DYNAMIC SIMULATOR SCENARIO 1 MT-ILT-27E (2015 ILT NRC Scenario 1) Rev. 0

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<i> () Xcel</i> En	ergy≊	SIMULA	TOR EXE	ERCISE	GUIDE	(SEG)
SITE: MONT	ICELL	.0	SEG #	ILT-SS-	27E	
SEG TITLE:	2015	ILT NRC SCENARIO 1			REV. #	0
PROGRAM:	INITI	AL LICENSE TRAINING	3	#:	MT-ILT	
COURSE:	NRC	SIMULATOR EVALUA	ΓΙΟΝ	#:	N/A	

TOTAL TIME: 45-90 MINUTES

Developed by:		
	Instructor	Date
Reviewed by:		
	Instructor (Simulator Scenario Development Checklist.)	Date
Validated by:		
	Validation Lead Instructor (Simulator Scenario Validation Checklist.)	Date
Approved by:		
	Training Supervision	Date

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- 1. CRD Pump trip
- 2. SRV G fails open (mechanically)
- 3. 2R Transformer oil leak
- 4. SRV G fails open (mechanically)

After EOP Entry:

1. One Control Rod stuck out

Abnormal Events:

- 1. Loss of CRD Flow
- 2. Stuck Open Relief Valve
- 3. Emergency transfer from 2R to 1R XFMR

Major Transients:

1. Torus rupture requiring Emergency Depressurization

- 1. <u>CT 6:</u> When an SRV is stuck open and can <u>NOT</u> be closed then insert a manual reactor scram.
- 2. <u>CT 26</u>: When torus water level can <u>NOT</u> be maintained above -3.3', then scram and execute Emergency Depressurization per C.5-2002.

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		

Event 1	1.	SHIFT RUNNING RBCCW PUMPS		
			CRS	Directs BOP to Transfer RBCCW to #12 RBCCW Pump IAW B.02.05-05.E.1
Booth Operator		a. Respond as RBO that you are standing by at the RBCCW pumps	BOP CR208.102	Directs RBO to be stationed by the RBCCW pumps
Booth Operator		 Respond as RBO that the #12 RBCCW pump suction and discharge valves are fully open 	BOP	Directs RBO to verify suction and discharge valves for #12 RBCCW pump are fully open (Step 3)
			BOP	BOP starts #12 RBCCW pump from C-06
Booth Operator		 Respond as RBO that the #12 RBCCW pump is operating normally 	BOP	Directs RBO to locally check pump and motor performance of #12 RBCCW pump
Booth Operator		 d. When directed by the BOP to close the #11 RBCCW pump discharge valve, INSERT MANUAL TRIGGER 1. When ramp is complete, immediately notify the BOP that the #11 RBCCW pump discharge valve is CLOSED 	BOP	Directs RBO to slowly CLOSE discharge valve on #11 RBCCW pump and then immediately secures the pump
Booth Operator		e. When directed to OPEN the #11 RBCCW pump discharge valve, INSERT MANUAL TRIGGER 3 and verify the valve opens. Once OPEN, notify the BOP that the discharge valve for #11 RBCCW pump is OPEN	BOP	Directs RBO to fully open the discharge valve for #11 RBCCW pump Reports to the CRS that the #12 RBCCW pump is running and that #11 RBCCW pump is secured
			ROA	Places #11 RBCCW pump in auto-standby

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
Event 2	2. <u>#11 CRD PUMP SHAFT SHEAR</u>				
Booth Operator	 When directed by the Lead Evaluator, insert MANUAL TRIGGER 5 and verify CH26A activates: 				
	Key Parameter Response: CRDH pressures and flows lower	SS315.102 CR200.147			
	Key Expected Alarms: 5-B-17 (Charging Water Lo Press)	OATC	Responds to annunciators and notifies CRS of the degraded CRDH parameters.		
	Automatic Actions: None	CRS OATC	Direct / Perform C.4-B.01.03.A (Loss Of CRD Pump Flow)		
Booth Operator	 As the RB Operator, wait one minute and respond as follows: 	OATC	Starts 12 CRD Pump		
Booth Operator	 11 CRD Pump is running but has an extremely high pitch sound. 		Verifies CRDH parameters are restored		
	2) #12 Pump is running normally		Secures 11 CRDH pump		
		OATC	Monitors and controls system pressures and flows and adjust as necessary per B.01.03		
Booth Operator	 Acknowledge any investigation / notification requests to Engineering, Maintenance and Plant Management. 	BOP	Initiates investigation		

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
Event 3	3. STUCK OPEN "G" SRV				
Booth Operator	 When directed by the Lead Evaluator, Insert Manual Trigger 7 and verify Malfunction AP01G goes active. 				
	Key Parameter Response: C-03 Amber light for G SRV will be ON. MWe and B steam line flow will lower	BOP	Implement C.4-B.03.03.A (Stuck Open Relief Valve)		
	Key Expected Alarms: 5-A-46 (SRV OPEN)	BOP	 Place handswitch 2E-S4G for SRV "G" in OPEN and then return to the normal position. 		
	Auto Actions: None	CR200.154 BOP	• Place handswitch 2E-S4G for SRV "G" in CLOSE.		
		BOP	On C-253D, Place HS-S3B in BYPASS		
		BOP	On C-253D, VERIFY HS-S43 in Off.		
		CRS SS315.109 SS315.159	Direct Rapid Power Reduction C.4-F when the SRV fails to close		
Booth Operator	3 seconds after the OATC takes the #12 Recirc Pump to lower, VERIFY EVENT TRIGGER 9 goes active and APO1G is deleted. This will cause SRV "G" to CLOSE.	OATC CR200.203	Reduces recirculation flow as needed		
Booth Operator	 b. Acknowledge any investigation / notification requests to Engineering, Maintenance and Plant 	CRS SS299.354	Evaluates TS 3.3.6.3 (LLS INST) as NOT MET with the switch in OFF (Div 1) and Div 2 circuits bypassed.		
	Management.	CR299.356	 Condition A applies which requires the channels to be restored within 72 hours 		
	<u>NOTE</u> : If SRV left open long enough, the crew may place Torus cooling in service.		May also evaluate TS 3.6.1.5 (LLS Valves) & TRM 3.4.4 (SRVs) as NOT MET		
			 Determines that Conditions A applies which requires the valve be restored in 14 days 		

SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
Event 4	4. Oil leak on 2R / Emergency transfer to 1R			
Booth Operator	 When directed by the Lead Examiner, insert Manual Trigger 11 and verify C-08-B01, 2TR Trouble goes active 			
	Key Parameter Response: None			
	Key Expected Alarms: 8-B-01 (No. 2R XFMR TROUBLE)			
	Auto Actions: None	BOP	Clears all personnel from area near 2R	
			 Verify that 2R Voltages appear normal 	
	<u>NOTE</u> : The following cue must make it clear that it is imperative to do the emergency transfer operation.		• Dispatch an operator to check the 2R transformer or request security to observe 2R transformer with cameras	
Booth Operator	 Role Play the dispatched operator or as security if called: Wait 2 minutes and then report that a steady stream of oil is gushing out of 2R and a large pool of oil has already formed 		Relay information about the oil leak to the CRS	
		CRS	Directs performance of B.09.06-05.E.1 (Transfer of Plant Buses From 2R to 1R – Emergency Method)	
		BOP CR262.133	Performs emergency closed bus transfer from 2R to 1R	
			 Makes plant page to clear all personnel from vicinity of 2R 	
			• Bus 13	
			 Place 152-302/CS to CLOSE 	
			 Place 152-301/CS to TRIP 	

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
			• Bus 14		
			 Place 152-402/CS to CLOSE 		
			 Place 152-401/CS to TRIP 		
			• Bus 11		
			 Place 152-107/CS to CLOSE 		
			 Place 152-101/CS to TRIP 		
			• Bus 12		
			 Place 152-207/CS to CLOSE 		
			 Place 152-201/CS to TRIP 		
Booth Operator	<u>NOTE</u> : Verify the BOP has opened the knife switch on C-31. If not, then DO NOT open 3N4 with the following actions.		 Open knife switch 16 on panel C-31 		
Booth Operator	 Role Play the equipment operator dispatched to open 3N4 as necessary. Wait 10 minutes and: 		Open 3N4 34.5KV Circuit Breaker		
	1) Activate Manual Trigger 13		 As time allows dispatch an operator to 4 kV rooms to reset relay flags 		
	 Verify Remote Function ED06, 3N4 Local operation, to OPEN 		 Notify the System Dispatcher (TSO) of the Transfer to the 1R Transformer 		
		CRS SS299.358 CR299.358	Evaluates LCO 3.8.1 as NOT met		
			Condition A is applicable		

SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
Booth Operator	 Role Play as necessary to inform the crew that another operator will be called in to perform OSP-MSC-0542 		 Required Action A.1: Initiate SR 3.8.1.1 (OSP-MSC-0542), Weekly Breaker Alignment, Indicated Power Availability, and Voltage to AC & DC Power Distribution Checks) within 1 hour 	
			 Required Action A.2: Declare required features INOP within 24 hours when redundant feature is INOP – This action is N/A for these conditions. 	
			 Required Action A.3: Restore an Offsite Circuit within 72 hours 	
Booth Operator	e. For notifications, Role Play Single Point of Contact and plant support personnel as necessary		 Make notifications for the LCO Entry. 	
Operator	and plant support personnel as necessary	CRS	May also evaluate TLCO 3.8.1 as NOT met, however, the LCO 3.8.1 actions are more limiting.	

