Facility: Monticello Scenario No.: ILT-SS-04E (**NRC 1**) Op-Test No.: MNGP 09

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions:
Normal plant startup in progress at approximately 38% power. No Limiting conditions for Operation in effect.

Turnover:
Ready to place the "B" Feedwater Regulating valve in service.
Continue raising reactor power with Recirc.

Event No.	Malf. No.	Event Type*	Event Description
1	None	**N (BOP)**	Place the "B" Feedwater Regulating valve in service.
2	None	**R (ATC/SRO)**	Raise reactor power with Recirc from 38% to 50%.
3	RR09C	**I (ATC/SRO)**	Recirc Speed Controller failure. Operator will lock the scoop tube. The CRS will address Tech Specs for Recirc speed mismatch.
4	RC02	**I (BOP/SRO)**	RCIC Auto Initiation (Inadvertent). The BOP will secure RCIC. The CRS will determine Tech Specs for inoperable RCIC. (ABNORMAL)
5	EG02A&B	**C (BOP/SRO)**	Complete loss of Stator Water cooling flow. BOP actions to start a SWC pump will be unsuccessful. The crew will manually scram the reactor. (ABNORMAL)
6	CH16 CH19 TC02 TC06A&B EG03	**M (Crew)**	Scram with Hydraulic ATWS The crew will perform C.5-1100 for RPV control. The crew will perform C.5-2007 for a failure to scram. The Power/Level Control contingency will be necessary. The scenario ends when Hot Shutdown Boron weight has been injected and the crew begins restoring RPV level.
7	SL01A&B	**C (ATC)**	The 1st SBLC Pump fails to start. The OATC will successfully start the 2nd SBLC Pump

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

ES-301-4 & 5 Quantitative attributes:
Total Malfunctions: 5 Malfunctions
Malfunction(s) after EOP: E7
Abnormal Events: E3, E4 & E5
EOPs: 1100
EOP Contingencies: Power/Level Control (2007)
Critical Tasks: Inhibit ADS, Initiate SBLC, Power/Level Control
Tech Spec: E3 & E4
SRO-I ATC I/C: E3 & E7
Note: CRS does not get shared credit for (N)ormal event

Xcel Energy	SIMULATOR EXERCISE GUIDE (SEG)

SITE: MONTICELLO **SEG #** ILT-SS-04E

SEG TITLE: 2009 ILT NRC 1 - ATWS **REV. #** 0

PROGRAM: INITIAL LICENSE TRAINING **#:** MT-ILT

COURSE: NRC EXAM **#:** M-8119

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by: _____
Instructor *Date*

Reviewed by: _____
Instructor *Date*
(Simulator Scenario Development Checklist.)

Validated by: _____
Validation Lead Instructor *Date*
(Simulator Scenario Validation Checklist.)

Approved by: _____
Training Supervision *Date*

Guide Requirements

Goal of Training:

ILT NRC EXAM

Learning Objectives:

1. Demonstrate the ability to predict and/or monitor changes in parameters associated with operating system controls for the appropriate tasks.
2. Demonstrate the ability to correctly use procedures to correct, control, or mitigate the consequences of normal and abnormal operations for the appropriate tasks.
3. Demonstrate the ability to monitor automatic operations of the systems to ensure proper operation for the appropriate tasks.
4. Demonstrate the ability to manually operate and/or monitor systems in the control room in accordance with approved procedures for the appropriate tasks.
5. Demonstrate the ability to complete administrative requirements, as necessary, in order to operate the plant for the appropriate tasks.
6. Demonstrate knowledge of and ability to implement shift supervision duties as they relate to crew operations for the appropriate tasks.
7. Given a degrading or improving plant condition or event, demonstrate the ability to: (CRS)
    a. Evaluate trends that may result in equipment damage or reduction in plant safety.
    b. Ensure proper diagnosis of plant problems by monitoring and interpreting data (information from panel indications).
    c. Evaluate and diagnose challenges to Critical Plant Parameters.
    d. Evaluate events and accidents.

Prerequisites:

Completion of MT-ILT Training program

Training Resources:

Simulator

References:
1. FP-T-SAT-72
2. FP-T-SAT-75
3. NUREG 1021, Rev.9, Supplement 1

Commitments:
None

Evaluation Method:
ILT NRC EXAM

Operating Experience:
None

Related PRA Information:

Initiating Event with Core Damage Frequency:
ATWS

Important Components:
SBLC, CRD

Important Operator Actions with Task Number:
SS304.201 – Implement the response for Failure to Scram.
CR314.104 – Perform actions associated with Failure To Scram.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

Shift Manager Tasks:

None

SRO Tasks:

SS200.133	Direct Reactor Startup to Full Power IAW C.1	5, 6, 7
SS299.352	Apply administrative requirements for Tech Spec Section 3.4 and Bases to Reactor Coolant System (RCS)	5, 6
SS299.353	Apply administrative requirements for Tech Spec Section 3.5 and Bases to ECCS and RCIC	5, 6
SS304.193	Implement RPV control.	5, 6, 7
SS304.194	Implement primary containment control.	5, 6, 7
SS304.201	Implement the response for a failure to scram	5, 6, 7
SS314.101	Supervise alternate rod insertion	5, 6, 7
SS314.108	Supervise terminate and prevent	5, 6, 7
SS315.126	Supervise response to a stator cooling water failure.	5, 6, 7
SS315.160	Supervise response to inadvertent ECCS initiation.	5, 6, 7

RO Tasks:

CR200.127	Perform a power ascension after the reactor is on line >15% power.	1, 2, 3, 4
CR200.171	Perform the procedure for a stator cooling water failure.	1, 2, 3, 4
CR200.204	Perform the procedure for inadvertent ECCS initiation.	1, 2, 3, 4
CR202.114	Respond to unstable speed control on one pump.	1, 2, 3, 4
CR299.354	Apply Tech Spec 3.4 and Bases to the Reactor Coolant System (RCS)	2, 5
CR299.355	Apply Tech Spec 3.5 and Bases to ECCS and RCIC	2, 5
CR304.102	Perform actions associated with RPV Control.	1, 2, 3, 4

RO Tasks:

CR304.103	Perform actions associated with Primary Containment Control.	1, 2, 3, 4
CR314.104	Perform actions associated with Failure To Scram	1, 2, 3, 4
CR314.105	Perform actions associated with Alternate Rod Insertion	1, 2, 3, 4
CR314.112	Perform actions to Terminate and Prevent injection	1, 2, 3, 4

STA Tasks:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. #11 Recirc Pump speed control failure
2. Inadvertent initiation of RCIC
3. Loss of Stator Water cooling flow

After EOP Entry:

1. Failure of a SBLC pump to start

Abnormal Events:

1. Inadvertent initiation of RCIC
2. Loss of Stator Water cooling flow

Major Transients:

1. ATWS

Critical Tasks:

1. **{Perform the actions to inhibit ADS during an ATWS situation.}**
2. **{During failure to scram conditions with reactor power above 3%, terminate and prevent injection from all sources except SBLC, RCIC, and CRD until level lowers to at least -33".}**
3. **{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 OVERVIEW:

INITIAL CONDITIONS:

1. This scenario can be run from:

- Adjust an IC to ≈40% power with 11 RFP running and the 'A' Main Feedwater Regulating Valve in service (IC-281).

2. The initial plant conditions are:

- Normal Plant Startup in progress
- Initial power Level – 38%
- Electrical lineup – 2R Supplying
- Xcel Condition – Green
- CDF – Yellow
- Master Level control is in Auto with the 'A' M/A station in AUTO
- Plant staffing – Normal Week day with the normal plant staffing on site for a startup.

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3. The following equipment is OOS:

- 12 Service Water Pump out for replacement of pump and motor.

4. The following evolutions are planned for the shift:

- Place the 'B' Main FWRV in service.
- Continue C.1 (STARTUP). Power Ascension - VIII.A. at Step 11.
- Raise power to 48% using Recirc Pumps.
- Nuclear Engineer recommendations for power ascension to 48% are provided
- Nuclear Engineering is recalculating data for power rise from 48% to 100% power.

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Place the 'B' Main FWRV in service.

SEQUENCE OF EVENTS:

Event 1: Perform power escalation as directed by the Nuclear Engineer

- The crew will take the duty with the plant at ≈38% reactor power. Power is being raised for a Normal plant startup. After taking the duty the CRS will direct the performance of C.1 (Startup) VIII.A Step 11 (page 78). This will have the BOP place the 'B' Main Feedwater Regulating Valve in service and then the OATC will place level control in 3 Element and continue raising reactor power using recirc.

Event 2: Raise Reactor Power with Recirc

- After the 'B' Main Feedwater Regulating Valve is in service the OATC will begin to raise reactor power to 48% by raising Recirc pump speed.

Event 3: 11 Recirc Speed Control Signal Failure

- While raising power with Recirc pumps, a failure will occur causing a slow, steady rise in No. 11 Recirc pump speed. The OATC should diagnose this failure of speed control and by procedure lock the scoop tube. The crew should suspend any further power escalation until the speed control problem has been addressed. The CRS should address Tech Specs for recirc pump speed mismatch.

Event 4: RCIC Auto Initiation

- After the Speed control problem with No. 11 Recirc Pump has been addressed, an inadvertent initiation of RCIC will occur. The crew should work together to diagnose this event by watching reactor water level and RCIC controls and indications. The crew should enter the C.4 to secure RCIC and determine Tech Spec requirements. The RCIC Trip pushbutton will fail to work requiring the BOP to secure RCIC using MO-2075 or MO-2080.

Event 5: Complete loss of Stator Water cooling flow

- Once actions are complete for the inadvertent RCIC initiation, #11 Stator Water Cooling (SWC) pump will trip with a failure of #12 SWC pump to auto start. The BOP will take manual action to start #12 SWC pump and will be successful. After a 5 minute delay, the #12 SWC pump will also trip requiring the insertion of a manual scram.

Event 6: Reactor Scram/ATWS with SBLC failure

- When the Reactor scrams an ATWS situation develops and the Reactor remains at power. The crew will enter 2007 for guidance. Following guidance in C.5-3101, the rods will fully insert. The CRS will then transfer back to C.5-1100 once rods are fully inserted and restore RPV water level to the normal band.

Event 7 SBLC Failure

The first SBLC pump that is attempted to be started will fail to start. When a start of the second pump is attempted, it will start.

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

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	1. <u>INITIAL CONDITIONS (IC):</u> a. 40 % power IC-281 b. Mode: 1 c. Exposure: MOC d. Present Power: 38% e. XCEL Condition: Green f. CDF: Yellow g. Generator: ~200 MWe		
	2. <u>SIMULATOR SET UP</u> a. Set the plant initial conditions per the Initial conditions under the Scenario Overview. b. Enter the malfunctions, remotes, overrides and event triggers per the "Simulator Set-up Checklist".		
	3. <u>SHIFT BRIEF:</u> Verify crew performs walk down of control boards and reviews turnover checklists. **When asked for out plant status provide the following**:	CRS	Conducts Shift Brief: Plant is at 38% power, XCEL System condition is Green, and CDF is Yellow. A normal plant startup is in progress and the second Main FWRV is ready to be placed in service IAW C.1 (Startup) VIII (Power Ascension) Step 11, (Page 78)

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Turbine Building Status: • 4 Condensate Demineralizers are in service with the E vessel available to be placed in service. B vessel is the highest at 5.9 psid. • 12 Service Water Pump is tagged out and removed, ready for the new pump & motor. Reactor Building Status: • Processing water later in the shift • All systems are normal for continuing plant startup At the completion of the shift brief inform the CRS that their crew has the duty.		The following support is available: Operations: Normal staffing for the startup. Maintenance: Support available for normal plant startup. Engineering: Support available for normal plant startup. Management: Support available for normal plant startup.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 1	**4. <u>PLACE 'B' MAIN FWRV IN SERVICE</u>**		**<u>PLACE 'B' MAIN FWRV IN SERVICE</u>**
	a. CRS directs the continuance of C.1 (STARTUP) VIII.A Step 11.a (page 78) which directs performance of B.05.07-05.D.4 (Place Remaining B MAIN FW REG VAVE CV-6-12B in Service).	CRS	Directs the BOP to place the 'B' Main FWRV in service IAW B.05.07-05.D.4 (Place Remaining B Main FW Reg Valve CV-6-12B in Service).
		BOP	Performs the required actions from B.05.07-05.D.4 (Place Remaining B MAIN FW REG VAVE CV-6-12B in Service). • Verifies MO-1134, Hp Fw Line B Block valve is OPEN • Verifies CV-6-12B Feedwater Control M/A Station (6-84B) bias (vertical scale is set at ZERO, <u>Or</u> slightly negative. • Monitors RPV level during this operation. • Slowly OPEN CV-6-12B controller (6-84B) and observe output signal increasing (horizontal scale). • Monitor Vessel Level and Feedwater Loop Flows as CV-6-12B opens • WHEN CV-6-12B controller (6-84B) output (horizontal scale) matches the demand signal (vertical scale), THEN place CV-6-12B controller (6-84B) in AUTO position.
	CRS directs the performance of VIII.A.11.b & c	BOP/ OATC	• Places Reactor Level Control in 3 Element Control

