintain drywell temperature <150 degrees-F using drywell cooling systems.
  - • 6.63.03 Direct operator actions to maximize drywell cooling by installing Defeat-4
  - • 6.63.08 Direct operator actions to secure running recirc pumps, initiate drywell sprays using RHR pumps not required continuously for adequate core cooling
- ♦ 6.44 Direct crew response for performance of the RC/L of EOP 1.
  - • 6.44.03 Direct operator actions to restore and maintain RPV level between +170 and +211 inches with one or more Preferred Injection systems (Table 1A).
  - • 6.44.04 Direct operator actions to maintain RPV level above +15 inches and if necessary augment injection with Alternate Injection Systems (Table 2A).

- ♦ 6.45 Direct Crew response for performance of initial EOP 1 actions (RC)
  - 6.45.04 Direct operator actions to initiate any of the following which should have initiate but did not , isolations, ECCCS initiations, SBDG initiation
- ♦ 6.78 Direct crew response for performance of ED.
- ♦ 6.76 Direct crew response for perform ALC with 1 Core Spray and 1 other ECCS pump available

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP:

1.1 General Instructions

a. Reset to IC 20, then perform the following:
b. Verify the following event trigger definitions;
(1) **RDPACC(1) .LT. 1440** is set for event trigger 4.
(2) **ZDISWHS4925B(1) .GE. 1** is set for event trigger 10.
(3) PCPDWG .GT. 2.0 is set for event trigger 9
(4) ZDIRDC11AS3(1) .RE. 1 is set to event trigger 15
c. Type in malfunctions that are listed in the below **MALFUNCTION** Table.
d. Type in overrides that are listed in the below **OVERRIDE** Table
e. This ESG will require the BOP to perform STP 3.8.1-01 for a loss of an offsite source. Have enough copies available for the entire ESG run.

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
4	**RDPACC(1) .LT. 1440**	Scram accumulator pressure low
10	**ZDISWHS4925B(1) .GE. 1**	B RHRSW pump handswitch taken to stop. When event trigger #10 goes true, [RED], the booth instructor will delete override AO SW1P-22B
9	**PCPDWG .GT. 2.0**	DW 2 psig
15	**ZDIRDC11AS3(1) .RE. 1**	Emergency In switch taken to Emer In. When the #15 event trigger goes true, [RED], the booth instructor will delete malfunction RD061039.
The rest of the event triggers will be called out in the body of the scenario		

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
As dir	NM11B	B APRM flow unit fail DS		45	20	As is	0
As dir	AN1C03B(17)	RHRSW pump over load or trip		21	2		On
As dir	AN1C08A(7)	Start up transformer trouble alarm			3		On
T=0	ED06C	Start up transformer lockout			4		
As dir	RD061039	Rod 1039 drives in			5		
As dir	MC07	Condenser tube leak			6	As is	1.7
T=0	RR15A	Recirc line break	120	1600	4	As is	25
As dir	HP02	HPCI turbine trip			7		
As dir	HP03	HPCI Flow Controller fail in Auto			9	As is	0
T=0	RC02	RCIC Turbine Trip					

1.4 OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
As dir	AO SW1P-22B	B RHRSW pump amps		20	2	As is	.9
As dir	AI FWLIC-1319(1)	1E-3B Drain VLV CV(set pt.R1)			8	As is	1

1.5 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	Delay	Ramp	ET	Initial Value	Final Value
As dir	MC01	Main condenser vacuum breakers				CL	OP
As dir	MC02	Main condenser vacuum breakers				CL	OP

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

2 Conduct pre-scenario activities in accordance with the following procedures:

3.1 If this scenario is used in training mode: OTI 101

4 TURNOVER INFORMATION

⇒ Day of week and shift
- ♦ Wednesday
- ♦ Day shift

⇒ Weather conditions
- ♦ Warm
- ♦ Dry

⇒ (Plant power levels) Pwr 94%
- ♦ MWT 1787
- ♦ MWE 613
- ♦ CORE FLOW 46.9

⇒ Thermal Limit Problems/Power Evolutions
- ♦ None

⇒ Plant Risk Status
- ♦ CDF 2.362 E -5
- ♦ Color Yellow

⇒ Existing LCOs, date of next surveillance
- ♦ RCIC, day 1 of 14, TS 3.5.3 Condition A.
- ♦ Protected systems include:
  - A and B EDG, A and B ESW, B RWS, HPCI, and Div 2 250VDC charger 1D44.

⇒ STPs in progress or major maintenance
- ♦ None

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- ♦ Chemistry needs to take a sample of the water in the RHRSW IAW NS790702 Continuous Service Water Release Sampling and Analysis.
- ♦ Based on pump run times, the “B” RHRSW pump is the one that should be started for this evolution. Therefore right after turnover, start the “B” RHRSW pump IAW OI 416. When it is running call Chemistry.
- ♦ RCIC is inoperable due to finding water in the oil. The RCIC turbine has been tripped. The mechanics are down looking at the RCIC turbine. They are working with the WCC on how the tagout should be written. The WCC will inform you when they are ready to tag out the RCIC turbine.