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	5. STUCK OPEN "G" SRV		
Booth Operator	 When directed by the Lead Evaluator, Insert Manual Trigger 15 and verify Malfunction AP01G goes active. 		
	<u>Key Parameter Response</u> : C-03 Amber light for G SRV will be ON. MWe and B steam line flow will lower		
	Key Expected Alarms: 5-A-46 (SRV OPEN)		
	Auto Actions: None		
	Instructor/Evaluator Note: AOP Immediate actions have already been completed and will not be re-performed.	CRS SS315.109 SS315.159	Direct Rapid Power Reduction C.4-F when the SRV fails to close
		OATC CR200.203	REDUCEs recirculation flow as needed
			When the G SRV remains open, direct a manual scram of the reactor
CT-6	When an SRV is stuck open and can <u>NOT</u> be closed then insert a manual reactor scram prior to reaching 110°F bulk torus water temperature.	OATC	When directed, manually scrams the reactor

	SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
	6. IMMEDIATE REACTOR SHUTDOWN				
		CRS SS315.164	May direct reactor scram or an Immediate Reactor Shutdown IAW C.4.K (Immediate Reactor Shutdown)		
		OATC	May reduce Recirc Flow to minimum		
		CR200.208	Depresses pushbuttons for REACTOR SCRAM A and B		
		CRS SS315.101	Supervises response to a Reactor Scram		
		OATC	C.4-A (Reactor Scram) actions:		
Booth Operator	 When the Mode switch is placed in SHUTDOWN verify Event Trigger 17 goes active. This will close the stuck open SRV and initiate the Torus leak. 	CR200.146	Place Mode Switch in SHUTDOWN.		
	The OATC may address the stuck rod before proceeding with the remaining C.4.A actions (See Event 7) .		 Verifies all Control Rods are inserted to or beyond position 04 and notices 1 Rod remains full out 		
		OATC	 Provides scram script to CRS and reports EOP entry condition RPV level less than 9" 		
			 Controls Reactor water level between +11-46". When reactor water level starts to increase: 		
			 Place CV-6-13 Manual Loading Station Low Flow Valve in AUTO set between 15 and 20 inches 		
			 Close both Main FW Reg Valves 		
			 Verify CV-6-13 is closed when RPV level reaches +15 to +20 inches 		

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
			Monitor Reactor Power		
		OATC	 Insert SRM and IRM detectors. 		
			 Switch recorders from APRM to IRM. 		
			 Range down on IRMs as necessary. 		
			 Verify SDV Vent and Drain Valves closed. 		
			 Verify Recirc pumps have runback to minimum speed 		
			Verify RPS power supplies are available		
			Place DISCH VOL ISOL TEST switch in ISOL		
			 Verify the REACTOR MODE switch in SHUTDOWN 		
			 Place SDV HIGH WATER LEVEL BYPASS in BYPASS 		
			 Reset the Scram using the SCRAM RESET switch 		
			Reset the Rod Drift alarms		
			 Evacuate personnel from the RB Floor and Equipment Drain Tank Room 		
			 When all scram valves are CLOSED place the DISCH VOL ISOL TEST switch in NORM 		
			 Verify the SDV Vent and Drain Valves open 		
			Verify the accumulators recharge		

SCENARIO TIME-LINE:							
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES				
			 When Annunciator 5-B-30 (Disch Volume Tank Not Drained) and 5-B-21 (Disch Volume Water Level Scram Tip) IS RESET, Place SDV HIGH WATER LEVEL BYPASS in NORMAL 				
		BOP	Starts performance of Part B of C.4.A				
			 Announce over the plant paging system that a Reactor Scram has occurred. 				
			 Open Main Generator output breakers 8N7 & 8N8. 				
	NOTE: The remaining BOP actions may not be taken based on the Torus level priority.		Trip the Main Turbine.				
			 Verify the Generator Field Breaker Open. 				
			Start the Turbine Aux Oil Pump.				
			Verify Turbine Exhaust Hood Sprays in service.				
			Check the Turbine Stop Valves CLOSED				
			 Start the Turbine Bearing Lift Pumps (P-64A-F) 				
			 Verify Main Steam Pressure Control or Low-Low Set is controlling Reactor Pressure. 				
			 At C-25, Place the POST SCRAM switch in ON and verify all available Drywell Recirculation Fans are operating 				
			 Verify 4500 gpm through each operating Feed Pump 				
			 Verify Vapor Extractor and Auxiliary Oil Pump running on any non-operating Feed Pump 				

SCENARIO TIME-LINE:						
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES			
			 Verify 4100 gpm through each operating Condensate Pump 			
			 Notify Duty Chemist, Turbine Building Operator and Reactor Building Operator to perform scram actions 			
Event 6	7. UNISOLABLE TORUS LEAK					
Booth Operator	 Verify Event Trigger 17 is active and verify Malfunction PC05 at 100%. 					
	Key Parameter Response: Torus Level on LI-2996 (C-04) or PLR 7251A/B (C-03) lowering					
	Key Expected Alarms: 6-B-9/10 (High Water Level In RHR Rooms) 4-B-4 (Torus Hi-Low Level), 4-B-19/24 (Torus Vacuum Breakers Open) and 5-A-49 (Radwaste Trouble)					
	Auto Actions: Torus to Drywell Vacuum breakers begin to cycle	BOP OATC	Respond to annunciators			
	NOTE: It takes ~19 minutes to reach -3.3 ft which is the decision point for a Reactor Scram and Emergency depressurization		 Notify Rad Protection that a harsh environment or increase radiation environment may exist in the RHR rooms and that entry is required 			
	8. UNISOLABLE TORUS LEAK/ EOP 1300 ACTIONS					
	NOTE: The RHR Room water Level is never reported as having reached Max Safe Level (15 inches) and the timeline of local reports allows the Torus water level to be the critical parameter.	BOP OATC	 Dispatches an operator to investigate 			

	SCENARIO 1	IME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Booth Operator	 Role Play in-plant operator. When dispatched, WAIT 2 MINUTES then report that the water level is approximately 8 inches in both RHR rooms. 		 Receive the report from the plant and relay the information to the CRS.
			 Reports EOP 1300 Entry Condition of RHR Room water levels above 0 inches.
		CRS	Enters and directs actions from EOP1300 Secondary Containment Control
	<u>NOTE</u> : Torus Level can be monitored on Insight File pct112.	BOP OATC	 Verify the Reactor Bldg Floor drain Sump Pump is running
Booth Operator	 b. Role Play in-plant operator. If asked to report the source of the leak, WAIT UNTIL Torus Water Level is -1 feet, then report that the Leak is unisolable from a weld at the ring header in Bay 4. 		Attempt to identify and isolate the source of the water
		CRS	Monitor Area Water Levels approach to Max Safe
	9. UNISOLABLE TORUS LEAK/ EOP 1200 ACTIONS	SS304.194	
		BOP	Respond to 4-B-4, (Suppression Water Level Hi/Low)
			• Check LI-2996 on C-04 or PLR-7251A/B on C-03
			 Identifies and reports the lowering trend
	<u>NOTE</u> : It takes approximately 3 minutes to reach -4 inches Torus water level		 Reports EOP 1200 Entry Condition when Torus water level (Narrow Range) is < -4 inches
			Monitors and reports Torus water level throughout
		CRS	Enters and directs actions from EOP-1200 (Primary Containment Control)