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	If called for the status of the RBM jumpers, inform the CRS that the jumpers are removed.	CRS	Verifies any jumper hung to bypass the Rod Block Monitor per Operations Manual B.05.01.02-05.H has been removed.
Event 2	**5. <u>Raise Reactor Power with Recirc</u>** a. CRS directs the OATC to raise Recirc speed to 48% reactor power using the following: 1) 2300 (Reactivity Adjustment) 2) Nuclear Engineer Reactivity Maneuvering Steps b. BOP is required to Peer check	 CRS OATC 	**<u>Raise Reactor Power with Recirc</u>** CRS directs the OATC to raise Recirc speed to 48% Raises Recirc speed to raise power. Maintains loop flow parameters approximately equal
Event 3	**6. <u>RECIRC PUMP RUNAWAY:</u>** a. When directed by the Lead Instructor, at approximately 42% power, insert **MANUAL** TRIGGER **1 (RR09C).** This should be inserted when the OATC raises 11 Recirc speed. The failure will engage and speed will continue rising until the OATC takes action. b. If called, respond appropriately as the Ops Manager, Plant Manager, Engineering or maintenance concerning notification of the event.	 OATC CRS	**<u>RECIRC PUMP RUNAWAY</u>** <u>Key Parameter Response</u>: Pump speed rising. <u>Key Expected Alarms:</u> 4-C-5 (Fluid Drive A Scoop Tube Lock) once the OATC locks the scoop tube. <u>Auto Actions:</u> Reactor power rising, loop flow rising, pump speed rising Identifies that 11 Recirc speed continues to rise after releasing the control switch, verifies via recorder indication, locks the scoop tube and informs the CRS. Directs the RO to perform B.01.04-05.H.1 (Unstable Speed Control on One Pump).

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			B.01.04-05.H.1 actions:
	c. If called as an in-plant operator to investigate the #11 Recirc MG, there is no apparent problem.	OATC	Lock the scoop tube drive
	d. For this scenario it is NOT expected that the crew will need to make recirc adjustments following the speed control issue. The CRS may direct a second operator to prepare for local manual adjustments	Crew	Notify: Ops Manager Engineering Plant and Systems Manager Instrument Engineer
	e. Depending on how soon the OATC recognized the runaway recirc pump and locked the scoop tube, the mismatch may NOT be >10%. However, the CRS should still evaluate for entry into this condition.	CRS	Evaluate Tech Specs and enter TS 3.4.1 Condition B for mismatched Recirc flows (>10% when operating at < 70% rated core flow)
		CRS	Notifies an extra licensed operator to make preparations for manually adjusting #11 Recirc scoop tube
		CRS	Suspends further power escalation until the problem with the Recirc speed control has been resolved.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 4	**2. <u>RCIC INADVERTANT AUTO INITIATION</u>**		**<u>RCIC INADVERTANT AUTO INITIATION</u>**
			<u>Key Parameter Response:</u> Pump speed rising.
			<u>Key Expected Alarms:</u> 4-A-14 (RCIC Low Flow)
	a. When directed by the Lead Examiner, insert **MANUAL TRIGGER 3 (RC02)** to cause an auto initiation of RCIC with a failure of the turbine trip pushbutton.		<u>Auto Actions:</u> RCIC starts and injects, Feed flow may reduce to compensate.
		Crew	Recognizes the RCIC start and informs CRS
		Crew	Makes a plant announcement about RCIC in operation and about evacuation of the RCIC Room
		CRS	Directs BOP to use C.4-G and secure RCIC
	NOTE: The CRS may direct RCIC shutdown IAW the Hard Card, but should also direct the use of the C.4-G procedure.		Performs the required actions per C.4-G (Inadvertent ECCS Initiation Signal).
		BOP	Notify CRS
		BOP	Determines was caused by a spurious signal.
	NOTE: 4AWI-04.01.01 allows the CRS to secure a system.	BOP	Depresses the RCIC Turbine Trip pushbutton.
	b. With a failure of the RCIC Trip Pushbutton, two additional methods may be used to shutdown RCIC.	BOP	Determines that HO-7, Turbine Stop Valve, remains open.
		BOP	Notifies CRS
		CRS	Directs the BOP to secure RCIC by:

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	CRS may reference C.4-B.04.01.E (PCIS Group 5) for alternate methods to shutdown RCIC	BOP	**1. Closing MO-2080:** Places the handswitch for MO-2080 to close. Observes HO-7 closing Verifies that RCIC speed lowers when the valve has closed and reports to the CRS that RCIC has been shutdown.
	c. MO-2076 and MO-2078 will reopen if closed due to receiving an open signal from the initiation signal. d. MO-2075 will remain closed.	BOP	**2. For closing the Steam line isolation valves:** Closes MO-2075 Verifies one of the steam line isolations remain closed Verifies RCIC speed lowers when the steam line isolates Notifies CRS that RCIC has been shutdown
	e. If called, respond appropriately as the Ops Manager, Plant Manager, Engineering, RP or maintenance concerning notification.	Crew CRS CRS	Notifies Management, RP and Single Point of Contact. References TS 3.5.3 to assess RCIC operability Determines RCIC is INOP (but available in an emergency) and Condition A applies Required Action A.1 – HPCI is administratively operable Required Action A.2 – Restore in 14 days

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	**3. <u>TRIP OF #11 Stator Water Cooling Pump</u>** a. When directed by the Lead Examiner, **insert MANUAL TRIGGER 5 (EG02A & EG02B with 5 min delay)**. This will trip the running SWC Pump and prevent the Standby pump from starting automatically. b. Additionally with Manual Trigger 5, **verify CH16 and CH19 activate** which will cause the ATWS when the crew inserts a Scram c. When the reactor is scrammed and the Mode Switch is taken to SHUTDOWN **verify**	 BOP CRS OATC	**<u>TRIP OF #11 Stator Water Cooling Pump</u>** <u>Key Parameter Response:</u> Loss of running pump indication. <u>Key Expected Alarms:</u> 8-A-17 (No. 1 Generator Cooling Wtr Failure) <u>Auto Actions:</u> Standby pump fails to auto start Performs the required actions of C.4-B.06.02.04.A: (Stator Cooling Water Failure) Verify a Stator Cooling water pump is running. • The BOP should start the standby pump and 8-A-17 should clear. • After a 5 min delay, 12 SWC Pump will trip. The BOP should recognize that a loss of SWC has occurred and communicate to the CRS that a reactor scram is required. <u>If</u> a total loss of Stator Cooling has occurred, <u>And</u> cooling can <u>NOT</u> be immediately restored, <u>Then</u> initiate a Reactor Scram. Directs OATC to insert a manual reactor scram. May direct reducing Recirc Flow to minimum first. • If directed, reduces Recirc Flow to minimum • Inserts a manual reactor scram.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	MANUAL TRIGGER 6 activates. This will cause the turbine to trip simulating a problem with the runback circuitry from the loss of stator water cooling. This will complicate the ATWS forcing the crew to inject SBLC.		• Takes the Mode Switch to SHUTDOWN
Event 6	**4. <u>EOP ACTIONS (ATWS)</u>**		**<u>EOP ACTIONS (ATWS)</u>**
		OATC	Provides a Scram Report • Mode Switch is in Shutdown • All rods are <u>NOT</u> in • Reactor power is >3% • EOP Entry
		CRS	Enters EOP 1100 RPV Control, transitions to EOP 2007, Failure to Scram, and directs: • Inhibit ADS • Defeat MSIV Low-Low Level Isolation (C.5-3301) • Prevent Core Spray injection (C.5-3205) • Perform ATWS hard card actions
	{Perform the actions to inhibit ADS during an ATWS situation.}	BOP	Inhibits ADS
		BOP	Defeat MSIV low-low level isolation

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	{During failure to scram conditions with reactor power above 3%, terminate and prevent injection from all sources except SBLC, RCIC, and CRD until level lowers to at least -33".}	BOP OATC	Terminates and Prevents Core Spray <u>Power Leg Actions:</u> Performs the Power Leg hard card. Enters 3101 to insert the control rods
Event 6	**ATWS Actions (Cont'd)** **{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}** a. Part C will be successful with elevated drive pressure and driving rods. b. **DELETE CH19** when directed by the lead instructor to allow rods to drift in and be driven in. c. Insert **MANUAL TRIGGER 11 (CH 34)** to close CRD-168 when requested. d. Insert **MANUAL TRIGGER 13 (CH 22)** to close CRD-14 when requested.	OATC	<u>3101 Actions:</u> Performs Part C to insert rods Closes CRD-168, CRD-79-1 & CRD-79-2 Closes CRD-14 to raise drive pressure

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 7	**5.** SBLC Failure a. Event Triggers 7 or 9 will auto activate to clear the trip on the second SBLC pump that is started. b. If #11 SBLC is attempted to be started first, **verify SL01B deletes** so #12 SBLC pump will start. c. If #12 SBLC is attempted to be started first, **verify SL01A deletes** so #11 SBLC pump will start.	OATC	Initiates SBLC before Torus temp reaches 110ºF • Whichever SBLC pump is attempted to be started will fail to start. • When the opposite pump is attempted to be started it will start.
Event 6	**6.** <u>Level Leg Actions:</u> a. Meets the override conditions and therefore enters the forced level reduction leg.	BOP	<u>Level Leg Actions:</u> Verify needed auto actions With power >3% & level above -33” • Prevents injection from Condensate & Feedwater, HPCI, and LPCI
	b. For level control, the CRS should direct condensate and feedwater injection be	CRS	• Lets level drop until - Power is <3% or - All SRVs stay closed and DW < 2 psig or

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	re-established and used to maintain level in the desired band.		- Level reaches -126 inches Records final level and sets level band Uses Condensate & Feedwater as necessary to maintain established level band.
Event 6	**7.** Pressure leg actions: a. When directed by the Lead Examiner, **Delete CH16** to allow the control rods to insert.	CRS/ BOP OATC	Stabilize RPV pressure below 1056 psig using SRVs Recognizes and reports all rods are fully inserted.
Event 6	**8. EOP ACTIONS (PRIMARY CONTAINMENT CONTROL)** (Note: Malfunctions for the Generator Lockout and stuck closed Turbine Bypass valves are included to ensure heat addition to the Primary Containment and necessitate SBLC operation.)	BOP	Monitor Primary Containment Parameters • If Torus Water Temperature exceeds 90°F, notify the CRS of the EOP C.5-1200 entry condition.
	a. EOP C.5-1200 steps become applicable only if Torus Water Temperature exceeds 90°F	CRS	Enters EOP C.5-1200 Primary (Containment Control) • Directs start of all available Torus Cooling
	NOTE: THIS SHOULD BE DIRECTED USING THE TORUS COOLING HARD CARD.	BOP	Starts all available Torus Cooling A (B) • Verify CV-1728 (1729), RHR HX SW Outlet, controller set at 20%.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		BOP	• 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 No 11(12) and /or No 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. • CLOSE MO-2002 (2003), HX Bypass. • Verify V-AC-5 (4), A (B) RHR RM COOLER UNIT, in operation.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS/INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	9. SCENARIO TERMINATION a. When conditions are stabilized as follows or at discretion of lead instructor/evaluator end the scenario by placing the simulator in **FREEZE**. 1) All rods inserted and the crew has restored RPV water level to the normal band. OR 2) Hot Shutdown Boron Injected and the crew has restored RPV water level to the normal band.	CRS OATC Crew:	**SCENARIO TERMINATION** Exits C.5-2007 and enters C.5-1100. Restores water level to +9 to +48 inches using condensate and feedwater. • Remain in simulator for potential questions from evaluator. • No discussion of scenario or erasing of procedure marking is allowed.

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Deleted: entered C.5-1100 and/or

Deleted: with Hot Shutdown Boron Injected.