⇒ Comments, evolutions, problems, core damage frequency, etc.
- ♦ WCC is fully staffed.

- There is one extra NSPEO in the pump house for the start of the B RHRSW pump.
- During the past shift there have been 3 1T136 High-level alarms, 1C07B D-10. Each alarm stayed in for about 90 seconds. The Aux man went into the condenser bay and found nothing out of the ordinary.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	• Provide Shift Turnovers to the **SRO** and **RO**s.	• Get familiar with plant conditions. **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover. (SRO 1.01)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Start up of the "B" RHRSW pump for Chemistry to obtain a sample **EVENT #1**	**Booth Instructor,** when he crew has the watch, and/or at the direction of the Lead Evaluator Role-play as the NSPEOs as directed in the plant. When asked, report that the oil levels of the "B" ESW and "B" RHRSW pump motors are sat and that room ventilation is operating. When directed, report back that the Auto vent is shut and no leakage is observed.	After the watch is assumed the **CRS** will direct the BOP to start up the "B" RHRSW pump IAW OI 416 for Chemistry to obtain a sample. The **BOP operator** will start the "B" RHRSW IAW OI 416: • Start ESW Per OI 454. [**critical**] o Place HS 4928B on 1C06 in the START position. o Verify red indicating light ON and amps between 95 and 115. o Verify flow greater than 300 gpm. o Verify auto vent closed, no excessive leakage, and room air flow. • Prior to pump start, verify, MO-1947 RHR HX SERVICE WATER OUTLET valve closed • Prior to next two steps, notify Chemistry and verify NS790702 Continuous Service Water Release Sampling and Analysis is current. • If starting B side pumps, start B and/or D RHRSW PUMPS by performing either of the following o Place handswitch HS-4925B, B RHRSW PUMP 1P-22B on Panel 1C03 in the START position, and allow it to spring return to AUTO. (Section 1.0 Step 5.a [**critical**]). • Throttle open MO-1947 RHR SERVICE WATER OUTLET valve with HS-1947C, (Section 1.0 Step 6 [**critical**]). • Continue to raise flow to obtain flow greater than 2000 gpm per running pump as indicated on FI-1944 RHRSW INLET FLOW. • Confirm B RHRSW PUMP 1P-22B, is running by observing the following: o Red (pump running) indicating light on Panel 1C03 is ON. o The associated RHRSW pump ammeters on, Panel 1C03, indicate normal running amps, (between 47 and 70 Amps). • As soon as possible after RHRSW pump start, perform the following: o Inspect the auto vent/vacuum breaker for evidence of excessive leakage.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Start up of the "B" RHRSW pump for Chemistry to obtain a sample **EVENT #1 continued**		The **BOP operator** will start the "B" RHRSW IAW OI 416, continued: • Monitor RHRSW/ESW Pit Level while system is in operation at 1C-29 on A[B] RHRSW/ESW PIT LEVEL LR-4935A[B], computer point B279 [B280] or locally on LIS-4935A/B. • Control ESW/RHRSW pit level per OI 410 Section 6.6. • Notify Chemistry. (RO 30.01, & SRO 1.01)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

"B" Recirc Flow unit failing down scale.
 	
EVENT #2
	Booth Instructor, when "B" RHRSW is in service and/or at the direction of the Leak Evaluator, start the next event by performing the following"
	
	IMF NM11B to 0 over 45 sec by setting event trigger 20 to true.
		Crew
		• Recognize the flow unit rod block alarm, and the half scram. They will then follow the 1C05A (E-2) and perform the following:
		  • The **ATC operator** will Bypass APRM flow unit "B" on 1C05, with CRS permission. (ARP 1C05A E-2, step 3.4.c [**critical])**
		  • The **ATC operator** or the **BOP** operator will place the MODE switch for "B" Flow unit in a position other than OPERATE or STANDBY. This is a back panel operation. (ARP 1C05A E-2, step 3.5.a [**critical**])
		  • The **ATC operator** will reset the half scram. (ARP 1C05A E-2, step 3.5.c [**critical**])
		
		The CRS will determine the following concerning TS:
		  • Refers to TS 3.3.1.1 RPS and determines that **no TS** exist (B 3.3-9, 10).
		  • Refers to TRM 3.3.2 and determines that **no TRM** exists for rod block.
		