SCENARIO TIME-LINE:							
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES				
		SS314.115	 Directs performance of C.5-3401 (Torus Water Level Makeup) 				
Booth Operator	 Role Play the out-plant operator if assigned to perform C.5-3401: Wait 2 minutes and report that he must find boots as PPE for the water on the floor. 	BOP CR314.119	 May direct an in-plant operator to perform C.5-3401 steps for Core Spray and RHR. (May choose not to perform due to safety concerns) 				
			 Verifies the HPCI CST Suction, MO-2063 Open 				
			 Opens the HPCI Pump Minimum Flow Valve CV-2065 				
			 Verifies the RCIC CST Suction, MO-2102 Open 				
			 Opens the RCIC Pump Minimum Flow Valve CV-2104 				
	10. EMERGENCY DEPRESSURIZATION	CRS	CRS May anticipate Blowdown per a C.5-1100 Override Statement and direct RPV pressure be lowered using the Turbine Bypass Valves				
СТ 26	When torus water level can <u>NOT</u> be maintained above -3.3', then scram and execute <u>EMERGENCY</u> <u>DEPRESSURIZATION</u> per C.5-2002.	CRS	When it is determined that Torus Water Level can <u>NOT</u> be maintained above -3.3 ft, Blowdown and enter EOP 2002.				
		CRS	 Recognizes when Torus Water Level can <u>NOT</u> be maintained above -3.3 ft 				
			 Enters and directs EOP-2002 (Blowdown) 				
			 Verifies Torus level > -5.9 ft. 				
			Directs that 3 ADS SRVs be opened				

SEQ

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SCENARIO TIME-LINE:						
SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES				
	BOP	If directed to ANTICIPATE BLOWDOWN and lower RPV pressure using the Turbine Bypass Valves				
	CR304.145	 At C-07, places PRESS REG OVERRIDE in OPEN until both Bypass valves are open 				
	BOP	Perform Emergency Depressurization				
		 When directed by CRS, place 3 ADS SRVs to OPEN and verifies they have opened 				
		Monitor RPV Pressure and Level				

		CR304.145	 At C-07, places PRESS REG OVERRIDE in OPEN until both Bypass valves are open
		BOP	Perform Emergency Depressurization
			 When directed by CRS, place 3 ADS SRVs to OPEN and verifies they have opened
			Monitor RPV Pressure and Level
Event 7	11. CONTROL ROD 14-27 FAILS TO INSERT		
	Key Parameter Response: Control Rod remains at position 48 and RWM indicates one rod still out.		
	Key Expected Alarms: None		
	Auto Actions: None	OATC	 Identifies that Rod 14-27 did not fully insert
Booth Operator	 Role Play the Reactor Bldg Operator as necessary and, as requested wait 1 minute and insert MANUAL TRIGGER 19 to close CRD-14 		 Informs the CRS and performs actions to insert Control Rod 14-27
			May reset the scram and insert the control rod
Booth Operator	 Verify REMOTE FUNCTION CH22 goes active to close CRD-14 		1. Direct an out-plant operator to manually close CRD-14
Booth	b. If the OATC places the ROD MOVEMENT		Bypass the RWM
Operator	CONTROL switch to ROD IN to insert Rod 14-27, verify EVENT TRIGGER 21 goes active and MALFUNCTION CH02_058 DELETES.		 Select and insert the full out rod
Booth Operator	c. If the OATC uses EMERG ROD IN to insert Rod 14-27, verify EVENT TRIGGER 23 goes active and MALFUNCTION CH02_058 DELETES.		

SCENARIO TIME-LINE:						
SEQ	SE	QUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
	12. <u>SC</u>	ENARIO TERMINATION				
	a.	The scenario may be terminated when actions are taken to insert the control rods and an Emergency Depressurization has been performed.				
	b.	The scenario may be also terminated at the discretion of lead instructor/evaluator	Crew	 Remain in simulator for potential questions from evaluator. 		
	C.	End the scenario by placing the simulator in FREEZE.	Crew	 No discussion of scenario or erasing of procedure marking is allowed. 		

? Xcel Ene	ergy≊	SIMULATOR EXERCISE GUIDE (SEG)				
SITE: MONT	ICELL	.0	SEG #	ILT-SS-	28E	
SEG TITLE:	2015	ILT NRC SCENARIO 2	2		REV. #	0
PROGRAM:	INITI	AL LICENSE TRAINING	3	#:	MT-ILT	
COURSE:	NRC	SIMULATOR EVALUA	TION	#:	N/A	

TOTAL TIME: 45-90 MINUTES

Developed by:		
	Instructor	Date
Reviewed by:		
	Instructor (Simulator Scenario Development Checklist.)	Date
Validated by:		
	Validation Lead Instructor (Simulator Scenario Validation Checklist.)	Date
Approved by:		
	Training Supervision	Date

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- 1. RBM B Upscale failure
- 2. RPV Flange Leak
- 3. Control Rod Drift out
- 4. 12 Stator Water Cooling Pump trip
- 5. Scram Discharge Volume failure to isolate

After EOP Entry:

1. ADS Valves fail to open on ED

Abnormal Events:

- 1. Control Rod Drifting
- 2. Loss of Stator Water Cooling

Major Transients:

1. Unisolable leak from SDV resulting in a RPV blowdown

- 1. <u>CT-ADS</u> When two or more ADS valves fail to open when Emergency Depressurization is required, open additional SRVs until a total of three SRVs are open.
- 2. <u>CT-34</u> When a primary system is discharging into the secondary containment through an unisolable break; perform an Emergency Depressurization per C.5-2002 when max safe operating values are exceeded in two or more areas.

		SCENARIO	TIME-LINE:	:
SEQ		SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 1	1.	PLACE THE 2 ND MFRV IN SERVICE AND REACTOR WATER LEVEL CONTROL IN 3 ELEMENT CONTROL	CRS BOP CR259.103	 Directs BOP to place the 2nd MFRV in service IAW Form 2167 (PLANT STARTUP) and B.05.07-05.D.4 (PLACE REMAINING B MAIN FW REG VALVE CV-6-12B IN SERVICE) Verifies MO-1134 is OPEN. Verifies MTS-6-84B bias (vertical scale) is set at ZERO Using MTS-6-84B, OPENS CV-6-12B Monitors Vessel level and FW flow as CV-6-12B OPENS When MTS-6-84B output (horizontal scale) matches demand signal (vertical scale), then places MTS-6-84B in AUTO.
Event 2	2.	RBM B FAILS UPSCALE		
BOOTH INST		 When directed by the lead evaluator, Insert MANUAL TRIGGER 1 and verify NI17B activates. 		
	Ke	y Parameter Response: RBM B indicates upscale		

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Key Expected Alarms: 5-A-3 (ROD WITHDRAW BLOCK), 5-A-43 (RBM DOWNSCALE/TROUBLE), 5-A-51 (RBM HI/INOP)		
	Auto Actions: Rod Withdraw Block	OATC	Reports alarm and rod block to the CRS
			 Takes action IAW 5-A-51 (RBM HI/INOP)
			 Presses the Trip Status softkey and Contributions softkey to determine source of INOP trip.
			 Determines equipment failure is a Critical Self-Test Fault
			 Bypasses RBM B using Joystick 7B-S2
		CRS	Evaluates LCO 3.3.2.1-A as still MET
		SS299.351 CR299.353	 Condition A is still met because the plant is not below the limit specified in the COLR.
Event 3	3. VESSEL FLANGE SEAL LEAK		
BOOTH INST	a. When directed by the lead evaluator, Insert MANUAL TRIGGER 3 .		
	 b. Verify C-04-A35 MALFUNCTION (Annunciator) goes active: 		
	Key Parameter Response: None		
	Key Expected Alarms: 4-A-35 (VESSEL FLANGE SEAL LEAK)	BOP	Responds to annunciator and reports to the CRS
	Auto Actions: None.		