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SIMULATOR INPUT SUMMARY							
Manual Trigger	**Type**	**Code**	**Description**	**Delay**	**Ramp**	**Final Severity Or Value**	**Event Trigger**
1	Malfunction	RR09C	11 Recirc Pump runaway	00:00:00	00:00:00	10	None
3	Malfunction	RC02	RCIC Auto-Initiation	00:00:00	00:00:00	True	None
5	Malfunction	EG02A	11 Stator Cooling Pump Trip	00:00:00	00:00:00	True	None
5	Malfunction	EG02B	12 Stator Cooling Pump Trip	00:05:00	00:00:00	True	None
7	Malfunction	SL01A	SBLC PUMP #11 TRIP	00:00:00	00:00:00	True	ZD_SLSS2
9	Malfunction	SL01B	SBLC PUMP #12 TRIP	00:00:00	00:00:00	True	ZD_SLSS1
5	Malfunction	CH16	Failure to Scram	00:00:00	00:00:00	True	None
5	Malfunction	CH19	Multiple Control Rods Stuck	00:00:00	00:00:00	True	None
6	Malfunction	TC02	Turbine Master Trip	00:02:00	00:00:00	True	ZD_S1SHD
5	Malfunction	TC06A	#1 BPV Stuck Closed	00:00:00	00:00:00	True	
5	Malfunction	TC06B	#2 BPV Stuck Closed	00:00:00	00:00:00	True	
6	Malfunction	EG03	Generator Lockout	00:02:00	00:00:00	True	ZD_S1SHD
11	Remote	CH34	CRD-168	00:00:00	00:00:00	Closed	None
13	Remote	CH22	CRD-14	00:00:00	00:00:00	0	None

SIMULATOR INPUT SUMMARY							
Manual Trigger	**Type**	**Code**	**Description**	**Delay**	**Ramp**	**Final Severity Or Value**	**Event Trigger**
4	Override	05-S088-02	12 SWC Pump Handswitch – STOP	00:00:00	00:00:00	TRUE	ZD_SSCWP(2)
Initial Condition	Override	02-S17-04	A520P31-31 – RCIC Turbine Trip	00:00:00	00:00:00	Off	None
Initial Condition	Override	04-A1DS108-02	A530P32-03 – 12 SWP green light	00:00:00	00:00:00	Off	None
*Initial Condition	Remote	TC01	Exhaust Hood Spray Control Valve	00:00:00	00:00:00	Normal	None

*= Built into IC-281 and NOT shown on Input summary

Manual Settings & Instructions:

1. Reset to IC 281.
2. Verify the remote for Exhaust Hood Spray is set to Normal.
3. Insert the override for the RCIC Turbine Trip. This will prevent the RCIC Turbine Trip pushbutton from working during the inadvertent initiation.
4. To isolated #12 Service Water Pump:
    a. Place #12 Service Water pump handswitch to STOP to clear the Stby Setup light.
    b. Hang a SECURE/CAUTION tag.
    c. Install the override to turn off the green light indication.
5. Activate Manual trigger 4 at the beginning of the scenario. The event trigger for this removes the handswitch to stop override allowing it to start manually.
6. Activate Manual Triggers 7 and 9 at the beginning of the scenario. The event triggers for these remove the trip in one second from the SBLC pump that is NOT initially started. This will allow the second SBLC Pump to start.

7. Verify 4 Condensate Demineralizers are in service.
8. Event Trigger 6 will activate the Turbine Master trip when the Mode Switch is taken to SHUTDOWN on the scram. The Turbine ETV will NOT trip but the turbine master trip will force SRVs to lift ensuring the crew takes action to inject SBLC.
9. Verify availability of Nuclear Engineer Recommendations for power ascension to 48%.

(This table may be modified based on site simulator)

Attach the following site-specific information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: New Create

SIMULATOR SETUP CHECKLIST (IC *)

Before Training or Evaluation:

- ☐ Simulator in Training Load
- ☐ Alarm Sound "ON" on simulator console
- ☐ Simulator reset to correct IC (malfunctions, remotes, overrides entered per guide)
- ☐ MTF-7100-051 (Attendance Record) available
- ☐ Chart recorders operating and forwarded
- ☐ Tags hung per simulator guide (Caution, Danger, Info)
- ☐ Pens, paper, markers, available
- ☐ Turnover Sheet, LCO log, PRA sheet as applicable
- ☐ SPDS terminals operating
  - ☐ Verify that SPDS is the EOF has "MPIRT" in the lower right corner of display.
    - ☐ Verify "SPIRT" does NOT appear in the lower right corner. (If it does, contact John Shriver)
    - ☐ Check for outside air temperature approximately the same as real air temperature on the SPDS (another indication that the SPDS is indicating Live data or Simulator data).
- ☐ Process Computer alarm screen up and clear
- ☐ Numac alarms reset and displays off
- ☐ RWCU filter demin flows set to desired flow (approx. 80 gpm)
- ☐ RWCU temperature set between 115° and 118°F
- ☐ Generator MVAR loading ≤50 MVAR delivered
- ☐ Turbine lube oil temperature between 111° and 113°F
- ☐ Reactor water level control is in 3 element and Median selected (unless IC specifies a different configuration)
- ☐ Status board updated
- ☐ Verify all Hi / Hi-Hi alarms are reset on C-37 for neutron monitors.

Continued on Back

SIMULATOR SETUP CHECKLIST (IC *)
(Continued)

Before Evaluation Only:

- ☐ Videotape in VCR and setup to record (Taped evaluations only)
- ☐ Exam signs posted on all simulator doors
- ☐ Evaluation team briefed
- ☐ SEC contacted if participating
- ☐ Determine individual responsible for SEC duties if SEC NOT participating
- ☐ Phone volume at Instructor Console in the Simulator Control Room turned down

After Training for the Day

- ☐ Simulator reset to IC-15
- ☐ Tags removed from control panels
- ☐ Exam/Training signs turned around
- ☐ Procedures cleaned and put away
- ☐ Headsets turned off and put away
- ☐ Recorders stopped
- ☐ Phone volume at Instructor Console in the Simulator Control Room returned to normal

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

1. The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No
2. The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	Yes	No
3. The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4. Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5. Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6. The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	No
7. The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	Yes	No
8. The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*	Yes	No
9. The scenario guide incorporates verification of Operator Fundamental application.*	Yes	No
10. Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*	Yes	No

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

1. The desired initial condition(s) could be achieved.	Yes	No
2. All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3. All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4. All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5. During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6. Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could NOT be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7. Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

Discrepancies noted (Check "none" or list items found) ☐ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

_____

_____

_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

Facility: Monticello Scenario No.: ILT-SS-05E (**NRC 2**) Op-Test No.: MNGP 09

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions:
Normal plant startup in progress at approximately 54% power. No Limiting conditions for Operation in effect.

Turnover:
Waiting for Nuclear Engineers to double check rod sequence calculations; then continue raising reactor power with Rods. While waiting, perform Core Spray Quarterly

Event No.	Malf. No.	Event Type*	Event Description
1	CS01A	**N (BOP/SRO)**	Perform Core Spray Quarterly. Pump motor breaker trips on Lockout.
2	RW01 C-05-A35	**I (ATC/SRO)**	The RWM fails inoperable. The CRS refers to Tech Spec 3.3.B.3(b) and determines that the RWM can be bypassed.
3	C-06-A02	**C (BOP/SRO)**	Reactor Feed Pump high vibration. The BOP will address this problem and eventually trip the RFP. (ABNORMAL)
4	None	**R (ATC/SRO)**	Lower reactor power with Rods from 54% to 50% with control rods in preparation for securing the RFP.
5	CH07B	**C (ATC)**	CRD Flow Control valve fails closed. ATC will swap to alternate Flow Control Valve.
6	AP07	**I (BOP/SRO)**	Inadvertent ADS Initiation The BOP will address this problem. The CRS will address Tech Specs for 3.3.5. (ABNORMAL)
7	ED05A RR01B	**M (Crew)**	Bus 11 Lockout, reactor scram, LOCA. All rods fully insert and the Primary containment responds as designed, but HPCI fails and RCIC cannot keep up with the inventory loss. Alternate Level Control contingency is performed. Emergency Depressurization is finally necessary to allow low pressure systems to inject. EOPs C.5 1100 and 1200 are performed.
8	HP04B HP03	**C (BOP or ATC)**	HPCI Fails to inject. The BOP/ATC will take manual control but HPCI Turbine eventually trips.

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

ES-301-4 & 5 Quantitative attributes:
Total Malfunctions: 7 Malfunctions
Malfunction(s) after EOP: E8
Abnormal Events: E3 & E6
EOPs: 1100 & 1200
EOP Contingencies: ALC & ED
Critical Tasks: ED, Restore RPV Level
Tech Specs:E2 & E6
SRO-I ATC I/C: E2 & E5

Xcel Energy	SIMULATOR EXERCISE GUIDE (SEG)

SITE: MONTICELLO **SEG #** ILT-SS-05E

SEG TITLE: 2009 ILT NRC 2, LOCA & ALC **REV. #** 0

PROGRAM: INITIAL LICENSE TRAINING **#:** MT-ILT

COURSE: NRC EXAM **#:** M-8119

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by: _____
Instructor *Date*

Reviewed by: _____
Instructor *Date*
(Simulator Scenario Development Checklist.)

Validated by: _____
Validation Lead Instructor *Date*
(Simulator Scenario Validation Checklist.)

Approved by: _____
Training Supervision *Date*

Guide Requirements

Goal of Training:

ILT NRC EXAM

Learning Objectives:

1. Demonstrate the ability to predict and/or monitor changes in parameters associated with operating system controls for the appropriate tasks.
2. Demonstrate the ability to correctly use procedures to correct, control, or mitigate the consequences of normal and abnormal operations for the appropriate tasks.
3. Demonstrate the ability to monitor automatic operations of the systems to ensure proper operation for the appropriate tasks.
4. Demonstrate the ability to manually operate and/or monitor systems in the control room in accordance with approved procedures for the appropriate tasks.
5. Demonstrate the ability to complete administrative requirements, as necessary, in order to operate the plant for the appropriate tasks.
6. Demonstrate knowledge of and ability to implement shift supervision duties as they relate to crew operations for the appropriate tasks.
7. Given a degrading or improving plant condition or event, demonstrate the ability to: (CRS)
    a. Evaluate trends that may result in equipment damage or reduction in plant safety.
    b. Ensure proper diagnosis of plant problems by monitoring and interpreting data (information from panel indications).
    c. Evaluate and diagnose challenges to Critical Plant Parameters.
    d. Evaluate events and accidents.

Prerequisites:

Completion of MT-ILT Training program

Training Resources:

Simulator

References:	**1.** FP-T-SAT-72 **2.** FP-T-SAT-75 **3.** NUREG 1021, Rev.9, Supplement 1
Commitments:	None
Evaluation Method:	ILT NRC EXAM
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** LOCA **Important Components:** Containment **Important Operator Actions with Task Number:** XRPVBLDNY-Blowdown to prevent core damage

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

Shift Manager Tasks:

None

SRO Tasks:

SS200.133	Direct Reactor Startup to Full Power IAW C.1	6, 7
SS299.351	Apply Administrative requirements of T.S. Section 3.3 and Bases to Instrumentation	6, 7
SS299.353	Apply Administrative requirements of T.S Section 3.5 and Bases to ECCS and RCIC	6, 7
SS304.193	Implement RPV Control	6, 7
SS304.194	Implement Primary Containment Control	6, 7
SS304.198	Implement Emergency RPV Depressurization	6, 7
SS314.106	Supervise use of alternate injection systems for RPV makeup	6, 7
SS314.107	Supervise RPV makeup with CRD	6, 7
SS314.119	Supervise containment spray	6, 7
SS315.101	Supervise response to reactor scram	6, 7
SS315.130	Supervise response to a Feedwater pump trip	6, 7
SS315.138	Supervise response to loss of Bus 11 or Bus 12	6, 7
SS315.159	Supervise rapid power reduction	6, 7
SS315.160	Supervise response to inadvertent ECCS initiation	6, 7

RO Tasks:

CR200.127	Perform a power ascension after the reactor is on line >15% power	1-5
CR200.146	Perform the procedure for a Reactor Scram	1-5
CR200.175	Perform the procedure for feedwater pump trip	1-5
CR200.182	Perform the procedure for a loss of Bus 11 or Bus 12	1-5
CR200.203	Perform the procedure for rapid power reduction	1-5
CR200.204	Perform the procedure for inadvertent ECCS initiation	1-5
CR203.111	Transfer the A(B) RHR from LPCI to Torus Cooling with normal offsite power available during abnormal and emergency conditions	1-5
CR299.353	Apply T.S. Section 3.3 and Bases to Instrumentation	2, 5

RO Tasks:

CR299.355	Apply Tech Spec 3.5 and Bases to ECCS and RCIC	2, 5
CR304.102	Perform the actions associated with RPV Control	1-5
CR304.103	Perform the actions associated with Primary Containment Control	1-5
CR314.101	Perform actions associated with Emergency RPV Depressurization	1-5
CR314.110	Use alternate injection systems for RPV makeup	1-5
CR314.111	Perform actions associated with RPV makeup with CRD	1-5

STA Tasks:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Core Spray Test
2. RWM INOP
3. RFP high vibes
4. CRD Flow Control failure
5. Inadvertent ADS timer initiation

After EOP Entry:

1. HPCI flow controller failure, then isolation

Abnormal Events:

1. RFP high vibes
2. Inadvertent ADS timer initiation

Major Transients:

1. LOCA with a loss of high pressure injection.

Critical Tasks:

1. **[Inhibit ADS to avoid auto initiation that would result in a violation of cooldown rate or a loss of adequate core cooling.]**
2. **[When RPV water level cannot be maintained >-149", Emergency Depressurize the reactor.]**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. Reactor power ~55%

   - Startup in progress at C.1 Section VIII.A, Step 18 (Raise power with Rods per Reactor Engineer)
   - 2 RFPs in service
   - Waiting for Nuclear Engineer to verify predictor results and to provide a new withdrawal sequence.