		The Crew will;
		Initiate an AR, WRC and contacts I&C and system engineer.
		(RO 1.04 & SRO 1.02)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Tripping of the "B" RHRSW pump **EVENT #3**	**Booth Instructor,** after a the "B" APRM flow unit is bypassed and the scram is reset and/or at the direction of the Lead Evaluator begin the RHRSW motor problems by performing the following" **IMF AN1C03B(17)** **AND** **IOR AO SW1P-22B to .9 over 20 sec. by setting event trigger 2 to true.** This will bring in the B RHRSW motor trip alarm and have the motor amps rise up to the alarm setpoint. **Booth Instructor** when the amp meter for the B RHRSW pump is at .9, perform the following: **MOR AO SW1P-22B from AS IS to .95 over 400 sec,** This will slowly ramp up the pump motor amps. **Booth Instructor** as the Amps ramp up, perform the following: Monitor event trigger 10, when the event trigger turns **RED**, the BOP has taken the B RHRSW pump handswitch to STOP. When this happens perform the following: **DELETE the following:** **MF AN1C03B(17) and** **OR AO SW1P-22B**	**The BOP operator** will respond to the annunciator 1C03B B-8 "B" RHRSW PUMP 1P-22B TRIP OR MOTOR OVERLOAD and perform the following: • If Pump 1P-22B did not trip confirm amps >80 on Panel 1C-03 on Ammeter labeled B RHRSW PUMP 1P-22B. • If at any time 1P-22B amps cannot be maintained <80 amps, or either bearing temp cannot be maintained <180°F, or 1P-22B is no longer required for adequate core cooling, o Reduce flow through 1P-22B to minimum o Trip the pump. (**critical)** (30.03) **CRS** will determine that with the "B" RHRSW pump inoperable, TS 3.7.1 Condition A must be entered. (1.02)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Control rod 10-39 drifts in. **EVENT #4**	**Booth Instructor** when the B RHRSW pump is removed form service and the TS has been addressed, and/or at the direction of the Lead Evaluator, perform the following: NOTE: **Driver, read before inserting RD06,** during this next event, you will have to watch the RED/GREEN box for **event trigger 15**. When the ATC operator places the EMERGENCY IN switch to Emergency in, Event Trigger 15 box will turn RED. This is when you have to delete RD061039 When ready perform the following; **IMF RD061039 by setting event trigger 5 to true.** This will start control rod 1039 drifting in. When the ATC operator takes the Emergency In switch to Emergency in, and **event trigger box 15 turns RED**, **DMF RD061039**	**ATC operator** will respond to annunciator 1C05A D-8, Rod Drift, and perform the following: (99.13) • At 1C05, select affected Control Rod, monitor 4 rod display to determine if a control rod is drifting, and if so in what direction. (**critical**) • IF any control rod is drifting **IN**, perform the following: o Place the C11A-S3 EMERG IN/NOTCH OVERRIDE SELECT switch on 1C05 in the EMERG ROD IN position momentarily (less than ½ second) to abort the rod sequence timer. (**critical**) • Determine that the rod has stopped drifting. • Run an OFFICIAL 3D CASE for abnormal reactor power/control rod distributions. **SRO** will direct and the **Crew** will perform the following per AOP 255.2, POWER/REACTIVITY ABNORMAL CHANGE: (RO 94.03, SRO, 5.03) • Take any necessary steps to bring the reactor power/reactivity transient under control, including, but not limited to: o Assuming manual control of a malfunctioning system.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Control rod 10-39 drifts in. **EVENT #4 continued**	**Booth Instructor** role-play as the RE when called. If asked about what to do with the drifted rod: • If asked for a pull sheet to withdraw the drifted rod, inform the crew that you will prepare one, • If told that rod 10-39 was being declared inoperable and it was going to be driven full in, and they want you to prepare the necessary rod pattern and paperwork to bypass this rod, inform the crew that you will prepare the requested material.	• Verify control rod positions are correct for the established sequence, by using Rod Pattern Log. • Verify thermal limits on the Official 3D Case. • In the event of inadvertent entry into area above the power to flow map (i.e. exceeding load line limit) exit this area by inserting control rods. • Notify the Reactor Engineer and Operations Manager. **SRO** will direct and the **Crew** will perform the following per AOP 255.1, CONTROL ROD MOVEMENT/INDICATION ABNORMAL. (RO 94.02) • Enter the Mispositioned Control Rod TAB. • Run an official case and verify thermal limits are all less than 1.0. o Contact the Reactor Engineer and the Operations Manager ▪ The AOP guidance is more geared to a misposition during a start up, not due to a rod drifting in. After notifying the Reactor Engineer and the Ops Manager, the determination may be to do nothing until the situation has been assessed further. **SRO** will determine that the Control Rod 1039 should be declared inoperable. • Enter TS 3.1.3 Condition C.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