SCENARIO TIME-LINE:					
SEQ		EQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
BOOTH INST		When CV-2369 is placed in OPEN, verify Event Trigger 29 activates. This will delete the Vessel Flange Seal Leak alarm after a 2 minute delay.	BOP	Places CV-2369 in OPEN	
BOOTH INST		 If confirmatory indication requested, state as the RBO that PS 2-102 reads 616 psig. 		Alarm will clear after 2 minutes and 1 minute later CV- 2369 is placed back in the closed position.	
BOOTH INST		 Acknowledge as Plant Technical Staff the receipt of the annunciator. 		Notifies Plant Technical Staff of the receipt of the annunciator	
Event 4	4.	CONTROL ROD 18-19 DRIFTS OUT			
BOOTH INST		When directed by the Lead Evaluator, insert MANUAL TRIGGER 5 and verify 03-S72-02 activates for 2 seconds and CH01_034 activates.	OATC CR200.226 SS315.167	Acknowledges the alarm and informs the CRS that Control Rod 18-19 is drifting out.	
Key Parameter Response: Control Rod 18-19 drifting out				Enters C.4-B.01.03.C (CONTROL ROD DRIFTING)	
Key Expected Alarms: 5-A-27 (ROD DRIFT)				 Places Rod Select Power Switch to OFF and back to ON 	
	<u>Auto</u>	matic Actions: None		 Reselects Control Rod 18-19 and inserts to position 00 	
BOOTH INST		 Once the OATC holds the Rod Insert switch to IN for 5 seconds, verify the control rod drift malfunction CH01_034 deletes. 		 May hold the Rod Insert Switch to IN or release it. 	
BOOTH INST		As the Reactor Building Operator; when directed to isolate and/or disarm Control Rod 26-27, wait 3 minutes, insert Manual Trigger 7 and report that the control rod is isolated and/or disarmed.	CRS/ BOP	Directs the Reactor Building Operator to hydraulically isolate and/or electrically disarm HCU 18-19 IAW B.01.03- 05.G.2 (HYDRAULIC CONTROL UNIT ISOLATION).	
			CRS	Evaluates LCO 3.1.3-C as NOT MET	

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		SS299.349 CR299.351	Action C.1: Fully insert control rod within 3 hours
			Action C.2: Disarm CRD within 4 hours
Event 5	5. <u>12 STATOR WATER COOLING PUMP TRIP WITH</u> REACTOR SCRAM		
BOOTH INST	 When directed by the lead evaluator, INSERT MANUAL TRIGGER 9 and verify EG02B activates. 		
	Key Parameter Response: Loss of Stator Water Cooling	BOP	Announces that a complete loss of Stator Water Cooling has occurred.
	Key Expected Alarms: 8-A-17 (NO. 1 GENERATOR COOLING WTR FAILURE	SS315.126	Enters procedure C.4-B.06.02.04.A (STATOR COOLING WATER FAILURE).
	<u>Auto Actions</u> : Turbine Generator Runback. An automatic scram will occur if both Main Turbine Bypass Valves go full open due to the Runback.	CR200.171	Recommends that a Manual Reactor Scram be inserted.
		OATC CR200.166 SS315.164	Inserts a manual Reactor scram.
		OATC	Takes actions IAW C.4-A (Reactor Scram) PART A:
		SS315.101 CR200.146	Place Mode Switch in SHUTDOWN.
			 Verify all Control Rods are inserted to or beyond position 04.

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			 Provides scram script to CRS. Reports RPV less than 9" EOP entry condition.
			 Controls Reactor water level between +9 and +48 inches. When RPV water level starts to increase:
			 Place CV-6-13 Manual Loading Station Low Flow Valve in AUTO set between 15 and 20 inches
			 Close both Main FW Reg Valves
			 Close MO-1133 and MO-1134 (HP Feedwater Line Block valves
			 Verify CV-6-13 is closed when RPV level reaches +15 to +20 inches
			Monitor Reactor Power
			 Insert SRM and IRM detectors.
			 Switch recorders from APRM to IRM.
			 Range down on IRMs as necessary.
	<u>NOTE</u> : The remaining ATC actions in C.4-A may NOT be performed depending on when the SDV leak is recognized.		Verify SDV Vent and Drain Valves closed.
			Verify Recirc Pumps have run back to minimum
		BOP	Takes actions IAW C.4-A (Reactor Scram) PART B:
			Plant page that a Reactor Scram has occurred.
			• Open Main Generator output breakers 8N7 & 8N8.
			Trip the Main Turbine.

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	<u>NOTE</u> : The remaining BOP actions in C.4-A may NOT be performed depending on when the SDV leak is recognized.		 Verify the Generator Field Breaker Open.
			Start the Turbine Aux Oil Pump.
			Verify Turbine Exhaust Hood Sprays in service.
			Start the Turbine Bearing Lift Pumps
			 Verify Main Steam Pressure Control or Low-Low Set is controlling Reactor Pressure.
			 At C-25, Place the POST SCRAM switch in ON and verify all available Drywell Recirculation Fans are operating
			 Verify 3300 gpm through each operating Feed Pump
			 Verify Auxiliary Oil Pump running on any non- operating Feed Pump
			 Verify 3000 gpm through each operating Condensate Pump
Event 6	10. SDV Vent and Drain Valve Failure to Isolate		
	 The malfunctions for SDV vent and drain valve failures, CH22A and CH22B, are inserted during the initial setup. 		
	Key Parameter Response: Scram Discharge Volume Vents and Drains remain open		
	<u>Key Expected Alarms:</u> 3-B-56 (HIGH AREA TEMP STEAM LEAK), 4-A-11 (REACTOR BUILDING HI RADIATION)		

SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
	Auto Actions: None		The BOP will respond to annunciators and report to the CRS EOP 1300 Entry Conditions	
	NOTE: It takes approximately 4 minutes for area A-11, West CRD HCU, to reach Max Safe Rad levels (1R/hr). It takes an additional 4 minutes for the second area, A-15 Reactor Bldg Drain Tank, to reach Max Safe (1R/hr).			
		Crew SS304.196 SS304.239	Perform the actions of EOP-1300 (Secondary Containment Control)	
		CR304.105 CR304.153	 Directs evacuation of area or entire reactor building. 	
			 Reports Reactor Building radiation levels and temperatures are rising 	
			 Keeps the CRS informed of Secondary Containment parameter values and trends 	
	NOTE: The SDV isolation valves will NOT be able to be reset due to a malfunction on the SDV high level bypass circuitry.	OATC	Attempts to manually close SDV isolation valves	
		CRS	Enters EOP-1300 (Secondary Containment Control)	
			Direct isolation of the SDV	
		CRS	Monitors Secondary Containment parameters	
CT-34	When a primary system is discharging into the secondary containment through an unisolable break, perform an Emergency Depressurization per C.5-2002 when max safe operating values are exceeded in two or more areas.	Crew SS304.198 CR314.101	 Recognizes when 2 area radiation levels have exceeded Max Safe 	

	SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES			
		CRS	Enters and directs EOP-2002 (Blowdown)			
			 Verifies Torus level > -5.9 ft. 			
			Directs that 3 ADS SRVs be opened			
		BOP	Perform Emergency Depressurization			
		CRS	Enters EOP-1300 (Secondary Containment Control)			
<u>CT-ADS</u>	When two or more ADS valves fail to open when		Directs opening of all 3 ADS SRVs.			
	Emergency Depressurization is required, open additional SRVs until a total of three SRVs are open.	BOP	Recognizes that C & D SRVs failed to open			
			Opens additional SRVs until a total of 3 are open			
	8. SCENARIO TERMINATION					
FLOOR INST	The scenario may be terminated when Emergency Depressurization has been performed.					
	The scenario may be also terminated at the discretion of lead instructor/evaluator	Crew:	Remain in simulator for potential questions from evaluator.			
	End the scenario by placing the simulator in FREEZE .	Crew:	No discussion of scenario or erasing of procedure marking is allowed.			

2 Xcel Ene	ergy≊	SIMULAT	OR EXE	ERCISE	GUIDE (SEG)
SITE: MONT	ICELL	.0	SEG #	ILT-SS-2	29E	
SEG TITLE:	2015	ILT NRC SCENARIO 3			REV. #	0
PROGRAM:	INITI	AL LICENSE TRAINING		#:	MT-ILT	
COURSE:	NRC	SIMULATOR EVALUAT	ION	#:	N/A	

TOTAL TIME: 45-90 MINUTES

Developed by:		
	Instructor	Date
Reviewed by:		
	Instructor (Simulator Scenario Development Checklist.)	Date
Validated by:		
	Validation Lead Instructor (Simulator Scenario Validation Checklist.)	Date
Approved by:		
	Training Supervision	Date

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- 1. RCIC Steam Leak with Group 5 Isolation failure
- 2. ADS Timer Malfunction
- 3. CRD Flow Control Valve failure
- 4. Main Turbine Vibrations

After EOP Entry:

- 1. ARI Failure
- 2. SBLC Pump failure

Abnormal Events:

- 1. Group 5 Isolation.
- 2. Inadvertent ECCS Initiation
- 3. Rapid Power Reduction

Major Transients:

1. Hydraulic ATWS

- 1. <u>CT-46</u>: During failure to scram conditions with reactor power above 4.0%, terminate and prevent injection from all sources except SBLC, RCIC, and CRD until level lowers to at least -33".
- 2. <u>CT-48</u>: During failure to scram conditions with a critical reactor, insert control rods using one or more methods contained within C.5-3101 to achieve reactor shutdown under all conditions.