2. The following equipment is OOS:
   - 12 RBCCW Pump is OOS for breaker replacement.

3. The following evolutions are planned for the shift:
   - Perform 'A' Core Spray Quarterly while waiting for new predictor results

SEQUENCE OF EVENTS:

Event 1:

- Perform Core Spray Quarterly.
  #11 Pump motor breaker trips on Lockout. (Note: This event is NOT intended as a Tech Spec evaluation for the CRS.)

Event 2:

- The RWM fails inoperable. The CRS refers to Tech Spec 3.3.2.1(B) and determines that the RWM can be bypassed.

Event 3:

- Reactor Feed Pump high vibration.
  The BOP will address this problem and eventually trip the RFP.

Event 4:

- The ATC will lower reactor power with Rods from 55% to 50% in preparation for securing the Feed Pump.

Event 5:

- CRD Flow Control valve fails closed.
  ATC will swap to alternate Flow Control Valve.

Event 6:

- ADS Timer inadvertent ECCS initiation. The BOP and CRS perform C.4-G, Inadvertent ECCS Initiation. CRS will address Tech Spec 3.3.5.1 and 3.5.1

Event 7:

- Bus 11 Lockout, reactor scram, LOCA.
- With RFP #12 secured, a Bus 11 Lockout results in the loss of all Feedwater.
- All rods fully insert but HPCI fails and RCIC can NOT keep up with the inventory loss. Alternate Level Control contingency is performed.
- Emergency Depressurization is finally necessary to allow low pressure systems to inject.
- EOPs C.5 1100 and 1200 are performed.

Event 8:

- HPCI fails to inject.
  The BOP or ATC will take manual control but HPCI eventually trips on high steam flow.

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

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS (IC): • Mode: 1 • Exposure: BOC • Power: ≈55% • Pressure: 964 psig • Generator: 311 Mwe • Total Recirc Flow: 35.5 M/lb/hr	(RO/LO/ SRO)	
	1. SIMULATOR SET UP Reset to IC 282 per SIMULATOR INPUT SUMMARY and Manual Setting and Instructions		
	2. Shift Brief: Turbine Building Status: 4 Condensate F/D are in service, 'C' demin has highest d/p indication at 5.3 psid. Conditions are normal. Reactor Building Status: Conditions are normal.	CRS	Performs Shift Brief CDF is GREEN, XCEL condition is GREEN. Waiting for Nuke guidance to continue reactor startup 12 RBCCW Pump is OOS for breaker replacement. Perform Core Spray quarterly surveillance

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	3. <u>COMPLETE TURNOVER:</u> Verify crew performs walk down of control boards and reviews turnover checklists. At the completion of the shift brief inform the CRS that their crew has the duty.		The following support is available: <u>Operations</u>: Normal Staffing for startup <u>Maintenance</u>: Support available upon request <u>Engineering</u>: Support available upon request
Event 1	**4. <u>Core Spray Quarterly surveillance:</u>** a. Provide candidates with a working copy of 0255-03-IA-1-1, (Core Spray Loop A Quarterly Pump and Valve Tests) b. Role Play the In-plant operator as necessary. The Local suction pressure is reading 5 psig. If asked about vibration readings, inform the CRS that vibrations readings are not required.	CRS BOP BOP	<u>Management</u>: Support available upon request Perform steps of 0255-03-1A-1-1 • Evaluate Tech Spec 3.5.1 Condition B • Place #11 Core Spray Pump in PULL-TO-LOCK. (Should acknowledge 3-A-14) • Cycle and time MO-1741 (3-A-54 should reset once the valve is OPEN.) • Place #11 Core Spray Pump in AUTO. (3-A-14 should reset.) • Check Annunciator 3-A-54 is reset • Record #11 CS Pump Suction and Discharge pressures • Calls for local suction pressure on PI-14-36A. Checks discharge pressure on C03 PI-14-48A.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	c. When #11 CS Pumps is started, verify TRIGGER 1 goes active and that Malfunction **CS01A** goes active after a 5 sec delay		• Makes plant page for 4KV breaker operation • Start #11 CS Pump. Key Parameter Response: 11 CS Pump starts and then trips. Key Expected Alarm: 3-A-22(Core Spray Pump 11 Lockout) Auto Actions: None
	d. Role Play the In-plant operator as necessary. The Core Spray pump breaker on Bus 15 has tripped on Lockout. There are no unusual indications at the Core Spray pump and motor.		o Dispatch in-plant operator(s) to: ▪ Inspect Bus 15 4KV area ▪ #11 core Spray Motor o May place #11 CS Pump in PTL
	e. Role Play Single Point of Contact (or equivalent management) as necessary.	CRS	• Notify the Single Point of Contact for the inoperable Core Spray pump
Event 2	**5. RWM INOP:** When directed by Lead Examiner, fail the Rod Worth Minimizer as follows: a. INSERT MANUAL **TRIGGER 3.**		Key Parameter Response: Control Rod Block. Key Expected Alarm: 5-A-35 (RWM Rod Block) Auto Actions: Control Rod Block and Rod Out Permit white light on C-05 goes out.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	b. Verify Malfunction **RW02A**, RWM Power level Set Point Failure goes active and the Rod Out Permit white light on C-05 goes out.	ATC	• Responds to annunciator 5-A-35 (RWM Rod Block) • Recognizes that a control rod block exists and that the RWM has a Power Level Unknown fault. • Notifies CRS and System Engineer.
	1) Role Play as necessary if directed to cycle power to the RWM instrument chassis in the Cable Spreading Room and provide the message number 52 for the Reactor power level unknown failure.	CRS	Refers to Tech Spec 3.3.2.1(C) and determines that the RWM can be bypassed. • Directs the OATC to perform procedure 2169
	2) If the Nuclear Engineer is called, state additional rod withdrawals will be necessary and they recommend bypassing the RWM. 3) If actions are not being taken to bypass the RWM. Call the CRS as the Ops Manager and state the RWM needs to be bypassed. Use Form 2169 and the Ops Manual as guidance.	ATC	Performs procedure 2169 • Checks the self-test status on the RWM and determines that a Reactor power level unknown failure has occurred. Marks step 1 with N/A. • Selects MESSAGES menu for current messages • Consults Table 2, RWM Rod Block Messages • Determines Step 4 is N/A. • Determines RWM may be bypassed per B.05.02-05.G.2 (RWM BYPASS). • Places the RWM keylock switch to BYPASS.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 3	**6. <u>#12 Reactor Feed Pump High Vibration:</u>** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 5** 1) Verify the following Malfunction goes active: **C-06-A02**, #12 RFP high Vibration b. If called respond as the out plant operator and WAIT 3 minutes to report vibrations on the 12 RFP at 4.7 mils and rising slowly. c. If called, respond as the Ops Manager, Plant Manager, and/or System Engineer concerning notification of the event. d. If directed to reset the RFP high vibration alarm as an in-plant operator, wait 3 minutes and then DELETE MALFUNCTION C-06-A02	BOP CRS BOP	<u>Key Parameter Response</u>: RFP vibrations. <u>Key Expected Alarm</u>: 6-A-2 (Rct Feed Pump P-2b High Vibration): <u>Auto Actions</u>: None. Dispatch operator to the turbine building • Reports RFP #12 vibration of 4.7 mils, rising slowly, to CRS Recognize the 4.7 mils is in the DANGER range. • Provides crew brief • Directs Rapid Power reduction (<u>≤</u>50%) per C.4-F • Directs BOP to remove #12 RFP from service. • Makes plant page for 4KV breaker operation • Trips 12 RFP and performs 6-A-7 (RCT Feed Pump P-2b Trip) and C.4-B.06.05A (Feedwater Pump Trip) • Verifies Automatic Action: o CV-3490 RFP Recirc to CDSR closes after 11 seconds. o Verifies 12 RFP Aux Oil Pump running

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Verifies that Recirc Pumps Auto-runback. • Allow plant conditions to stabilize. • Directs an out-plant operator to place #12 RFP in a Shutdown Lineup
Event 4	**7. <u>Lower reactor power by inserting control rods:</u>** NOTE: With the RWM INOP the OATC must start inserting partially withdrawn rods to 00. Then the rods at position 48 should be inserted working backwards from the current roller tape position.	OATC	Lowers power with control rods to be within the limits of 1 RFP (<50% power) per C.4.F (Rapid Power Reduction) • Verifies Recirc Flow > 35 Mlb/hr. • Reviews power/flow map to ensure <u>NOT</u> in buffer region. • Inserts control rods to position 04 or deeper using step 4 of C.4-F (RWM INOP). • Reduces reactor power to <50% in order to secure #12 RFP.
		CRS	Provides oversight for Rapid power Reduction reactivity manipulation

Deleted: Even with the RWM INOP the RPR rod sequence may be obtained and used as a guide to assist the OATC with rod insertion

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	**8. <u>CRD Flow Control Valve Failure:</u>**		<u>Key Parameter Response</u>: Reduced CRD cooling water flow <u>Key Expected Alarm</u>: 5-B-41 (CRD HI Temperature) <u>Auto Actions</u>: CRD Flow Control valve is closed.
		ATC	Responds to annunciator
	(Note: It takes 3.5 minutes for this malfunction to cause the 5-B-41 annunciator.)		• Informs Shift Supervision
Event 5 (Cont'd)	a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 7**		• Sends Reactor Building Operator to investigate CRD temperature recorder
	1) Verify the following MALFUNCTION goes active: **CHO7B**, CRD Flow control Valve fails closed		• Refers to procedure B.01.03-05 CRDH • Recognizes CRD FCV failure
		CRS	Directs swap to standby CRD FCV
	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.	ATC	Coordinates with Reactor Building Operator and performs the following:
	c. When directed to report to the CRD FCV station to support shift of FCV, WAIT 3 minutes and report you are standing by.		• Opens standby FCV manual inlet/outlet valves • Places Flow Controller in MANUAL • Manually runs controller to 0

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	d. When directed to OPEN CRD-16-2 and CRD-18-2, WAIT 2 minutes, then use modify REMOTE FUNCTION **CH17** to OPEN and report this action to the Control room. e. When directed to CLOSE CRD-16-1 and CRD-18-1, WAIT 2 minutes, then modify REMOTE FUNCTION **CH16** to CLOSE and report this action to the Control room f. If directed to report CRD temperatures, report all alarms are clear and all temperatures are lowering to normal.	ATC	• Places the CRD Flow Selector to the B position • Slowly OPENS the B FCV manually to approximately 54 to 56 gpm • Places the FCV in AUTO • Closes previously in-service FCV manual inlet/outlet valves Acknowledge annunciator 5-B-41 clear and informs Shift Supervision.
Event 6	**9. <u>ADS Inadvertent Initiation</u>** **a.** When directed by the lead evaluator, INSERT MANUAL **TRIGGER 9** **[Inhibit ADS to avoid auto initiation that would result in a violation of cooldown rate or a loss of adequate core cooling.]** 1) Verify that **AP07**, ADS Timer Initiation goes active. **NOTE**: <u>IF</u> the timer reaches 0 seconds, **Insert Trigger 10** to open the ADS valves. **Delete Trigger 10** if the timer is inhibited after the ADS valves are open.	BOP BOP	<u>Key Parameter Response</u>: ADS Timer counting down <u>Key Expected Alarm</u>: 3-A-25 (Auto Blowdown Timer Activated) <u>Auto Actions</u>: ADS Valves open after 107 seconds if not inhibited. Reports the following: • ADS timer actuation Places ADS AUTO/INHIBIT control switch to INHIBIT Places ADS AUTO/INHIBIT control switch to INHIBIT