The # 3B feedwater level controller will fail to control level at 100% **EVENT #5**	**Booth Instructor** when the TS determination has been made for the drifting control rod, and/or at the direction of the Lead Evaluator, perform the following: **IOR 1E-3B Drain VLV CV(set pt.R1) by setting event trigger 8 to true.** This will result in the 3B heater Drain valve failing in Automatic.	**Crew** will respond to annunciator ARP 1C06B C-7, LP FDWTR HTR 1E-3B HI LEVEL, and the **BOP operator** will perform the following: • At 1C06 confirm CV-1321 LPHEATER 1E-3B DUMP valve is opening. • At 1C20 perform the following: o Confirm high shell side water level on LIC 1319. o Verify that LIC-1319 is set IAW OI 646, Extraction Steam, in the AUTOMATIC mode, and responding correctly by: ▪ LIC-1319 output signal to CV-1319 going open. ▪ 1E-3B LP HEATER level returning to normal. ▪ LIC-1321, indicating the DUMP VALVE closing. • If level remains the same or tends to increase, attempt to control the 1E-3B LP HEATER level with LIC-1319 and or LIC-1321 in the AUTOMATIC mode. • If level remains the same or tends to increase, attempt to control the 1E-3B LP HEATER level with LIC-1319 and or LIC-1321 in the MANUAL mode. (**Critical**) • The BOP will report that the LIC-1319, the 3A heater drain controller has failed in it's Automatic Mode and is currently in manual with the dump performing the fine level control.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Start up Transformer trouble. **EVENT #6**	**Booth Instructor,** when the 1E-3B heater drain is being controlled in Manual, and/or at the direction of the Lead Evaluator begin the Start up transformer trouble by performing the following" **IMF AN1C08A(7) by setting event trigger 3 to true.** This is the Start up transformer trouble alarm **Booth Instructor** role-play as the Aux Operator when sent to the start up transformer Wait about 3 min then report that the alarm is **Sudden Internal pressure trip.** Report back in about another 2 minutes that you see that the relief has lifted. If called as the SOC thank the crew for the call about removing the Start up transformer from service.	**BOP operator** will respond to annunciator 1C08A A-7, STARTUP TRANSFORMER TROUBLE by announcing the alarm to the CRS, then pulling the ARP and performing the following. • Send an Operator locally to 1X3 Alarm Cubicle to determine the cause of the alarm. • With the aid of Table 1, Attachment 1, take the appropriate Corrective Action. o The BOP will learn from the Aux, that the alarm is: **Sudden internal pressure trip.** Then perform the following: ▪ Take Transformer 1X3 out of service immediately per OI 304.1 and OI 304.2 and initiate a WRC to have 1X3 inspected and repaired as necessary. **BOP operator** will inform the CRS of his findings and what the ARP calls for. **CRS** will direct and the **BOP operator** will perform the following: • Per OI 304.2. 4160V/480V ESSENTIAL ELECTRICAL DISTRIBUTION SYSTEM, the BOP operator will transfer the Startup Transformer to the Standby Transformer by performing the following: (15.01) o Verify AC Sources/SBDG LCOs have been entered if applicable. ▪ The BOP will make sure that the CRS is entering the TS LCO prior to removing the Startup Transformer. ▪ **CRS** will assess **TS** and determine that they must enter TS **3.8.1 condition A** for the loss of one offsite source. (1.02) ▪ Will inform the BOP to remove the Startup Transformer.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Start up Transformer trouble. **EVENT #6 continued**		o Place the BUS 1A3[4] TRANSFER breaker mode selector switch in the MANUAL position. (**critical**) o Insert the handle in the SYNCHRONIZE switch for 4KV BREAKER 1A301[401] STANDBY TRANSFORMER TO BUS 1A3[4], and place it in the ON position. (**critical**) o Verify that the synchroscope indicates near 12 o'clock and not moving with both white (differential phase voltage) indicating lights are OFF. o Verify that INCOMING VOLTS SYNCHRONIZE and RUNNING VOLTS SYNCHRONIZE are within 8 volts. o Select Phase 1 with the BUS 1A3[4] STARTUP XFMR AMPERES meter switch, and observe ammeter reading. Select Phase 1 with the STANDBY XFMR BUS 1A3 [1A4] AMPERES meter switch o Place the control switch 4KV BREAKER 1A301[401] STANDBY TRANSFORMER TO BUS 1A3[4] momentarily in the CLOSE position. Observe that the red (breaker closed) and white (closing spring charged) indicating lights are ON. (**critical**) o Observe that the bus has parallel supplies by observing approximately equal currents on the supply ammeters. o Place the control switch 4KV BREAKER 1A302[402] STARTUP TRANSFORMER TO BUS 1A3[4] momentarily in the TRIP position. Observe that the green (breaker open) and white (closing spring charged) indicating lights are ON. (**critical**) o Place the SYNCHRONIZE switch for 4KV BREAKER 1A301[401] STANDBY TRANSFORMER TO BUS 1A3[4] in the OFF position, and remove the handle. (**critical**) o Select individual phases with the BUS 1A3[4] STANDBY XFMR AMPERES meter switch to observe the current load and to verify approximately equal phase currents**.**