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 1	1. RESTORE RCIC SUCTION TO THE CSTS		
	Optional: This normal evolution has been validated as an	CRS	May perform refocus brief
	optional event. If the BOP operator does not need a normal evolution, this event may be omitted from the scenario.	BOP CR217.111	Performs B.02.03-05.G.2 (MANUAL SWITCHOVER OF RCIC SUCTION FROM THE TORUS TO THE CONDENSATE STORAGE TANKS).
			 Verifies Torus level <+2" and CST level >2'8"
	NOTE: Based on initial conditions, this TS has already been entered for restoring the suction to the CSTs		 Notifies CRS to evaluate TS 3.5.3 for RCIC
			 Concurrently closes MO-2100 and MO-2101
	NOTE: Without an automatic transfer signal, MO-2102 must be manually opened.		 Once dual indication is observed on MO-2100 & MO-2101, opens MO-2102 manually.
			 Verifies closed MO-2100 and MO-2101
			 Notifies CRS to exit TS 3.5.3
		CRS	Exits TS 3.5.3 for RCIC
Event 2	2. IN-SERVICE CRD FLOW CONTROL VALVE FAILS		
BOOTH INST	 a. When directed by the lead instructor, insert Manual Trigger 1 and verify CH07B goes active 		
	Key Parameter Response: Reduced CRD cooling water flow		
	Key Expected Alarm: 5-B-41 (CRD HI TEMPERATURE)	OATC	Responds to annunciator and informs CRS
	NOTE: It will take three minutes for the alarm to come in.		
	Auto Actions: None		

NOTE: Table may be modified as needed to include all scenario time-line items

		SCENARIO	TIME-LINE	:
SEQ	SE	QUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	b.	If directed to investigate CRD temperatures, wait 2 minutes and report that many CRD temperatures are rising and that CRD 26-15 is in alarm. The highest reading temperature is 255°F.		Sends Reactor Building Operator to investigate CRD temperature recorder. Recognizes CRD FCV failure
			CRS	Directs performance of B.01.03-05.E.4 (PLACING THE STANDBY CRD FLOW CONTROL VALVE INTO SERVICE)
	C.	When directed to report to the CRD FCV station to support shift of FCV, WAIT 1 minute and report you are standing by.	OATC CR201.111	Coordinates with Reactor Building Operator (RBO) and performs the following:
BOOTH INST	d.	When directed to OPEN CRD-18-2 and CRD-16- 2, WAIT 1 minute then use Manual Trigger 3 to modify REMOTE FUNCTION CH17 to OPEN and report this action to the Control room.		Directs RBO to OPEN CRD-18-2 & CRD-16-2
				Places CRD Flow Controller in MANUAL
				Closes CV-3-19A with the flow controller
				Places the CRD Flow Selector to the B position
				Slowly opens CV-3-19B to 55-58 gpm
				Places CRD Flow Control in auto
BOOTH INST	e.	When directed to CLOSE CRD-16-1 and CRD-18-1, WAIT 1 minute, then use Manual Trigger 5 to modify REMOTE FUNCTION CH16 to CLOSE and report this action complete.		Closes CRD-16-1 & CRD-18-1
	f.	If directed to report CRD temperatures, report all alarms are clear and all temperatures are lowering to normal.		 Acknowledge annunciator 5-B-41 clear and informs Shift Supervision.

		SCENARIO	TIME-LINE:	
SEQ		SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 3	3.	RCIC STEAM LEAK WITH GROUP 5 FAILURE		
BOOTH INST		 When directed by the Lead Examiner, insert Manual Trigger 7 and verify RC07 activates 		
	<u>Key</u> radi	Parameter Response: Rising temperatures and ation levels in the RCIC room		
	<u>Key</u> Rai @ 1	Expected Alarms: 4-A-11 (REACTOR BUILDING HI DIATION), 3-B-56 (HIGH AREA TEMP STEAM LEAK) 30°F		
	<u>Aut</u>	o Actions: Group 5 Isolation (Disabled)	BOP	Monitors and reports rising RCIC area temperatures and radiation level.
BOOTH INST		 If sent as the RBO to investigate the steam leak, wait one minute and report that it appears there is a steam leak coming from the vicinity of MO-2078. 		 May direct the RBO to investigate the leak.
				Enters C.4-B.02.04.A (STEAM LEAKS OUTSIDE PRIMARY CONTAINMENT)
				Evacuates RCIC room or entire Reactor Building
			CRS SS315.106 SS315.116	Enters C.5-1300 (SECONDARY CONTAINMENT CONTROL) and directs isolation of RCIC (Group 5)
			BOP CR200.151 CR200.161	Enters C.4-B.04.01.E (PRIMARY CONTAINMENT ISOLATION – GROUP 5)
BOOTH INST		c. When MO-2075 is closed, verify Event Trigger 29 activates. This will delete the RCIC leak (RC07)		Closes MO-2075 and MO-2076

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
BOOTH	d. If directed as the RBO to provide status after	CRS	Evaluates TS LCO 3.5.3 Condition A as NOT MET
INST	RCIC isolation valves have been shut, state that there is NO steam flow noise and steam is	SS299.353	Action A.1 – Verify HPCI operable immediately
	clearing from the room.	CR299.355	 Action A.2 – Restore RCIC within 14 days
Event 4	4. INADVERTENT ADS TIMER INITIATION		
	Optional: This event has been validated as an optional event. If the BOP/CRS does not need an Instrument Malfunction/Tech Spec call, this event may be omitted from the scenario.		
BOOTH INST	 When directed by the lead evaluator, Insert Manual Trigger 9 verify AP07 activates. 		
	Key Parameter Response: 107 second timer initiates		
	Key Expected Alarms: 3-A-25 (AUTO BLOWDOWN TIMER ACTIVATED)	BOP	Announces alarm
	Auto Actions: None	SS315.160	Enters C.4-G (INADVERTENT ECCS INITIAION)
		CR200.204	 Verifies alarm and timer initiation is inadvertent
			 Places ADS Inhibit Switched to INHIBIT
		CRS	Evaluates TS LCO 3.3.5.1 Condition A & G as NOT MET
		SS299.351	 Action G.1 – Declare ADS valves inoperable in 1 hour
		CR299.353	 Action G.2 – Restore to operable in 96 hours
	NOTE: With the Inhibit switches in INHIBIT the ADS		Evaluates TS LCO 3.5.1 K & L as NOT MET
	system is non-functional. CRS should not wait the 1 hour as allowed by LCO 3.3.5.1.		 Action L – Mode 3 in 12 hours / Mode 4 in 36 hours

		SCENARIO	TIME-LINE		
SEQ		SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS		EXPECTED STUDENT RESPONSES
Event 5	5.	MAIN TURBINE VIBRATIONS			
BOOTH INST		 When directed by the Lead Examiner, insert Manual Trigger 11 and verify TU03A/B/C activates. 			
	<u>Ke</u> Tu	y Parameter Response: Rising vibrations on Main rbine shaft bearings 1, 2 and 3.			
	<u>Ke</u> Hie	e y Expected Alarms : 7-B-33 (TURBINE VIBRATION GH)	BOP	Fc	bliows ARP 7-B-33 (TURBINE VIBRATION HIGH)
	<u>Au</u>	to Actions: None		•	If power reduction is necessary then perform C.4-F (Rapid Power Reduction)
				•	If sustained Turbine-Generator vibration levels approach 15 Mils, then reduce recirculation flow to minimum, initiate a manual reactor scram and manually trip the Turbine
			CRS SS315.159	Di	rects C.4-F (Rapid Power Reduction)
	<u>NC</u> rec	DTE : Lowering Reactor power will NOT be successful in ducing turbine vibration.	OATC CR200.203	•	Lowers reactor power by lowering recirc flow in an attempt to mitigate turbine vibrations.
	6.	CONTINUED VIBRATIONS – REACTOR SCRAM			
			CRS SS315.164	Di Sh	rects a reactor scram IAW C.4.K (Immediate Reactor nutdown)
BOOTH INST	NC ve tur	<u>DTE:</u> When the Mode switch is placed in SHUTDOWN, rify EVENT TRIGGER 28 activates TC02 tripping the bine and TU03A/B/C turbine vibrations ramp to 0%.	OATC CR200.208	De an	epresses pushbuttons for REACTOR SCRAM A and B nd places the Mode Switch in SHUTDOWN