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	a. If called, respond as the Ops Manager, Plant Manager, and/or System Engineer concerning notification of the event.	CRS	Refers to TS and enters Required Action G for LCO 3.3.5.1 and declares ADS SRVs inoperable per table 3.3.5.1-1 (function 4.b within 1 hour).
		CRS	Refers to TS and enters Required Action L for LCO 3.5.1 (be in MODE 3 within 12 hours).
Event 7	**11. Bus 11 Lockout:** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 11** 1) Verify the following Malfunctions go active: a) **ED05A**, Bus 11 Lockout b) **HP04B**, HPCI Speed control fails low c) (3 minute delay) **RR01B**, Small line break		Key Parameter Response: O volts on 11 Bus Key Expected Alarm: 8-B-14 (Bus 11 Lockout) Auto Actions: Loss of one Feed Pump and one Recirc Pump) • Check Bus 11 voltage on C08, which indicate 0 (or alternate indication). • Notify Shift Supervision. • Initiate an investigation to determine the cause of loss of power, and correct, if possible
	NOTE: An automatic Reactor Scram occurs 30 seconds after the bus 11 lockout due to the complete loss of Feedwater. The crew may manually Scram the Reactor during this time.	ATC	C.4-B.09.06.A actions • Monitor and control Reactor water level between +9 and +48 inches.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	NOTE: The following actions from C.4-B.09.06.A, C.4-B.06.05.A (Feedwater Pump Trip) and C.4-B.01.04.A (Trip Of One Recirc Pump) may NOT be performed at this time due to the intensity of the scenario:	BOP	• When Reactor water level decreases to +9 inches, verify a Reactor scram. C.4-B.09.06.A actions • Place the control switch for #11 RFP in the STOP position. C.4-B.06.05.A (Feedwater Pump Trip) • Verify the Aux Oil Pump running for #11 RFP. C.4-B.01.04.A (Trip Of One Recirc Pump) • Close the discharge valve for the tripped (Recirc) pump
Event 7	**12. Reactor Scram response:**	ATC	Actions per C.4-A (Reactor Scram): • Place Mode Switch in SHUTDOWN. • Verify all Control Rods are inserted to or beyond position 04. • Provides scram script to CRS Reports when Reactor level drops to less than 9" EOP entry condition. • Verify HPCI and RCIC initiation. • Monitor Reactor Power o Insert SRM and IRM detectors.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			o Switch recorders from APRM to IRM. o Range down on IRMs as necessary. • Verify SDV Vent and Drain Valves closed.
Event 7	**Reactor Scram response:**	BOP	Performs Part B of C.4.A • Announce over the plant paging system that a Reactor Scram has occurred. • Open Main Generator output breakers 8N4 & 8N5. • Trip the Main Turbine. • Verify the Generator Field Breaker Open. • Start the Turbine Aux Oil Pump. • Verify Turbine Exhaust Hood Sprays in service. (See Event 7) • Verify Main Steam Pressure Control or Low-Low Set is controlling Reactor Pressure.
		CRS	Supervise response to reactor scram

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 8	**13. <u>HPCI Failures</u>:** a. A HPCI Flow control problem will force the operator to take manual control of HPCI b. When HPCI flow has been restored to rated INSERT MANUAL **TRIGGER 13,** c. Verify the following MALFUNCTION goes active:**HP03**, HPCI Turbine Trip	BOP / ATC	Attempt to maintain RPV level with HPCI • Recognize that HPCI is <u>NOT</u> operating at rated flow. • Take manual control of flow controller and maximize HPCI injection. • Identifies that HPCI has tripped & informs CRS
Event 7	**14. <u>LOCA RPV Control:</u>**	CRS	Directs performance of C.5-1100 (RPV Control) • Direct second CRD pump and SBLC pump be initiated for RPV injection.
	15. If requested to close the CRD Pump Discharge Bypass valve , CRD-168, Role Play as necessary and modify REMOTE FUNCTION **CH34** to **CLOSED**	ATC	Performs RPV Control actions • Starts second CRD pump. (C.5-3204) o Verifies Pump Discharge Bypass closed. • Starts a SBLC pump for injection. (C.5-3203) o Verifies injection • Verifies proper RCIC operation • Adequately monitors and reports RPV level and Pressure, both values and trends.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 7	**16. <u>LOCA Primary Containment Control (Torus):</u>**	BOP CRS	Reports Drywell pressure rising • Reports EOP entry conditions. o DW pressure, DW Temp and Torus temp Directs performance of C.5-1200 (PC Control) • Start Torus sprays • Start all available Torus cooling • Spray the Drywell
Event 7	**<u>LOCA Primary Containment Control (Torus):</u>**	BOP	Performs C.5 1200 actions • Places Torus Sprays in service per C.5-3502: o Verifies RHR Pumps running o Takes Cont Spray/Cooling LPCI Initiation Bypass (A/B) to BYPASS o Opens MO-2006, 2010, & 2008 (A Loop) or Opens MO-2007, 2011, & 2009 (B Loop) o Verifies LPCI Inject Outboard Valves are closed; MO-2012 and MO-2013. • Initiates Containment Cooling o RHRSW Outlet valve controller set 20% o Place HX Bypass in CLOSE

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			o ECCS Load Shed to MANUAL OVERRIDE o Start RHRSW Pump(s) o Adjust flow to ≈3500 gpm per pump o Start room cooler
Event 7	**17. <u>LOCA Primary Containment Control (Drywell)</u>**:	BOP CRS BOP	Reports Drywell pressure rising • Reports EOP entry conditions. o DW pressure, DW Temp and Torus temp Directs performance of C.5-1200 (PC Control) • Start all available Drywell cooling • Spray the Drywell Performs C.5 1200 actions • Start all available drywell cooling (C.5-3503) o Place all D/W fan control switches to OFF o Open Knife switch KS3100 o Verify fan inlet dampers are in AUTO o Place all D/W fan control switches to ON o OPEN associated fan disch dampers

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Initiates Drywell Spray (C.5-3502) o Open Drywell Spray Outboard MO-2020 (2021) o Open Drywell Spray Inboard MO-2022 (2023) o Close Torus Cooling MO-2008 (2009)
Event 7	18. **Alternate RPV Level Control /Blowdown**: **[When RPV water level cannot be maintained >-149", Emergency Depressurize the reactor.]**	CRS BOP / OATC	Verifies two or more Injection Subsystems lined up with pumps running. 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 • Verifies that both Core Spray Subsystems and LPCI Pumps are available for injection • Opens 3 ADS SRVs • Monitor and report RPV level values and trends • Controls RPV injection from RHR. o Throttles MO-2012.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Controls RPV injection from Core Spray. o Throttles MO-1753 and MO-1754
End	19. When the conditions are stabilized or at discretion of lead instructor/evaluator 20. End the scenario by placing the simulator in freeze	Crew	• Remain in simulator for potential questions from evaluator. • No discussion of scenario or erasing of procedure marking is allowed.

SIMULATOR INPUT SUMMARY							
Manual Trigger	**Type**	**Code**	**Description**	**Delay**	**Ramp**	**Final Severity or Value**	**Event Trigger**
5	Malfunction	C-06-A02	Annunciator 6-A-2 (RFP High vibration)			ON	
7	Malfunction	CH07B	CRD FCV fails closed			CLOSED	
11	Malfunction	ED05A	Bus 11 Lockout			TRUE	
11	Malfunction	RR01B	Small Line Break RX Recirc 12	3:00	10:00	75%	
11	Malfunction	HP04B	HPCI Speed controller fails low			TRUE	
13	Malfunction	HP03	HPCI Turbine Trip			TRUE	
	Malfunction	CS01A	#11 Core Spray Pump Lockout	5 Sec		TRUE	1 2D_S5ASR(1)
9	Malfunction	AP07	ADS Timer Initiation			TRUE	
3	Malfunction	RW02A	RWM Power level Setpoint failure			TRUE	
10	Malfunction	AP01A	SRV A fails OPEN			TRUE	
10	Malfunction	AP01C	SRV C fails OPEN			TRUE	
10	Malfunction	AP01D	SRV D fails OPEN			TRUE	
30	Override	04-A1DS125-02	12 RBCCW PUMP GREEN LAMP			OFF	
	Malfunction	FW16B	12 RFP Trip			True	ZD_STR(4)

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Retention: Life of Plant
Retain in: Training Program File
Form retained in accordance with record retention schedule identified in FP-G-RM-01.

SIMULATOR INPUT SUMMARY							
	*Remote (As requested)	CH17	B CRD FCV Station CRD16-2 & 18-2			OPEN	
	*Remote (As requested)	CH16	A CRD FCV Station CRD16-1 & 18-1			CLOSED	
	*Remote (As requested)	CH34	CRD-168, CRD Pump Bypass Isolation			CLOSED	

* NOT shown on Input Summary

Manual Setting and Instructions:

1. Reset to IC 282.
2. Verify Initial Conditions:
    a. An Edge Rod Selected.
3. Verify Event Trigger 1 assigned as 2D_S5ASR(1) (#11 Core Spray Pump handswitch in START).
4. Verify Simulator Input Summary matches IC282 Summary.
5. Verify availability of Core Spray Quarterly Surveillance procedure 0255 with steps up to H.1 completed.
6. Insert Manual Trigger 30 to simulate the removal of 12 RBCCW Pump breaker and hang tag on pump switch.
7. Place the handswitch for 12 RBCCW pump in the OFF position to remove the Standby Setup feature.
8. Ensure roller tape is on C-05 and set to Step 31 so it can be used for Rapid Power Reduction with an INOP RWM.

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(This table may be modified based on site simulator)

Attach the following site-specific information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: New Create

SIMULATOR SETUP CHECKLIST (IC *)

Before Training or Evaluation:

- ☐ Simulator in Training Load
- ☐ Alarm Sound "ON" on simulator console
- ☐ Simulator reset to correct IC (malfunctions, remotes, overrides entered per guide)
- ☐ MTF-7100-051 (Attendance Record) available
- ☐ Chart recorders operating and forwarded
- ☐ Tags hung per simulator guide (Caution, Danger, Info)
- ☐ Pens, paper, markers, available
- ☐ Turnover Sheet, LCO log, PRA sheet as applicable
- ☐ SPDS terminals operating
  - ☐ Verify that SPDS is the EOF has "MPIRT" in the lower right corner of display.
    - ☐ Verify "SPIRT" does NOT appear in the lower right corner. (If it does, contact John Shriver)
    - ☐ Check for outside air temperature approximately the same as real air temperature on the SPDS (another indication that the SPDS is indicating Live data or Simulator data).
- ☐ Process Computer alarm screen up and clear
- ☐ Numac alarms reset and displays off
- ☐ RWCU filter demin flows set to desired flow (approx. 80 gpm)
- ☐ RWCU temperature set between 115° and 118°F
- ☐ Generator MVAR loading ≤50 MVAR delivered
- ☐ Turbine lube oil temperature between 111° and 113°F
- ☐ Reactor water level control is in 3 element and Median selected (unless IC specifies a different configuration)
- ☐ Status board updated
- ☐ Verify all Hi / Hi-Hi alarms are reset on C-37 for neutron monitors.

Continued on Back

SIMULATOR SETUP CHECKLIST (IC *)
(Continued)

Before Evaluation Only:

- ☐ Videotape in VCR and setup to record (Taped evaluations only)
- ☐ Exam signs posted on all simulator doors
- ☐ Evaluation team briefed
- ☐ SEC contacted if participating
- ☐ Determine individual responsible for SEC duties if SEC NOT participating
- ☐ Phone volume at Instructor Console in the Simulator Control Room turned down

After Training for the Day

- ☐ Simulator reset to IC-15
- ☐ Tags removed from control panels
- ☐ Exam/Training signs turned around
- ☐ Procedures cleaned and put away
- ☐ Headsets turned off and put away
- ☐ Recorders stopped
- ☐ Phone volume at Instructor Console in the Simulator Control Room returned to normal

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

1. The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No
2. The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	Yes	No
3. The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4. Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5. Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6. The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	No
7. The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	Yes	No
8. The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*	Yes	No
9. The scenario guide incorporates verification of Operator Fundamental application.*	Yes	No
10. Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*	Yes	No

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

1. The desired initial condition(s) could be achieved.	Yes	No
2. All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3. All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4. All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5. During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6. Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could NOT be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7. Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

Discrepancies noted (Check "none" or list items found) ☐ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

_____

_____

_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

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When directed by Lead Examiner, fail the Rod Worth Minimizer as follows:		Recognizes that a control rod block exists and that th RWM has a critical self-test fault. Notifies CRS and System Engineer.

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Role Play an in plant licensed operator as necessary if directed to cycle power to the RWM instrument chassis in the Cable Spreading Room and provide the message number 50 for the Critical self-test failure.