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Start up Transformer trouble. **EVENT #6 continued**	**Booth Instructor**, when the BOP opens he J and K breakers, **Delete Malfunction ED06C** NOTE, if the crew does not open the J and K breakers, the Start up transformer will lock out shortly after the reactor scrams. **Booth Instructor and Lead Evaluator,** the next event, Condenser tube rupture, takes about 7 minutes to get to the point where1C80 will alarm. It may be advisable to place the next malfunction in while this event is still in progress.	o On the BUS 1A3[4] VOLTS meter, observe that all three phase-to-phase voltages indicate approximately 4160V by selecting each phase-to-phase position. o Place the BUS 1A3[4] TRANSFER breaker mode selector switch in the AUTO position. (**critical**) • Per OI 304.1, 4160V/480V NONESSENTIAL ELECTRICAL DISTRIBUTION SYSTEM, the BOP operator will remove the Startup Transformer form service by performing the following: o Verify Offsite Sources LCO has been entered, if applicable. o Verify Essential Busses 1A3 and 1A4 are transferred to the Standby Transformer or SBDG per OI 304.2. o Notify the load dispatcher that the Startup Transformer (1X3) will be removed from service. o Place STARTUP TRANSFORMER J BREAKER control switch momentarily in the TRIP position. Observe the green (breaker open) indicating light is ON. (**critical**) o Place STARTUP TRANSFORMER K BREAKER control switch momentarily in the TRIP position. Observe the green (breaker open) indicating light is ON. (**critical**) o Open and tagout the local breakers for 1X003-1 and 1X003-2 to deenergize the startup transformer 1X3 cooling system. **CRS** When the BOP has the Startup Transformer removed from service: • Direct the BOP to perform STP 3.8.1-01, Offsite Power Sources. o The BOP will begin to perform STP 3.8.1-01.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Small Condenser Tube failure, leading to a fast power reduction. **EVENT # 7**	**Booth Instructor** when the Startup Transformer is removed form service, and/or at the direction of the Lead Evaluator, perform the following: **IMF MC07 at 1.7 by setting event trigger 6 to true.** This will start a small condenser tube leak. The first audible indication of a tube leak is annunciator 1C06B A-1. **Booth Instructor** call up Group Display 24 on the SPDS terminal in the instructor area, this will give you the condensate filter demin influent and effluent conductivity. **Booth Instructor** role play as the second and inform him that annunciator 1C80 A-6, INFLUENT HIGH CONDUCTIVITY, is alarming and is currently reading what GD-24 is reading. After the 1C80 alarm is received, **modify MC07 to 4 over 120 sec.**	**Crew** will respond to annunciator 1C06B A-1, CONDENSATE DEMIN PANEL 1C-80 TROUBLE, and perform the following: (1.04) • Send the second assistant to 1C80 to investigate. The **crew** will respond to annunciator 1C80 A-6, INFLUENT HIGH CONDUCTIVITY, and perform the following: • Enter AOP 639 Reactor Water/Condensate High Conductivity. • Avoid opening the F/D bypass. The **CRS** will direct and the **Crew** will perform the following actions per AOP 639, Reactor Water/Condensate High Conductivity. (RO 94.18, SRO 5.18) • Observe CRS-2738 RWCU influent conductivity. • Review Action Levels of Attachment 1-5 of PCP 1.9 Water Chemistry Guidelines. o Per Attachment 5, a Hotwell conductivity of >0.1 will be an Action Level 1. ▪ Write an AR, notify Chemistry, and evaluate. ▪ Attempt to reduce the problem. ▪ If not corrected within 96 hours, write another AR. • Monitor conductivity at the indicated recorders.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Small Condenser Tube failure, leading to a fast power reduction. **EVENT #7 continued**	**Booth Instructor** Role play as Chemistry and inform them that you will obtain a sample ASAP. It will take between 5 and 10 minutes for a chemist to get the results to the control room. **Wait** at least 5 minutes, then write down what the **influent conductivity** of GD 24 is reading _____. NOTE that if the reading has gone above .2, tell the control room a number a little above the .2 and ask if they want another sample taken. Then **WAIT** another 5 minutes to report a conductivity reading to the control room.	• Call Chemistry to sample. • Ensures that the F/D bypass stays closed. • When the Hotwell conductivity is reading ≥1.0 μmho/cm while the plant is at power, then: o **ATC operator** per IPOI 4 reduce reactor power to 27 Mlb/hr. o Manually scram the plant.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major transient LOCA, ALC, ED. **EVENT #8**	**Booth Instructor** at the time of the scram, event **trigger 4**, RDPACC(1) .LT. 1440, should have gone true. Verify the following MF inserts: **RR15A at 25 over 1600 sec. with a 2-minute time delay.** This will start a leak that will lead to an ALC ED and trip both FWPs. **Booth Instructor** roll play as the NSPEO if directed to break condenser vacuum: **MRF MC01 and MC02 to open.**	Following the Scram the SS will direct and the crew will perform the actions of IPOI 5. RO 93.22, SRO 4.21 Crew will determine that RPV level lowered below 170" and EOP 1 should be entered. The SS will direct and the crew will perform the following actions IAW EOP 1 • Verify all rods fully inserted. • RC/L o Maintain RPV level 170 to 211" with available inject sources. • RC/P o Override CV 4371A, (Defeat 11). o Stabilize RPV pressure below 1055 psig RO 95.45, SRO 6.45 The SS will direct and the crew will perform the following actions per AOP 639, Reactor Water/Condensate High Conductivity. • Manually operate HPCI, RCIC, and/or SRVs as needed for pressure control. • Manually close CV 1490B, Hotwell Reject Valve. • Trip or verify tripped, the running condensate and feedwater pumps. • Bypass condenser High Backpressure Trip by placing the HI COND BACKPRESSURE BYPASS switches to BYPASS. • Close the MSIVs and MSL drains. • Trip or verify tripped, the circ water pumps. • Close the Condenser outlet Valves. (due to the loss of power, this will have to be done manually) • Break vacuum • Commence an aggressive cooldown with in the limits of IPOI 4.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major transient LOCA, ALC, ED **EVENT #8 continued**	**Booth Instructor** at 2 psig in the DW, Verify that event trigger 9 goes true. This will fail the HPCI Flow controller to '0'. D/W Spray critical task **BEFORE drywell temperature reaches 280°F and WHILE in the safe region of the DWSIL, THEN initiate drywell sprays**	• Drain the water boxes. • Open V-42-12 RHRSW/ESW ISOL to RW Dilution line to limit the pressure on MO 4208 and 4209. (RO 95.45, SRO 6.45) **Crew** responds to Primary Containment HI/LO pressure alarm 1C05B, B-1. • Determines pressure is HI. • Verify proper operation of well water. • Verify Drywell cooling is sufficient. • Crew makes preparation to vent containment per OI 573 and may get venting started. When the Drywell reaches 2 psig, the crew will; Re-enter EOP 1 and maintain the same mitigation strategies, and Enter EOP 2. The SS will direct and the crew will perform the following actions IAW EOP 2: • PC/H o Install defeat 16 to restore sampling. • T/L o Maintain torus level between 10.1 and 10.4 feet. • DW/T o Attempt to maintain below 150°F. o As temperatures rise install defeat 4. o When out of the hatched region of Graph 7, Drywell Spray Initiation Limit, spray the D/W. (**Critical)**