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
	7. <u>Hydraulic ATWS</u>				
		OATC	Provides a Scram Report		
			 Reactor Scram, Mode Switch is in Shutdown, all rods are <u>NOT</u> in, Reactor power is >4%, EOP Entry 		
		CRS SS304.213 SS304.201 SS304.244 CR314.129 CR314.104	Enters EOP 1100 RPV Control, transitions to EOP 2007, Failure to Scram, and directs the following:		
	NOTE: The CRS may wait to direct this action as time permits.	BOP	 ○ Inhibit ADS 		
		SS314.111 CR314.115	 C.5-3301 (Defeat MSIV Low-Low Level Isolation) Places 4 Key switches to BYPASS on C-15 and C-17. 		
	NOTE: The CRS may wait to direct this action during the Level Leg actions.	SS314.108 CR314.112	 C.5-3205 (Prevent Core Spray injection) 		
			 Place the A & B CS INJECTION BYPASS Switches to BYPASS 		
			- Close MO-1751 (1752) Injection Outboard		
			 Place A and B CS Pump switches to PTL 		
			- Close MO-1753 (1754) Injection Inboard		

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	8. <u>Hydraulic ATWS Power Leg Actions</u>		
CT-48	During failure to scram conditions with a critical reactor, insert control rods using one or more methods contained within C.5-3101 to achieve reactor shutdown under all conditions.	OATC CR314.105	 Performs C.5-3101 (Alternate Rod Insertion)
		SS314.101	 Verifies Recirc pumps are at minimum speed and trips the pumps
	NOTE: ARI will NOT work for this scenario.	CR212.105	 Arms and Actuates A/B ATWS and determines if ARI is having success.
	<u>NOTE</u> : C.5-3101 Part C and/or Part D may be performed. If only one part is performed, the actions from the other part are not applicable	OATC	<u>Performs PART C</u> (INCREASE COOLING WATER DIFFERENTIAL PRESSURE AND USE RMCS)
			Bypasses RWM
			 Verifies 12 CRD pump is running
			 Fully open the CRD Flow Control Valve
			 Place FC 3-301 in MAN
			\circ Adjust output of FC 3-301 to 100%
			 Opens MO-3-20 (Drive Pressure to CRD)
BOOTH INST	 a. When requested to close CRD-168, activate Manual Trigger 13 and verify CH34 goes active. Wait 1 minute and report it as closed. 		 Directs Reactor Building Operator to CLOSE CRD-168, CRD-79-1 & CRD-79-2
			 When control rods no longer drift in, Drive rods using RMCS
			Establish Drive Pressure as high as possible below 400 psig by one or more of the following:

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
			 Throttle closed the CRD Flow Control Valve 		
			 Throttle closed Open MO-3-20 Drive Pressure to CRD 		
BOOTH INST	 b. If requested to close CRD-14, activate Manual Trigger 15 and verify CH22 is modified to 0. 		 Directs the Reactor Bldg Operator to CLOSE CRD-14 to raise drive pressure 		
BOOTH INST			 Select and insert rods in non-peripheral core regions with few or no rods inserted 		
			Attempt to achieve a "Black and White" pattern		
			Performs PART D (RESCRAM CONTROL RODS)		
	<u>NOTE</u> : C.5-3101 Part C and/or Part D may be performed. If only one part is performed, the actions from the other part are not applicable		 Evacuate personnel from the RB 896' Floor and the Equipment Drain tank Room 		
BOOTH INST	 c. When requested to deenergize the ARI valves insert Manual Trigger 17, this modifies RR18 is to Open. Wait 1 minute and report the ATWS 125 VDC Breakers Open. 		 Directs the in-Plant operator to deenergize the ATWS 125 VDC Valves by opening D-21 & D-11. 		
	NOTE: These contacts are modeled in the simulator. The jumpers are included with the C.5-3101 procedure.		 Installs jumpers to bypass all automatic scram signals in C-15 & C-17 		
			Resets the scram		
BOOTH INST	 d. If requested to open CRD-14, modify Remote Function CH22 is to Open, wait 1 minute and report CRD-14 Open. 		Directs the Reactor Bldg Operator to open CRD-14		
			 Verifies SDV Vent and drain valves Open 		
	NOTE: This may take up to 7 minutes.		 When Annunciator C-05-B-21 clears, closes the SDV vent and drain valves 		

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
BOOTH INST	e. <u>IF THE SCRAM IS RESET</u> and a Manual Reactor Scram is inserted for Part D, INSERT MANUAL TRIGGER 19 to deleted CH16 allowing the control rods to insert.		Inserts a Manual Reactor Scram
			 Verifies all control rods fully inserted and informs the CRS
	9. SBLC Initiation Problems		
BOOTH INST	<u>NOTE</u>: Event Triggers 28 or 29 will auto activate to clear the trip on the second SBLC pump that is started.		
	 a. If #11 SBLC is attempted to be started first, verify Event Trigger 27 goes True and SL01B deletes after 1 second so #12 SBLC pump will start. 	CRS	Directs SBLC initiation before Torus temp reaches 110°F using the SBLC Hard Card, B.03.05-05.G.1 (SBLC Manual Initiation)
	 b. If #12 SBLC is attempted to be started first, verify Event Trigger 26 goes True and SL01A deletes after 1 second so #11 SBLC pump will start. 		
	Key Parameter Response: Selected pump Green light stays on and Red light stays off, SBLC discharge pressure remains at 0 psig	OATC CR211.106	Places 11A-S1 SBLC System Selector Switch to SYS 1 or SYS 2 and recognizes that the first pump fails to start .
	Key Expected Alarms: None		Starts the other SBLC pump
	<u>Auto Actions</u> : RWCU isolates and pumps trip ONLY when the second pump starts.		 Verifies the RWCU Pumps trip and the Group 3 isolation valves close.
			 Verifies SBLC Pump running light is ON and, discharge pressure is slightly higher than RPV pressure with SBLC Tank level decreasing.

SCENARIO TIME-LINE:					
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES		
	10. Hydraulic ATWS Level Leg Actions				
		CRS	Verify needed auto actions		
			Identifies that power >4% & RPV level above -33" and directs Terminate and Prevent actions		
CT-46	During failure to scram conditions with reactor power above 4%, terminate and prevent injection from all sources except SBLC, RCIC, and CRD until level lowers to at least -33".	BOP CR314.112	 Prevents injection from Condensate & Feedwater by placing the FRV Controllers in Manual and closing the Reg Valves 		
		BOP	 Prevents injection form HPCI by placing the Aux Oil Pump in PTL 		
			Prevents LPCI injection as follows		
			Open Knife switches (C-03): 10A-S31A/B		
			Verify LPCI OBD Valves are closed, MO-2012/13		
		CRS	Lets level drop until		
			- Power is <4% or		
			 All SRVs stay closed and DW pressure is < 1.84 psig or 		
			- RPV Level reaches -126 inches		
	For level control, the CRS should direct condensate and feedwater injection re-established and used to maintain level in the desired band.		 Records final level and sets level band 		
			Uses Condensate & Feedwater as necessary to maintain established level band.		

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	11. Hydraulic ATWS Pressure Leg Actions		
		CRS/ BOP	 Stabilize RPV pressure below 1056 psig using the one remaining Bypass Valve and/or SRVs (LL- SET)
	12. (PRIMARY CONTAINMENT CONTROL)	BOP	Monitor Primary Containment Parameters
	NOTE : Based on Crew priorities and Torus water temperature EOP-1200 actions may be taken.		If Torus Water Temperature exceeds 90°F, notify the CRS of the EOP C.5-1200 entry condition.
		CRS	Enters EOP C.5-1200 Primary (Containment Control)
			Directs start of all available Torus Cooling
		BOP	Starts all available Torus Cooling IAW the Hard Card.
			• Verify CV-1728 (1729), RHR HX SW Outlet, controller set at 20%.
			• START No 11(12) and/or No 13(14) RHRSW pumps as needed.
			 Adjust flow for ~3500 gpm per pump using CV-1728 (CV-1729).
			• Verify 11(12) and/or 13 (14) RHR pumps running.
			 Partially OPEN MO-2008 (2009), Torus Cooling Inj/Test Inboard, by holding handswitch in OPEN position for 8 seconds.
			 Give MO-2006 (2007) an OPEN signal by momentarily placing RHR Div 1 Disch to Torus Otbd handswitch 10A-S14A (B) to OPEN.
			• THROTTLE OPEN MO-2008 (2009) to provide ~4000 gpm per pump.