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guidance) If the Nuclear Engineer is asked about upcoming rod withdrawal, role play as necessary to confirm that additional rod withdrawals will be necessary

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3	Malfunction	C-05-A35	RWM Rod Block Annunciator			TRUE

Facility: Monticello Scenario No.: ILT-SS-06E (**NRC 3**) Op-Test No.: MNGP 09

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions:
At 100% power with Transformer 1AR out of service to investigate a hot spot.
No Limiting conditions for Operation in effect.

Turnover:
Shift to standby RBCCW pump

Event No.	Malf. No.	Event Type*	Event Description
1	None	**N (BOP)**	Transfer to standby RBCCW pump
2	CH06_052	**I (ATC/SRO)**	Rod Drift Scram outlet valve failure The ATC will address this problem. The CRS will address Tech Specs for T.S. 3.1.3 Condition C
3	AP01E	**I (BOP/SRO)**	An SRV opens. The BOP will address this problem (logic). The SRV will close (ABNORMAL)
4	None	**R (ATC/SRO)**	Rapid power Reduction is performed for the leaking SRV.
5	C-08-B01	**C (BOP/SRO)**	An oil leak on Transformer 2R requires emergency transfer to 1R. The CRS will address Tech Specs for offsite sources (ABNORMAL)
6	ED05F	**C (ATC/SRO**	Bus 16 Lockout, #11 CRD Pump will not start, manual reactor scram and performance of EOPs C.5 1100
7	MS04B	**M (Crew)**	All rods fully insert but a steam leak inside the Drywell develops. Emergency Depressurization becomes necessary due to elevated Drywell temperatures. EOP C.5-1200 is performed.
8	(Override) 01-S030-02	**I (Crew)**	B RHR cannot be initiated in DW Spray mode. This results in use of the Emergency Depressurization Contingency.

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

ES-301-4 & 5 Quantitative attributes:
Total Malfunctions: 6 Malfunctions
Malfunction(s) after EOP: E8
Abnormal Events: E3 & E5
EOPs: 1200
EOP Contingencies: Emergency Depressurization
Critical Tasks: Manual Scram for Loss of CRD (200.167); Blowdown on DW Temp (314.101)
Tech Spec: E2 & E5
SRO-I ATC I/C: N/A

Xcel Energy	SIMULATOR EXERCISE GUIDE (SEG)

SITE: MONTICELLO **SEG #** ILT-SS-06E

SEG TITLE: 2009 ILT NRC 3, DRYWELL HIGH TEMPERATURE BLOWDOWN **REV. #** 0

PROGRAM: INITIAL LICENSE TRAINING **#:** MT-ILT

COURSE: NRC EXAM **#:** M-8119

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by: _____
Instructor *Date*

Reviewed by: _____
Instructor *Date*
(Simulator Scenario Development Checklist.)

Validated by: _____
Validation Lead Instructor *Date*
(Simulator Scenario Validation Checklist.)

Approved by: _____
Training Supervision *Date*

Guide Requirements

Goal of Training:	ILT NRC EXAM
Learning Objectives:	1. Demonstrate the ability to predict and/or monitor changes in parameters associated with operating system controls for the appropriate tasks. 2. Demonstrate the ability to correctly use procedures to correct, control, or mitigate the consequences of normal and abnormal operations for the appropriate tasks. 3. Demonstrate the ability to monitor automatic operations of the systems to ensure proper operation for the appropriate tasks. 4. Demonstrate the ability to manually operate and/or monitor systems in the control room in accordance with approved procedures for the appropriate tasks. 5. Demonstrate the ability to complete administrative requirements, as necessary, in order to operate the plant for the appropriate tasks. 6. Demonstrate knowledge of and ability to implement shift supervision duties as they relate to crew operations for the appropriate tasks. 7. Given a degrading or improving plant condition or event, demonstrate the ability to: (CRS) a. Evaluate trends that may result in equipment damage or reduction in plant safety. b. Ensure proper diagnosis of plant problems by monitoring and interpreting data (information from panel indications). c. Evaluate and diagnose challenges to Critical Plant Parameters. d. Evaluate events and accidents.
Prerequisites:	Completion of MT-ILT Training program
Training Resources:	Simulator

References:

1. FP-T-SAT-72
2. FP-T-SAT-75
3. NUREG 1021, Rev.9, Supplement 1

Commitments:

None

Evaluation Method:

ILT NRC EXAM

Operating Experience:

None

Related PRA Information:

Initiating Event with Core Damage Frequency:
Steam line break in the Drywell

Important Components:
Containment sprays

Important Operator Actions with Task Number:
Emergency Depressurization

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

Shift Manager Tasks:

None

SRO Tasks:

SS299.349	Apply Administrative requirements of T.S. Section 3.1 and Bases to Reactivity Control systems	6, 7
SS299.351	Apply administrative requirements for T.S. Section 3.3 and Bases to Instrumentation	6, 7
SS299.354	Apply administrative requirements for T.S Section 3.6 and Bases to Containment Systems	6, 7
SS299.356	Apply administrative requirements of T.S. Section 3.8 and Bases electrical power systems	6, 7
SS304.193	Implement RPV Control	6, 7
SS304.194	Implement Primary Containment Control	6, 7
SS304.198	Implement Emergency RPV Depressurization	6, 7
SS314.119	Supervise containment spray	6, 7
SS315.101	Supervise response to reactor scram	6, 7
SS315.102	Supervise response to loss of CRD pump flow	6, 7
SS315.109	Supervise response to stuck open relief valve	6, 7
SS315.140	Supervise response to a loss of Bus 15 or Bus 16	6, 7
SS315.159	Supervise rapid power reduction	6, 7
SS315.167	Supervise response to a control rod drifting	6, 7

RO Tasks:

CR200.146	Perform the procedure for a Reactor Scram	1-5
CR200.147	Perform the procedure for loss of CRD pump flow	1-5
CR200.154	Perform the procedure for a stuck open relief valve	1-5
CR200.184	Perform the procedure for loss of bus 15 or 16	1-5
CR200.203	Perform the procedure for rapid power reduction	1-5
CR200.226	Respond to a drifting control rod	1-5
CR262.133	Transfer of plant busses from 2R to 1R using the Emergency method	1-5
CR299.351	Apply T.S. Section 3.1 and Bases to Reactivity Control Systems	2, 5

RO Tasks:

CR299.353	Apply T.S. Section 3.3 and Bases to Instrumentation	2, 5
CR299.366	Apply T.S. Section 3.6 and Bases to Containment Systems	2, 5
CR299.358	Apply T.S. Section 3.8 and Bases electrical power systems	2, 5
CR304.102	Perform the actions associated with RPV Control	1-5
CR304.103	Perform the actions associated with Primary Containment Control	1-5
CR314.101	Perform actions associated with Emergency RPV Depressurization	1-5
CR314.123	Perform actions associated with containment spray	1-5
CR314.124	Defeat Drywell cooler trips	1-5

STA Tasks:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. Rod Drift in
2. SRV opening
3. 2R Trouble
4. Bus 16 lockout
5. CRD Pump fails to start

After EOP Entry:

1. A Drywell Spray failure

Abnormal Events:

1. Rod Drift in
2. SRV opening
3. Bus 16 Lockout

Major Transients:

1. LOCA with loss of Drywell Spray

Critical Tasks:

1. **{Within 5 minutes of the second accumulator low pressure alarm, scram the reactor when no CRD pump is running and the second accumulator low pressure alarm is received.}**
2. **{When drywell temperature cannot be restored and maintained below 281°F, then perform Emergency Depressurization per C.5-2002.}**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. 100% Power with 12 CRD Pump in service for vibration testing.

2. The following equipment is OOS:
   - 1AR Transformer, inspecting due to a hot spot.

3. The following evolutions are planned for the shift:
   - BOP to place 12 RBCCW Pump in service and place 11 RBCCW Pump in standby
   - Vibration testing on 12 CRD pump
   - Continued investigation on 1AR Transformer

SEQUENCE OF EVENTS:

Event 1:
- Transfer to the standby RBCCW Pump

Event 2:
- The OATC will respond to a single control rod drift in due to a leaking scram outlet valve.
- The CRS will enter the appropriate tech spec (3.1.3. Required Action C.1 & C.2).

Event 3:
- Stuck open Relief Valve
  The BOP will address this problem. The SRV will close when C.4-B.03.03.A (Stuck Open Relief Valve) is implemented. The CRS will enter the appropriate tech spec (3.3.6.3 Condition A and 3.6.1.5 for Low-Low Set inoperable.

Event 4:
- Rapid Power Reduction is performed for the leaking SRV

Event 5:

- A significant oil leak on 2R Transformer requires emergency transfer to 1R. The CRS will address Tech Specs for offsite sources, 3.8.1

Event 6:

- Bus 16 (4KV Essential Bus) Lockout, #11 CRD Pump will NOT start, manual reactor scram.

Event 7:

- All rods fully insert and EOP C.5 1100 is performed.
- A steam leak inside the Drywell develops and EOP C.5-1200 is performed.
- Emergency Depressurization becomes necessary due to elevated Drywell temperatures.

Event 8:

- A RHR can NOT be initiated in DW Spray mode.
  This results in use of the Emergency Depressurization Contingency.

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

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS (IC): • Mode: 1 • Power: 100% • Pressure: 1000 • Generator: 608 MWe	CRS ATC BOP	
	1. SIMULATOR SET UP Reset to IC 283 per SIMULATOR INPUT SUMMARY and Manual Setting and Instructions		
	2. SHIFT BRIEF: Verify crew performs walk down of control boards and reviews turnover checklists. **When asked for out plant status provide the following**: Turbine Building Status: 5 Condensate F/D are in service, 'C' demin has highest d/p indication at 3.8 psid. All conditions are normal. Reactor Building Status: All conditions are normal. At the completion of the shift brief inform the CRS that their crew has the duty.	CRS	Performs Shift Brief CDF is GREEN, XCEL condition is GREEN. 1AR Transformer out of service to investigate a hot spot The following support is available: Normal Day Shift Operations: normal crew compliment plus 3 relief crew NLOs Maintenance: Support available upon request Engineering: Support available upon request Management: Support available upon request

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 1	3. **Transfer from #11 RBCCW Pump to #12 RBCCW Pump.** a. Role play and complete necessary actions as an in-plant operator: 1) The #12 pump suction and discharge valves are open prior to starting 2) The pump and motor operate normally after starting 3) When directed to operate the #11 Pump discharge valve, Role Play as necessary and use Remote **RPCC-11** to cycle the discharge valve. (This operation is transparent to the control room operators)	BOP	Transfer to the standby RBCCW Pump. • Station an operator at RBCCW Pumps • Establish communications • Insure #12 RBCCW Pump suction and discharge valves are open • Start #12 RBCCW Pump • Confirm proper operation with in-plant operator • Direct in-plant operator to close the #11 RBCCW Pump discharge valve • When the #11 RBCCW Pump discharge valve is closed, immediately trip the pump • Direct the in-plant operator to re-open the #11 RBCCW Pump discharge valve • Place the #11 RBCCW Pump switch in Auto-standby

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 2	**4. <u>Rod Drift_IN</u>** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 1**, 1) Verify the following Malfunction goes active: **CH06_052** Control Rod 42-23 Scram Outlet Valve Leaking. NOTE: If immediate actions are not taken by the time the rod reaches notch position 24, set the severity of the above malfunction to 0 to stop the rod drift. This will force the crew to take action. b. If asked about CRD Pump Bypass Flow, Role Play the Reactor Bldg. Operator and report that flow is 30 gpm. c. If asked to check out HCU, state that the scram outlet line is hot to the touch. NOTE: The crew may not perform HCU isolation actions since 4 hours is allowed.	OATC CRS	<u>Key Parameter Response</u>: Rod 42-23 drifting in. <u>Key Expected Alarms</u>: 5-A-27 (Rod Drift) <u>Auto Actions</u>: None • Takes actions per C.4-B.01.03.C • Take ROD SELECT POWER SWITCH to OFF and back to ON • Reselect drifting rod and insert to position 00 • Notify Shift Supervision • Verify proper CRD System parameters • Verify core thermal power and margins to thermal limits have <u>NOT</u> been exceeded • Notify Nuclear Engineer Supervisor Evaluate LCO not met and enters T.S. 3.1.3 Condition C. Required action C.1 is met and C.2 is due in 4 hours