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major transient LOCA, ALC, ED **EVENT #8 continued**	**Note** HPCI will undergo a flow controller failure when the DW reaches 2 psig. **Booth Instructor**, when the **HPCI flow** controller failure is identified and HPCI control is transferred to Manual and injected into the RPV for level control, then allow HPCI to inject into the RPV for a short time, **then** perform the following: **IMF HP02 by setting event trigger 9 to true.** This will result in HPCI tripping and not being able to be reset. ALC ED critical task **IF the reactor is shutdown under all conditions and RPV level drops to +15", THEN perform Emergency RPV Depressurization before RPV level reaches -25"**.	• T/T o Maintain below 95°F by starting torus cooling if necessary. RO 95.14, 95.63, SRO 6.14, 6.63, STA 4.07 • PC/P o **When torus pressure rises above 2 psig, Spray the Torus.** The **Crew** will determine that RPV level is lowering. The **CRS** will direct and the **crew** will perform the following actions IAW EOP • Attempt to restore and maintain level with systems form TABLE 1A. o RCIC will be initiated to inject. o Both CRD pumps will be started. o HPCI will auto start on 2 psig in the DW. ▪ The BOP will determine that the flow controller has failed in Auto. ▪ The BOP will take manual control of the HPCI flow controller. **(Critical)** ▪ The CRS will be informed that HPCI is injecting into the RPV in manual mode. • OSS will be informed that HPCI has tripped and cannot be restarted. RO 95.44, SRO 6.44 The **Crew** will determine that PRV level is still lowering and all High pressure injection systems are injecting. **CRS** will exit EOP 1 Level Control and enter ALC.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Major transient LOCA, ALC, ED **EVENT #8 continued**	**Booth Instructor and/or Lead Evaluator** When the reactor is stable and RPV level is approaching or at the desired level band, and/or at the direction of the Lead Instructor, the scenario can be ended. **Booth Instructor** when the scenario is complete, announce the following: **The scenario is complete, please stand by your stations for follow up questions if necessary**	The **CRS** will direct and the **crew** will perform the following actions IAW ALC/ED: • Lock out ADS. • Verify that RHR and CS Systems are running and available for injection. • When RPV level lowers to 15", and prior to -25", Emergency depressurization will be directed. **(critical)** • For ED o Torus level verified >4.5'. o 4 ADS SRVs are opened and verified open. RO 95.80, SRO 6.78 • When the shutoff head of the CS and RHR pumps is reached, inject into the RPV to restore level above -39". • Restore RPV level to 170 to 211". (RO 95.76 SRO 6.76) **IF** entry to the Sat Curve has occurred, The **CRS** will direct and the **crew** will perform the following actions: • The wide range Yarways are no good. • Subtract 23 inches form the Fuel Zones and Narrow range GEMACs