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• CLOSE MO-2002 (2003), HX Bypass.
			 Verify V-AC-5(4), A(B) RHR RM COOLER in operation.
BOOTH INST	When control rods are being inserted using Part C AND when directed by the Lead Examiner, INSERT MANUAL TRIGGER 19 to deleted CH16 allowing the control rods to insert.		
	a The scenario may be terminated as follows:		
	 Actions are being taken to insert control Rods or ALL rods are inserted. 		
	 RPV level and pressure are being restored following the all rods in condition. 		
	 The scenario may be also terminated at the discretion of lead instructor/evaluator 	Crew	 Remain in simulator for potential questions from evaluator.
	c. End the scenario by placing the simulator in FREEZE.	Crew	 No discussion of scenario or erasing of procedure marking is allowed.

? Xcel Energy		SIMULATOR EXERCISE GUIDE (SEG)					
SITE: MONT	ICELL	.0		SEG #	ILT-SS-	30E	
SEG TITLE:	2015	ILT NRC SCEN	IARIO 4			REV. #	0
PROGRAM:	INITI	AL LICENSE TF	RAINING		#:	MT-ILT	
COURSE:	NRC	SIMULATOR E	VALUATIO	NC	#:	N/A	

TOTAL TIME: 45-90 MINUTES

Developed by:		
	Instructor	Date
Reviewed by:		
	Instructor (Simulator Scenario Development Checklist.)	Date
Validated by:		
·	Validation Lead Instructor (Simulator Scenario Validation Checklist.)	Date
Approved by:		
	Training Supervision	Date

QUANTITATIVE ATTRIBUTES

Malfunctions:

Before EOP Entry:

- 1. Main Turbine Bypass Valve fails CLOSED
- 2. RBCCW Pump trip
- 3. 11 Recirc Pump trip
- 4. RMCS Normal Rod insertion failure
- 5. Dual Recirc Pump Trip

After EOP Entry:

1. Loss of High Pressure Feed (Reactor Feed Pumps, HPCI and RCIC)

Abnormal Events:

- 1. Loss of RBCCW Flow
- 2. Trip of One Recirc Pump
- 3. Trip of Two Recirc Pumps

Major Transients:

1. LOCA requiring Emergency Depressurization

- 1. <u>CT-16</u>: Inhibit ADS to avoid auto initiation that would result in a violation of cooldown rate or a loss of adequate core cooling.
- 2. <u>CT-22</u>: When RPV water level can <u>NOT</u> be maintained >-149", Emergency Depressurize the reactor.

SEQ

Event 1

BOOTH

FLOOR INST

INST

ILT-SS-30E (2015 ILT NRC Scenario 4) Rev. 0

SCENARIO TIME-LINE:					
SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES			
1. EXERCISE MAINTURBINE BYPASS VALVES					
Optional: This normal evolution has been validated as an optional event. If the BOP/CRS does not need a Normal Evolution/Tech Spec call, this event may be omitted from the scenario.	BOP	Performs Test OSP-TRB-0570 (EXERCISE MAIN TURBINE BYPASS VALVES)			
 Acknowledge report of changing radiological conditions. 		Notifies RP of changing radiological conditions			
		Notifies CRS to enter TS 3.7.7.A			
		Cycles BV-1 by performing the following:			
		Selects BV-1 with BYPASS VALVE TEST switch			
NOTE: Depending on how long BV-1 is OPEN; the receipt of 5-B-32 (Main Steam Line Leakage) will be expected		Presses BYPASS VALVE TEST pushbutton			
based on difference in total steam flow and steam flow to the turbine.	BOP	• Times and records valve travel to the OPEN position (15-25 seconds) and generator gross load (MWe)			
		Releases BYPASS VALVE TEST pushbutton			
		• Times and records valve travel to the CLOSED position (15-25 seconds)			
		Returns BYPASS VALVE TEST switch to OFF			
		Cycles BV-2 by performing the following:			
		Selects BV-2 with BYPASS VALVE TEST switch			
		Presses BYPASS VALVE TEST pushbutton			
		• Times and records valve travel to the OPEN position (15-25 seconds) and generator gross load (MWe)			

• Notifies CRS that BV-2 will NOT open

SCENARIO TIME-LINE:						
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES			
BOOTH INST	 Acknowledge BV-2 failure as Operations Management. 	CRS	 Instructs BOP to stop test and reevaluates TS 3.7.7 Enters Condition A Required Action A.1 – Restore BV-2 to operable within 2 hours. 			
Event 2	 <u>#11 RBCCW PUMP TRIP</u> <u>Optional:</u> This event has been validated as an optional event. If the BOP does not need a component malfunction, this event may be omitted from the scenario. 					
BOOTH INST	 a. When directed by the Lead Examiner, insert MANUAL TRIGGER 1 Verify the following Malfunction goes active: SW01A, #11 RBCCW Pump Trip <u>Key Parameter Response</u>: #11 RBCCW Pump trips and the Standby #12 RBCCW Pump fails to auto start. <u>Key Expected Alarms</u>: 6-B-32 (RBCCW LOW DISCH PRES) 					
	Automatic Actions: None b. When notified to investigate, wait 2 minutes and report as the Outplant operator that the breaker for #11 RBCCW pump has tripped on overcurrent and that there is an acrid odor near the breaker.		 Takes action IAW C.4-B.02.05A (LOSS OF RBCCW) Verify a RBCCW pump is running Notices that #12 RBCCW Pump failed to auto start and manually starts the pump Notifies Reactor Building and/or Turbine Building Operator(s) to investigate the cause of the trip. 			

	SCENARIO	FIME-LINE :	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	 Depending on how rapidly the BOP starts #12 RBCCW Pump, RWCU may or may not isolate on high temperature. 		 Notifies Engineering and/or Maintenance of the failure of 11 RBCCW Pump and the failure of 12 RBCCW Pump to auto start.
BOOTH INST	d. If notified, acknowledge the report.		 Verifies RWCU isolates on high temperature
	NOTE: This SEG is NOT validated for RWCU restoration.		
FLOOR INST	Once the Loss of RBCCW actions are taken and at the discretion of the lead evaluator, MOVE ON TO THE NEXT EVENT.	CRS SS315.107	Notifies Ops Management and performs crew brief.
Event 3	3. <u>11 RECIRC PUMP LOCKOUT</u>		
BOOTH INST	 When directed by the Lead Examiner, insert MANUAL TRIGGER 3, and verify RR05A activates. 		
	Key Parameter Response: Loss of flow in the A Recirc Loop and Reactor power lowering.		
	Key Expected Alarms: 4-C-1 (RECIRC A LOCKOUT)		
	Automatic Actions: None	BOP	Takes actions IAW C.4-B.01.04.A (TRIP OF ONE RECIRC PUMP)
			Notifies CRS
	b. When contacted as engineering, maintenance or		Closes 11 Recirc Pump Discharge valve
	plant management, state that the appropriate investigations and/or notifications will be initiated.		 After 5 minutes, re-opens 11 Recirc Pump Discharge Valve
		OATC	Takes actions IAW C.4-B.05.01.02.A (CONTROL OF NEUTRON FLUX OSCILLATIONS)
			 Determines plant is operating in the Unanalyzed Region of the P-F map

SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
			Takes action IAW C.4-F (RAPID POWER REDUCTION)	
	<u>NOTE:</u> Based on validation, the crew should decide to lower power to approximately 45-55%.		 Inserts control rods to exit Unanalyzed Region 	
		CRS	Evaluates TS LCO 3.4.1 as NOT met.	
			Condition A applies for mismatched Recirc flows	
			 24 hours to match flows or establish single loop operations. 	
Event 4	4. RMCS NORMAL ROD INSERTION FAILURE			
	 When the OATC attempts to insert the second control rod, the Rod Insert Switch will fail to respond. Verify Event Trigger 25 (03-S72-01) activates when the second control rod (34-31) is selected. 			
	Key Parameter Response: No indicating light response from the directional solenoid valves or CRDH.	OATC		
	Key Expected Alarms: None			
	Auto Actions: None		B.01.03-05.H.1 (INOPERABLE CONTROL RODS)	
			If the Control Rod is NOT at position 00, then attempt to insert the control rod using the following:	
	<u>NOTE:</u> The crew is also allowed to use EMERG ROD IN based on entry into C.4-F (RAPID POWER REDUCITON). These procedures may NOT be used.		 Place Rod Out Notch Override Switch in EMERG ROD IN. 	
			B.05.05-05.H.1 (RMCS FAILURE)	
			 If RMCS failure detected and normal rod insertion capability is lost then place Rod Out Notch Override Switch in EMERG ROD IN. 	