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	d. If asked to hydraulically isolate the HCU, wait 3 minutes, DELETE MALFUNCTION **CH06_052** and report the HCU is isolated.		Directs HCU be disarmed
Event 3	5. **Stuck open Relief Valve:** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 3.** 1) Verify the following Malfunction goes active: **AP01E,** Stuck Open SRV 2) Verify the following Override goes active **A531P30-39**, E SRV Red Lamp ON **NOTE: The BOP should leave the simulator and go to the upper booth area to simulate going to the Cable Spreading Room (CSR).**	BOP	Key Parameter Response: Amber and Red CO3 light is on for SRV E open; MWe lowering, lower steam flow in A Main Steam line Key Expected Alarms: 5-A-46 (SRV Open) Auto Actions: None Implement C.4-B.03.03.A (Stuck Open Relief Valve) • Place handswitch 2E-S4E for SRV E in OPEN and then return to the normal position. • Place handswitch 2E-S4E for SRV E in CLOSE. • Place Div II Lo-Lo Set Logic Switch (HS-S3B) at panel C-253D in BYPASS • With SRV E still OPEN, verify keylock switch (HS-S43) at Panel C-253D in OFF. • Monitor and control Reactor pressure • Directs and supervises Rapid Power Reduction for Step 6 of C.4-B.03.03.A

... [1]

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	b. When the BOP simulates fuse removal for E SRV,		• Simulate fuse removal for E SRV at C-253A in the CSR, F1 & F2 on Strip AA
	1) Delete Override **A531P30-39**, E SRV Red Lamp ON	CRS	• Initiate 0444-B for Torus Heat Addition. • If Torus Water Temperature exceeds 90°F, enter C.5-1200, (Primary Containment Control) and TS 3.6.2.1 for high torus water temp.
	2) Delete Malfunction **AP01E,** Stuck Open SRV	BOP	• The CRS will declare TS 3.3.6.3 not met and enter Condition A (72 hour LCO) and 3.6.1.5 (14 Day LCO) for Low-Low Set inoperable
Event 4	**6. Rapid Power Reduction for SRV:**	CRS	Supervises Rapid Power Reduction for Step 6 of C.4-B.03.03.A
		ATC	Performs Rapid Power Reduction per C.4.F • Reduces recirculation flow • Does NOT go below 35Mlb/hr
	For notifications, Role Play Single Point of Contact and plant support personnel as necessary	CRS	• Make the following notifications for the unanticipated power change and degraded SRV: o Single Point of Contact

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 3	**7. Stuck open Relief Valve (Torus Cooling):** a. Even if Torus Water Temperature does NOT exceed 90°F, the CRS may elect to establish Torus Cooling. If so, these steps become applicable. Note: The CRS may evaluate TS 3.5.1 for LPCI injection paths inoperable.	BOP	Starts all available Torus Cooling A (B) • 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 No 11(12) and /or No 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. • CLOSE MO-2002 (2003), HX Bypass. • Verify V-AC-5 (4), A (B) RHR RM COOLER UNIT, in operation.

Deleted: BOP & CRS

Deleted: Enter T.S. 3.5.1 Conditions B&D for LPCI inject paths inoperable

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	8. **Emergency transfer from 2R to 1R:** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 5** 1) Verify the following Remote goes active: **C-08-B01**, 2TR Trouble b. Role Play the dispatched operator: Wait 2 minutes and then report that a steady stream of oil is leaking out of 2R and a large pool of oil has already formed	BOP CRS BOP	Key Parameter Response: None Key Expected Alarms: 8-B-01 (No. 2R XFMR TROUBLE) Auto Actions: None • Dispatch an operator to investigate from a distance. • Verify that 2R Voltages appear normal • Relay information about the oil leak to the CRS Directs emergency transfer from 2R to 1R Performs emergency closed bus transfer from 2R to 1R using B.09.06-05 E.1 (Emergency Method) • Makes plant page about 4KV breaker operation and to clear personnel from vicinity of 2R and 1R • Verify 115KV system voltage is ≥117.4 KV or confirm that the 10TR/XFMR auto load tap changer is in service. • Bus 13 o Place 152-302/CS to CLOSE o Place 152-301/CS to TRIP • Bus 14 o Place 152-402/CS to CLOSE

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5 (Cont'd)	Emergency closed bus transfer from 2R to 1R c. Role Play the equipment operator dispatched to open 3N4 as necessary. Modify Remote Function **ED06**, 3N4 Local operation, to OPEN d. If asked, Role Play personnel to confirm that the 10TR XFMR Auto load tap changer is in service. e. Role Play System Dispatcher as necessary when called to isolate the 2R Transformer	BOP CRS	o Place 152-401/CS to TRIP • Bus 11 o Place 152-102/CS to CLOSE o Place 152-101/CS to TRIP • Bus 12 o Place 152-202/CS to CLOSE o Place 152-201/CS to TRIP • Open knife switch 16 on panel C-31 • Open 3N4 34.5KV Circuit Breaker • Open 3N5 34.5KV Circuit Switch • Dispatch an operator to place the 2R Load Tap Changers in Manual and adjust voltages locally • Contact the System Dispatcher to isolate the 2R Transformer Evaluate Tech Spec 3.8.1 • Determine T.S. 3.8.1 Condition A is applicable

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	Role Play as necessary to inform the crew that another operator will be called in to perform OSP-MSC-0542		• Initiate SR 3.8.1.1 (OSP-MSC-0542, Weekly Breaker Alignment, Indicated Power Availability, and Voltage to AC & DC Power Distribution Checks)
	For notifications, Role Play Single Point of Contact and plant support personnel as necessary		• Make the following notifications for the LCO Entry. o Single Point of Contact
Event 6	9. **Bus 16 Lockout:** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 7**. 1) Verify the following Malfunction goes active: **ED05F**, Bus 16 Lockout 2) Verify the following Overrides go active **03-S55-01**, #11 CRD Pump fails to start **01-S030-02**, MO-2022 DW Spray failure b. If requested to supply Service Water to #12 DG, Role Play in plant personnel as necessary and Modify Remote Function **SW10** to Open	BOP	Key Parameter Response: Loss of 16 Bus voltage Key Expected Alarms: 8-C-18 (No. 16 4160V BUS LOCKOUT) Auto Actions: RPS B Half Scram Recognizes the loss of Bus 16 and take action per C.4-B.09.06.C (4KV Essential Bus) • Check Bus 16 voltage on C08, which indicate 0 (or alternate indication). • Notify Shift Supervision. • Shuts down #12 DG or supplies Service Water

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		ATC	Recognizes the loss of CRD and takes actions per C.4-B.01.03.A (Loss of CRD Pump Flow) • Attempt to start the #11 CRD pump
	[Within 5 minutes of the second accumulator low pressure alarm, scram the reactor when no CRD pump is running and the second accumulator low pressure alarm is received.] NOTE: The following actions from C.4-B.09.06.C and C.4-B.09.07.D (Loss of Power to LC-104 or Its MCCs) may NOT be performed at this time due to the intensity of the scenario:	CRS	• Notify the CRS that #11 CRD can NOT be started **NOTE: The 1st HCU alarms in 2 minutes and the 2nd HCU alarms in 3.5 minutes. The crew may manually Scram the Reactor during this time.** • When a second CRD accumulator alarm is received, manually scram the reactor. Direct actions for a loss of Bus 16 and complete loss of CRD flow • Monitor system operation and take appropriate action for RBCCW, Instrument Air, Drywell Coolers, Service Water, Reactor Pressure Control, RWCU • Place the following Control Switches in PULL-TO LOCK o 152-610/CS 1AR Trans to16 Bus o 152-602/CS 12 STDBY Diesel Gen to 16 Bus

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 6 Scram	**10. <u>Reactor Scram response</u>:** a. When the Mode Switch is taken to SHUTDOWN, verify **Trigger 9** goes active. b. After a 1 minute delay, verify the following Malfunction goes active **MS04B**, Main steam rupture inside Drywell	ATC	Actions per C.4-A (Reactor Scram): • Place Mode Switch in SHUTDOWN. • Verify all Control Rods are inserted to or beyond position 04. • Provides scram script to CRS when RPV level drops to less than 9" EOP Entry Condition • Monitor Reactor Power o Insert SRM and IRM detectors. o Switch recorders from APRM to IRM. o Range down on IRMs as necessary. • Verify SDV Vent and Drain Valves closed. • Maintain RPV Water Level 9-48 inches
	<u>NOTE</u>: The BOP may <u>NOT</u> complete all Part B actions listed because the next event starts 2 minutes after the Mode Switch is taken to SHUTDOWN and will be a higher priority.	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 bkrs 8N4 & 8N5. • Trip the Main Turbine. • Verify the Generator Field Breaker Open. • Start the Turbine Aux Oil Pump.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Verify Turbine Exhaust Hood Sprays in service. • Verify Main Steam Pressure Control or Low-Low Set is controlling Reactor Pressure.
Event 6	11. EOP-1100 after Reactor scram:	CRS	Supervise response to reactor scram, enters EOP-1100 and directs: • Maintain RPV Water Level 9-48 inches • With DW Press >2 psig, before 320 psig Reactor Pressure prevent injection from Core Spray and LPCI NOT needed for core cooling • Verifies that RPV pressure is stable and <1056 psig
		BOP	When directed, prevent injection from Core Spray and LPCI NOT needed for core cooling (per C.5-3205) • Prevents CS injection from Div 1 & Div 2 o Takes CS Injection Bypass switches to BYPASS (14A-S16A & B) o Closes CS Injection Outboard valves (MO-1751 and MO-1752) o Takes CS pump Handswitches to Pull-To-Lock o Closes CS Injection Inboard valves (MO-1753 and MO-1754)

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Prevents LPCI Injection o Bypasses LPCI Initiation 5-minute seal in by opening knife switches 10A-S31A and 10A-S31B o Verify closed MO-2012 Div 1 Inj Outboard o Verify closed MO-2013 Div 2 Inj Outboard
Event 7	**12. LOCA:** NOTE: The severity of the leak will ramp in over 15 minutes. If mitigating actions are taken promptly Drywell Air Temperature will exceed 281°F in approximately 10 minutes. If mitigating actions are NOT performed efficiently, 281°F will be exceeded more quickly.	BOP CRS	Reports Drywell pressure rising • Reports drywell pressure and temperature and torus temperature EOP entry conditions, values, and trends Enters EOP-1200 and directs: • Start all available torus cooling • Start all available drywell cooling • Start torus sprays • Start drywell sprays
Event 7	**13. Torus Cooling / Torus Sprays:**	BOP	Places Torus Sprays in service per C.5-3502: • Verifies RHR Pumps running • Takes Cont Spray/Cooling LPCI Initiation Bypass to BYPASS, 10A-S17A • Opens Discharge to Torus Outboard, MO-2006

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Opens Torus Spray Inboard, MO-2010 • Throttles Torus Cooling Inj/Test Inboard, MO-2008 • Verifies LPCI Inject Outboard Valves are closed; MO-2012 and MO-2013.
Event 7	**14. Torus Cooling / Torus Sprays:**	BOP	• Initiates Containment Cooling o RHRSW Outlet valve controller set to 20% o Place HX Bypass in CLOSE, MO-2002 o Start RHRSW Pump(s) o Adjust flow to ≈3500 gpm per pump o Verify HX Bypass closed, MO-2002 o Verify RHR Room Cooler in operation, V-AC-5
Event 7	**15. Drywell Cooling:**	BOP / ATC	Start all available drywell cooling (C.5-3503) • Place all D/W fan control switches to OFF • Open Knife switch KS3100 • Verify fan inlet dampers are in AUTO, HS-8040 A&C

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			• Place all D/W fan control switches to ON, V-RF-1&3 • OPEN associated fan disch dampers, V-D-15 & 19 at 100%
Event 8	16. **Drywell Spray failure**	BOP / ATC	Start D/W sprays • Opens the Outboard Drywell Spray valve, MO-2020 • Attempts to open the Inboard Drywell Spray valve, MO-2022 • Reports inability to spray drywell
Event 8	**17. Drywell Spray failure/ Blowdown** **[When drywell temperature cannot be restored and maintained below 281°F, then perform Emergency Depressurization per C.5-2002.]**	CRS	May anticipate Emergency Depressurization / direct opening the Turbine Bypass valves When D/W temp can NOT be maintained below 281°F directs performance of C.5-2002 (Emergency RPV Depressurization) • Directs injection be prevented from Core Spray and LPCI (NOT needed for Core Cooling) • Verifies Torus level > -5.9 ft. • Directs opening of all 3 ADS SRVs. • Directs RPV Level restoration

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		BOP/ ATC	If directed, anticipate Blowdown • At C07, places the Pressure Regulator Override (PRO) to OPEN Perform Blowdown • Prevents injection from Core Spray and LPCI (NOT needed for Core Cooling) • Opens 3 ADS SRVs • Monitor and report RPV level values and trends • Controls RPV water Level with Feedwater
End	18. When the conditions are stabilized or at discretion of lead instructor/evaluator 19. End the scenario by placing the simulator in freeze	Crew:	• Remain in simulator for potential questions from evaluator. • No discussion of scenario or erasing of procedure marking is allowed.