***** END OF SCENARIO *****

*** REVIEW SCENARIO OBJECTIVES WITH THE OPERATORS ***

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Start up of the "B" RHRSW pump for Chemistry to obtain a sample per NS790702 Continuous Service Water Release Sampling and Analysis **EVENT #1 (N-BOP)**	The **BOP operator** will start the "B" RHRSW IAW OI 416: • Start "B" ESW pump. [**Critical**] • Place handswitch HS-4925B, B RHRSW PUMP 1P-22B on Panel 1C03 in the START position, and allow it to spring return to AUTO. (Section 1.0 Step 5.a [**critical**]) • Throttle open MO-1947 RHR SERVICE WATER OUTLET valve with HS-1947C. (Section 1.0 Step 6 [**critical**]) RO 30.01, & SRO 1.01	OI 416, Rev. 38	Start up of RHRSW IAW OI 416. Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
"B" Recirc Flow unit failing downscale. **EVENT #2 (C-RO)**	**Crew** Recognize the flow unit rod block alarm, and the half scram. They will then follow the 1C05A (E-2) and performs the following: • The **ATC operator** will Bypass APRM flow unit "B" on 1C05, with CRS permission (ARP 1C05A E-2. [**Critical]**) • The **ATC operator** or the **BOP** operator will place the MODE switch for "B" Flow unit in a position other than OPERATE or STANDBY. This is a back panel operation. (ARP 1C05A E-2 [**Critical**]) • The **ATC operator** will reset the half scram. (ARP 1C05A E-2 [**Critical**]) The CRS will determine the following concerning **TS**: • Refers to TS 3.3.1.1 RPS and determines that **NO TS** exist (B 3.3-9, 10). • Refers to TRM 3.3.2 and determines that **NO TRM** exists for rod block. (RO 1.04 & SRO 1.02)	ARP 1C05A E-2, Step 3.4.c Step 3.5.a Step 3.5.c Technical Specifications Technical Requirements Manual	APRM Flow Unit Failure Sat _____ Unsat _____ TS determination for APRM flow unit Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Tripping of the “B” RHRSW pump **EVENT #3 (C-BOP)**	**The BOP operator** will respond to the annunciator 1C03B B-8 “B” RHRSW PUMP 1P-22B TRIP OR MOTOR OVERLOAD and perform the following: • If at any time 1P-22B amps cannot be maintained <80 amps, o The BOP operator will trip the “B” RHRSW pump. (**Critical)** (30.03) **CRS** will determine that with the “B” RHRSW pump inoperable, TS 3.7.1 Condition A must be entered. (1.02)	ARP 1C03B B-8, Rev.6 Step 3.4.d	Tripping of the “B” RHRSW pump based on high amps Sat _____ Unsat _____ TS determination inoperable RHRSW pump Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Control rod 10-39 drifts in. **EVENT #4 (C-RO)**	**ATC operator** will respond to annunciator 1C05A D-8, Rod Drift, and perform the following: (99.13) • At 1C05, select affected Control Rod, monitor 4-rod display to determine if a control rod is drifting, and if so in what direction. (**Critical**) • IF any control rod is drifting **IN**, perform the following: o Place the C11A-S3 EMERG IN/NOTCH OVERRIDE SELECT switch on 1C05 in the EMERG ROD IN position momentarily (less than ½ second) to abort the rod sequence timer. (**Critical**) **SRO** will consult TS and determine the following: • TS 3.1.3 Condition C for and inoperable Control Rod. (1.02)	ARP 1C05 A D-6, Rev.10 Step 3.1 Step 3.3.b	Control rod drifting in. Sat _____ Unsat _____ Control rod inoperable Sat _____ Unsat _____
The 1E-3B feedwater level controller will fail to control level at 100%. **EVENT #5 (C-BOP)**	**Crew** will respond to annunciator ARP 1C06B B-7, LP FDWTR HTR 1E-3B HI LEVEL, and the **BOP operator** will perform the following: • If level remains the same or tends to increase, attempt to control the 1E-3B LP HEATER level with LIC-1319 and or LIC-1321 in the MANUAL mode. (**Critical**)	ARP 1C06B C-7, Rev.2 Step 3.1.e	3A drain valve failing closed. Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Start up Transformer trouble. **EVENT #6 (C-BOP)**	Per OI 304.2. 4160V/480V ESSENTIAL ELECTRICAL DISTRIBUTION SYSTEM, the BOP operator will transfer the Startup Transformer to the Standby Transformer by performing the following: (15.01) • Verify AC Sources/SBDG LCOs have been entered if applicable. o **CRS** will assess **TS** and determine that they must enter TS **3.8.1 condition A** for the loss of one offsite source. (1.02) • Place the BUS 1A3[4] TRANSFER breaker mode selector switch in the MANUAL position. (**Critical**) • Insert the handle in the SYNCHRONIZE switch for 4KV BREAKER 1A301[401] STANDBY TRANSFORMER TO BUS 1A3[4], and place it in the ON position. (**Critical**) • Place the control switch 4KV BREAKER 1A301[401] STANDBY TRANSFORMER TO BUS 1A3[4] momentarily in the CLOSE position. Observe that the red (breaker closed) and white (closing spring charged) indicating lights are ON. (**Critical**)	ARP 1C08A A-7, Rev. 15 OI 304.2 Rev 52 Section 7.3, Step 1. Section 7.3, Step 2 Section 7.3, Step 3 Section 7.3, Step 7	TS determination for Startup Transformer Sat _____ Unsat _____ Transferring startup transformer to the standby Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Start up Transformer trouble. **EVENT #6 (C-BOP)** **continued**	• Place the control switch 4KV BREAKER 1A302[402] STARTUP TRANSFORMER TO BUS 1A3[4] momentarily in the TRIP position. Observe that the green (breaker open) and white (closing spring charged) indicating lights are ON. (**Critical**) • Place the SYNCHRONIZE switch for 4KV BREAKER 1A301[401] STANDBY TRANSFORMER TO BUS 1A3[4] in the OFF position, and remove the handle. (**Critical**) • Place the BUS 1A3[4] TRANSFER breaker mode selector switch in the AUTO position. (**Critical**) • Place STARTUP TRANSFORMER J BREAKER control switch momentarily in the TRIP position. Observe the green (breaker open) indicating light is ON. (**Critical**) • Place STARTUP TRANSFORMER K BREAKER control switch momentarily in the TRIP position. Observe the green (breaker open) indicating light is ON. (**Critical**)	OI 304.2 Rev 52 Section 7.3, Step 9 Section 7.3, Step 10 Section 7.3, Step 13 OI 304.1 Rev 46 Section 5.3, Step 5 Section 5.3, Step 6	Removing the startup transformer form service Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Small Condenser Tube failure, leading to a fast power reduction. **EVENT #7 (R-RO)**	Crew enters AOP 639 when appropriate. When the Hotwell conductivity is reading ≥1.0 μmho/cm while the plant is at power, then: • Per IPOI 4 reduce reactor power to 27 Mlb/hr.	AOP 639, Rev. 22	Reactivity manipulation for performing a fast power reduction. Sat _____ Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Major transient LOCA, ALC, ED.
 	