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	5. <u>12 RECIRC PUMP LOCKOUT</u>		
	When directed by the Lead Examiner, insert MANUAL TRIGGER 5, and verify RR05B activates.		
	Key Parameter Response: Loss of flow in the B Recirc Loop and Reactor power lowering.		
	Key Expected Alarms: 4-C-2 (RECIRC B LOCKOUT)		
	Automatic Actions: None		
		OATC	Takes action IAW C.4-B.01.04.B (TRIP OF TWO RECIRC PUMPS)
			 If in Mode 1 or 2, then manually scram the reactor IAW C.4-K (IMMEDIATE REACTOR SHUTDOWN)
		OATC	Takes actions IAW C.4-A (Reactor Scram) PART A:
BOOTH INST	 Verify Event Trigger 29 goes active when the Mode switch is placed in SHUTDOWN. This will initiate the following: 	SS315.101 CR200.146	Place Mode Switch in SHUTDOWN.
BOOTH INST	 Trip of RFPs after 5 and 10 second delays. Verify FW16A & B activate. 		 Verify all Control Rods are inserted to or beyond position 04.
	 A small break LOCA on a 2 minute ramp after a 2 minute delay. Verify RR01B activates. 		• Provides scram script to CRS. Reports RPV less than 9" EOP entry condition.
			• Controls Reactor water level between +9 and +48 inches. When RPV water level starts to increase:
			 Place CV-6-13 Manual Loading Station Low Flow Valve in AUTO set between 15 and 20 inches
			 Close both Main FW Reg Valves

	SCENARIO	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			 Close MO-1133 and MO-1134 (HP Feedwater Line Block valves
			 Verify CV-6-13 is closed when RPV level reaches +15 to +20 inches
			Monitor Reactor Power
			 Insert SRM and IRM detectors.
			 Switch recorders from APRM to IRM.
			 Range down on IRMs as necessary.
			 Verify SDV Vent and Drain Valves closed.
			Verify Recirc Pumps have run back to minimum
		BOP	Takes actions IAW C.4-A (REACTOR SCRAM) PART B:
			Plant page that a Reactor Scram has occurred.
			 Open Main Generator output breakers 8N7 & 8N8.
			Trip the Main Turbine.
	<u>NOTE</u> : The remaining BOP actions in C.4-A may NOT be performed depending on when the LOCA is recognized.		Verify the Generator Field Breaker Open.
			Start the Turbine Aux Oil Pump.
			Verify Turbine Exhaust Hood Sprays in service.
			Start the Turbine Bearing Lift Pumps
			 Verify Main Steam Pressure Control or Low-Low Set is controlling Reactor Pressure.

	SCENARIO 1	TIME-LINE:	
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			 At C-25, Place the POST SCRAM switch in ON and verify all available Drywell Recirculation Fans are operating
			 Verify 3300 gpm through each operating Feed Pump
			 Verify Auxiliary Oil Pump running on any non- operating Feed Pump
			 Verify 3000 gpm through each operating Condensate Pump
Event 6	6. Loss of High Pressure Feed / Alternate RPV Level Control	CRS	Directs performance of C.5-1100 (RPV Control)
	 a. Role Play in-plant operators as necessary. There is no apparent cause for the loss of the Feed Pumps. 	OATC	 Recognizes the loss of both Feed Pumps
			 Attempts to restart the Feed Pumps
			 Notifies CRS that Feed Pumps will not start.
		CRS	Directs RPV level control using HPCI and/or RCIC
BOOTH INST	 NOTE: If these start automatically they will still trip. Verify the following: When RCIC flow reaches ~ 100 gpm, verify EVENT TRIGGER 26 activates. This will trip RCIC (RC03) after a 30 second time delay. When HPCI MO-2036 begins to open (Red Light ON), verify EVENT TRIGGER 27 activates. This will immediately trip HPCI (HP03). NOTE: Both systems are set to trip on high exhaust pressure complications from the LOCA. 	OATC	 Attempts to start HPCI and RCIC Notifies CRS that HPCI and RCIC both tripped on high exhaust pressure.
		CRS	Direct Alternate Level control Actions

SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
<u>CT-16</u> :	Inhibit ADS to avoid auto initiation that would result in a violation of cooldown rate or a loss of adequate core cooling.	OATC/ BOP	Inhibits ADS	
BOOTH INST	 If directed to Close CRD-168, insert Trigger 7 and verify remote CH34 activates 		 May close CRD-168 IAW C.5-3204 (RPV Makeup With CRD) – Only one CRD Pump 	
		OATC/ BOP	 Starts a SBLC pump for injection IAW C.5-3203 (Use of Alternate Injection Systems for RPV Makeup) 	
			 Verifies injection 	
			 Adequately monitors and reports RPV level and Pressure, both values and trends. 	
Event 7	7. LOCA in Primary Containment (Drywell):	BOP	Reports Drywell pressure rising	
			Reports EOP entry conditions.	
			\circ DW pressure, DW Temp and Torus temp	
	<u>NOTE</u> : Containment Spray/Cooling actions may not be taken if the crew prioritizes RPV water level.	CRS	Directs performance of C.5-1200 (PC Control)	
			Start Torus sprays	
			 Start all available Torus cooling 	
			Spray the Drywell	
		BOP	Performs C.5 1200 actions	
			 Places Torus Sprays in service IAW C.5-3502 (Containment Sprays): 	
			 Verifies RHR Pumps running 	
			 Takes Cont Spray/Cooling LPCI Initiation Bypass (B) to BYPASS 	

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SCENARIO TIME-LINE:				
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES	
			 Opens MO-2007, 2011, & 2009 (B Loop) 	
			 Verifies LPCI Inject Outboard Valves are closed; MO-2012 and MO-2013. 	
		BOP	Initiates Containment Cooling	
			 RHRSW Outlet valve controller set 20% 	
			 Place HX Bypass in CLOSE 	
			 ECCS Load Shed to MANUAL OVERRIDE 	
			 Start RHRSW Pump(s) 	
			◦ Adjust flow to ≈3500 gpm per pump	
			 Start all available drywell cooling IAW C.5-3503 (Defeat Drywell Cooler Trips) 	
			 Place all D/W fan control switches to OFF 	
			 Open Knife switch KS3100 	
			\circ Verify fan inlet dampers are in AUTO	
			\circ Place all D/W fan control switches to ON	
			 OPEN associated fan disch dampers 	
		BOP	 Initiates Drywell Spray IAW C.5-3502 (Containment Sprays): 	
			 Open Drywell Spray Outboard MO-2021 	
			 Open Drywell Spray Inboard MO-2023 	
			 Close Torus Cooling MO-2009 	

		SCENARIO [®]	TIME-LINE:	
SEQ		SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 7 CON'T	8.	Alternate RPV Level Control / Emergency Blowdown:	CRS SS304.226 CR304.139	Verifies two or more Injection Subsystems lined up with pumps running.
CT-22		When RPV water level can <u>NOT</u> be maintained >-149", Emergency Depressurize the reactor.		When RPV level is < -126 inches and prior to -149 inches, directs performance of C.5-2002 (Emergency RPV Depressurization)
				 Verifies Torus level > -5.9 ft.
				 Directs opening of all 3 ADS SRVs.
				Directs RPV Level restoration
			BOP	Verifies that both Core Spray Subsystems and LPCI Pumps are available for injection
BOOTH INST		a. Verify Event Trigger 28 goes active when A SRV Handswitch is taken to Open	BOP/ OATC	Opens 3 ADS SRVs
		 Verify that Malfunction RR03B (B Loop Rupture) goes active at 3% severity. 		Monitor and report RPV level values and trends
			BOP	Controls RPV injection from RHR.
				 Opens Knife Switch to Bypass LPCI 5 Minute Timer using C.5-3208
				Throttles MO-2013.
				 May divert LPCI flow using B.03.04-05.H (TORUS COOLING HARD CARDS)
			BOP	Controls RPV injection from Core Spray.
				 Throttles MO-1754
			OATC	Controls RPV injection from the Condensate system.
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SCENARIO TIME-LINE:				
SEQ	ł	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	9.	SCENARIO TERMINATION		
FLOOR INST		 a. The scenario may be terminated when Emergency Depressurization has been performed OR RPV water level is recovered above TAF. b. The scenario may be also terminated at the discretion of lead instructor/evaluator c. End the scenario by placing the simulator in EREFZE 	Crew: Crew:	 Remain in simulator for potential questions from evaluator. No discussion of scenario or erasing of procedure marking is allowed