EVENT #8 (M-ALL)
	The **CRS** will direct and the **crew** will perform the following actions IAW EOP 2
	
	• DW/T
	  • As temperatures rise install defeat 4.
	  • When out of the hatched region of Graph 7, Drywell Spray Initiation Limit, spray the D/W. (**Critical)**
	• PC/P
	  • When torus pressure rises above 2 psig, Spray the Torus**.**
	As level lowers, the **CRS** will direct and the **crew** will perform the following actions IAW EOP 1.
	• Attempt to restore and maintain level with systems form TABLE 1A.
	  • Both CRD pumps will be started. (**Critical)**
	  • HPCI will be initiated,
	  o OSS will be informed that HPCI flow controller has failed in Auto, but will inject in manual. (**Critical)**
	  o The CRS will be notified when HPCI trips. (**Critical)**
	RO 95.44, SRO 6.44, STA 4.07
		EOP 1, Rev.11
		EOP 2, Rev.12
		ALC, Rev.4
		ED, Rev.4
			Carry out actions as applicable for EOP 2
			Sat _____
			Unsat _____
			
			BEFORE drywell temperature reaches 280°F and WHILE in the safe region of the DWSIL, THEN initiate drywell sprays
			Sat _____
			Unsat _____
			
			Attempts to restore level via EOP 1 Table 1A
			Sat _____
			Unsat _____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Major transient LOCA, ALC, ED
EVENT #8 (M-ALL)
continued
	CRS will exit EOP 1 Level Control and enter ALC.
	
	The **CRS** will direct and the **crew** will perform the following actions IAW ALC/ED:
	• Lock out ADS. (**Critical)**
	• When RPV level lowers to 15", and prior to -25", Emergency depressurization will be directed. **(Critical)**
	
	• For ED
	  • 4 ADS SRVs are opened and verified open. (**Critical)**
	  RO 95.80, SRO 6.78
	  • When the shutoff head of the CS and RHR pumps is reached, inject into the RPV to restore level above -39". (**Critical)**
	  (RO 95.76 SRO 6.76)
		EOP 1, Rev.11
		EOP 2, Rev.12
		ALC, Rev.4
		ED, Rev.4
			Transition from EOP1 to ALC
			Sat _____
			Unsat _____
			
			ALC ED critical task
			IF the reactor is shutdown under all conditions and RPV level drops to +15", THEN perform Emergency RPV Depressurization before RPV level reaches -25
			Sat _____
			Unsat _____
			
			ED and reflood evolution
			Sat _____
			Unsat _____

HPCI manual control **EVENT #9 (C-BOP)**	**BOP** will determine that HPCI flow controller has failed in AUTO. BOP will transfer the HPCI flow controller to Manual and begin to inject into the RPV. [**Critical]**	EOP 1, Rev. 11	Transfer HPIC from Auto flow control to manual and inject. Sat _____ Unsat _____

ESG Validation Checklist

SEG/ESG ____ESG 19_____ **Rev. 0_____**

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

ESG Validation Checklist

SEG/ESG ____ESG 19_____ **Rev. 0_____**

Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

_____ _____

SME/Instructor Date

_____ _____

SME/Instructor Date

ESG Validation Checklist

SEG/ESG ____**ESG 19**_____ **Rev. 0**_____

Crew:		Instructors:	
OSM		Booth	
CRS		Floor	
STA		Extra	
1C05			
1C03			
BOP			

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

ESG Validation Checklist

SEG/ESG ____ESG 19_____ Rev. 0_____

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.