SIMULATOR INPUT SUMMARY							
Manual Trigger	**Type**	**Code**	**Description**	**Delay**	**Ramp**	**Final Severity or Value**	**Event Trigger**
1	Malfunction	CH06_052	Control Rod 42-23 Scram outlet valve leaking			60	
3	Malfunction	AP01E	Stuck open SRV			TRUE (1)	
7	Malfunction	ED05F	Bus 16 Lockout			TRUE (1)	
	Malfunction	MS04B	Main Steam Rupture in Drywell	1:00	15:00	11%	9 ZD_S1SHD
5	Malfunction	C-08-B01	2R Trouble			TRUE (1)	
3	Override	01-DS-174-02	E SRV Red Lamp			ON	
7	Override	03-S55-01	#11 CRD Pump Handswitch START Position			FALSE	
7	Override	01-S030-02	MO-2022 Handswitch OPEN Position			FALSE	
	*Remote (As requested)	ED06	3N4 Local operation			OPEN	
	*Remote (As requested)	SW10	B ESW Inlet Isolation valve SW-229			OPEN	

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Manual Setting and Instructions:

1. Reset to IC 283
2. Verify Initial Conditions:
    a. C08, 1AR Transformer out of service
    - 1AR Breakers to Bus 15 and 16 are in PTL
    - 1AR Transformer volts on C08 reading 0 volts
    - Mimic updated

    b. C07, Hood Spray in Normal
    c. C05, #12 CRD Pump running
3. Verify Event Trigger 9 definition as ZD_S1SHD (Mode Switch to Shutdown)
4. Verify available copies of 0444-B for Torus Temperature monitoring and OSP-MSC-0542 for the loss of 2R.

(This table may be modified based on site simulator)

Attach the following site-specific information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: New Create

SIMULATOR SETUP CHECKLIST (IC *)

Before Training or Evaluation:

- ☐ Simulator in Training Load
- ☐ Alarm Sound "ON" on simulator console
- ☐ Simulator reset to correct IC (malfunctions, remotes, overrides entered per guide)
- ☐ MTF-7100-051 (Attendance Record) available
- ☐ Chart recorders operating and forwarded
- ☐ Tags hung per simulator guide (Caution, Danger, Info)
- ☐ Pens, paper, markers, available
- ☐ Turnover Sheet, LCO log, PRA sheet as applicable
- ☐ SPDS terminals operating
  - ☐ Verify that SPDS is the EOF has "MPIRT" in the lower right corner of display.
    - ☐ Verify "SPIRT" does NOT appear in the lower right corner. (If it does, contact John Shriver)
    - ☐ Check for outside air temperature approximately the same as real air temperature on the SPDS (another indication that the SPDS is indicating Live data or Simulator data).
- ☐ Process Computer alarm screen up and clear
- ☐ Numac alarms reset and displays off
- ☐ RWCU filter demin flows set to desired flow (approx. 80 gpm)
- ☐ RWCU temperature set between 115° and 118°F
- ☐ Generator MVAR loading ≤50 MVAR delivered
- ☐ Turbine lube oil temperature between 111° and 113°F
- ☐ Reactor water level control is in 3 element and Median selected (unless IC specifies a different configuration)
- ☐ Status board updated
- ☐ Verify all Hi / Hi-Hi alarms are reset on C-37 for neutron monitors.

Continued on Back

SIMULATOR SETUP CHECKLIST (IC *)
(Continued)

Before Evaluation Only:

- ☐ Videotape in VCR and setup to record (Taped evaluations only)
- ☐ Exam signs posted on all simulator doors
- ☐ Evaluation team briefed
- ☐ SEC contacted if participating
- ☐ Determine individual responsible for SEC duties if SEC NOT participating
- ☐ Phone volume at Instructor Console in the Simulator Control Room turned down

After Training for the Day

- ☐ Simulator reset to IC-15
- ☐ Tags removed from control panels
- ☐ Exam/Training signs turned around
- ☐ Procedures cleaned and put away
- ☐ Headsets turned off and put away
- ☐ Recorders stopped
- ☐ Phone volume at Instructor Console in the Simulator Control Room returned to normal

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

1.	The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No
2.	The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	Yes	No
3.	The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4.	Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5.	Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6.	The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	No
7.	The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	Yes	No
8.	The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*	Yes	No
9.	The scenario guide incorporates verification of Operator Fundamental application.*	Yes	No
10.	Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*	Yes	No

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

1. The desired initial condition(s) could be achieved.	Yes	No
2. All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3. All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4. All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5. During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6. Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could NOT be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7. Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

Discrepancies noted (Check "none" or list items found) ☐ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

_____

_____

_____

Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

Facility: Monticello Scenario No.: ILT-SS-07E (**NRC 4/SPARE**) Op-Test No.: MNGP 09

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions:
At 100% power.
B RPS MG secured.

Turnover:
Perform Reactor Bldg. to Torus Vacuum Breaker test.

Event No.	Malf. No.	Event Type*	Event Description
1	(Override) S74-02 DS162-02	**N (BOP/SRO)**	Perform Reactor Bldg. to Torus Vacuum Breaker Test. Valve fails to close which requires the CRS to address Tech Specs
2	NI13D	**I (ATC/SRO)**	APRM #4 fails Upscale The ATC will address this problem. The CRS will address Tech Specs for RPS instruments
3	MC04B MC03	**C (BOP/SRO)**	Loss of Steam Supply to an SJAE. BOP and CRS will Respond (ABNORMAL)
4	None	**R (ATC/SRO)**	Rapid power Reduction is performed for the loss of Main Condenser vacuum.
5	SW01A	**C (BOP/SRO)**	The running RBCCW pump trips and the auto-start of the standby pump fails. (ABNORMAL)
6	ED06A CH22A&B	**M (Crew)**	Loss LC 101 with B RPS MG secured. The Scram will not reset and the Discharge Volume cannot be isolated. EOP 1300 is performed. Crew will anticipate Emergency Depressurization, which becomes necessary due to elevated Reactor Bldg. Radiation levels.
7	CH02_119	**C ATC**	1 Rod stuck out after scram
8	AO08C&D	**C BOP**	2 of 3 ADS valves fail to open.

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

ES-301-4 Quantitative attributes:
Total Malfunctions: 7 Malfunctions
Malfunction(s) after EOP:E7 & E8
Abnormal Events: E3, E5, & E6
EOPs: 1300
EOP Contingencies: Emergency Depressurization
Critical Tasks: ED, Use alternate ADS valves
Tech Spec: E1 & E2
SRO-I ATC I/C: NA

Xcel Energy

SIMULATOR EXERCISE GUIDE (SEG)

SITE: MONTICELLO **SEG #** ILT-SS-07E

SEG TITLE: 2009 ILT NRC 4, EOP C.5-1300 BLOWDOWN **REV. #** 0

PROGRAM: INITIAL LICENSE TRAINING **#:** MT-ILT

COURSE: NRC EXAM **#:** M-8119

TOTAL TIME: 1.5 HOURS

Additional site-specific signatures may be added as desired.

Developed by: _____
Instructor *Date*

Reviewed by: _____
Instructor *Date*
(Simulator Scenario Development Checklist.)

Validated by: _____
Validation Lead Instructor *Date*
(Simulator Scenario Validation Checklist.)

Approved by: _____
Training Supervision *Date*

Guide Requirements

Goal of Training:

ILT NRC EXAM

Learning Objectives:

1. Demonstrate the ability to predict and/or monitor changes in parameters associated with operating system controls for the appropriate tasks.
2. Demonstrate the ability to correctly use procedures to correct, control, or mitigate the consequences of normal and abnormal operations for the appropriate tasks.
3. Demonstrate the ability to monitor automatic operations of the systems to ensure proper operation for the appropriate tasks.
4. Demonstrate the ability to manually operate and/or monitor systems in the control room in accordance with approved procedures for the appropriate tasks.
5. Demonstrate the ability to complete administrative requirements, as necessary, in order to operate the plant for the appropriate tasks.
6. Demonstrate knowledge of and ability to implement shift supervision duties as they relate to crew operations for the appropriate tasks.
7. Given a degrading or improving plant condition or event, demonstrate the ability to: (CRS).
   a. Evaluate trends that may result in equipment damage or reduction in plant safety.
   b. Ensure proper diagnosis of plant problems by monitoring and interpreting data (information from panel indications).
   c. Evaluate and diagnose challenges to Critical Plant Parameters.
   d. Evaluate events and accidents.

Prerequisites:

Completion of MT-ILT Training program

Training Resources:

Simulator

References:	**1.** FP-T-SAT-72 **2.** FP-T-SAT-75 **3.** NUREG 1021, Rev.9, Supplement 1
Commitments:	None
Evaluation Method:	ILT NRC EXAM
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** Unisolable LOCA in the Reactor Building **Important Components:** Scram Discharge Volume Vent valves **Important Operator Actions with Task Number:** SS304.198 – Implement emergency RPV depressurization CR304.101 – Perform the actions associated with Emergency RPV Depressurization.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE(S):

Shift Manager Tasks:

None

SRO Tasks:

SS299.351	Apply Administrative requirements of T.S. Section 3.3 and Bases to instrumentation	6, 7
SS299.354	Apply Administrative requirements of T.S. Section 3.6 and Bases to containment systems	6, 7
SS304.193	Implement RPV Control	6, 7
SS304.196	Implement Secondary Containment Control	6, 7
SS304.198	Implement Emergency RPV Depressurization	6, 7
SS315.101	Supervise response to reactor scram	6, 7
SS315.107	Supervise response to loss of RBCCW flow	6, 7
SS315.127	Supervise response to decreasing condenser vacuum	6, 7
SS315.141	Supervise response to a loss of power to LC-101 or its MCCs	6, 7
SS315.159	Supervise rapid power reduction	6, 7

RO Tasks:

CR200.146	Perform the procedure for a Reactor Scram	1-5
CR200.153	Perform the procedure for loss of RBCCW flow	1-5
CR200.172	Perform the procedure for decreasing condenser vacuum	1-5
CR200.185	Perform the procedure for a loss of power to LC-101 or its MCCs	1-5
CR200.203	Perform the procedure for rapid power reduction	1-5
CR299.353	Apply T.S. Section 3.3 and Bases to instrumentation	2, 5
CR299.356	Apply T.S. Section 3.6 and Bases to containment systems	2, 5
CR304.102	Perform the actions associated with RPV Control	1-5
CR304.105	Perform the actions associated with Secondary Containment Control	1-5
CR314.101	Perform actions associated with Emergency RPV Depressurization	1-5

STA Tasks:

None

QUANTITATIVE ATTRIBUTES (Use this form for Evaluations only.)

Malfunctions:

Before EOP Entry:

1. RB to Torus Vacuum Breaker failure
2. APRM #4 Upscale
3. SJAE steam supply failure
4. RBCCW Pump trip
5. Loss of LC-101

After EOP Entry:

1. One rod fails to scram
2. 2 of 3 ADS SRVs fail to open during blowdown

Abnormal Events:

1. SJAE steam supply failure
2. RBCCW Pump Trip
3. Loss of LC-101

Major Transients:

1. Small, unisolable LOCA and Secondary Containment High Radiation Levels

Critical Tasks:

1. **{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.}**
2. **{When Emergency Depressurization is required, operate additional SRVs as necessary to achieve a total of 3 open SRVs.}**

SCENARIO OVERVIEW:

INITIAL CONDITIONS:

1. 100% power.
2. Procedure 0141 (Reactor Building to Torus Vacuum Breaker Operability Check) is commenced. Step 1 has been completed.
3. The following equipment is OOS:
   - B RPS MG Set

SEQUENCE OF EVENTS:

Event 1:

- Perform Reactor Bldg. to Torus Vacuum Breaker Test.
- Valve fails to close which requires the CRS to address Tech Specs 3.6.1.6.

Event 2:

- APRM #4 fails Upscale
  The ATC will address this problem. The CRS will address Tech Specs for LCO 3.3.1.1.

Event 3

- Loss of Steam Supply to an SJAE.

Event 4:

- Rapid power Reduction is performed for the loss of Main Condenser vacuum

Event 5

- RBCCW Pump Trip with auto-start failure of standby pump.

Event 6:

- Loss of LC 101
- The Scram will NOT reset without RPS and the Discharge Volume can NOT be isolated.
- EOP 1100 and 1300 are performed.
- Crew will anticipate Emergency Depressurization, which becomes necessary due to elevated Reactor Bldg. Radiation levels.

Event 7:

- One Control Rod fails to scram and remains full out.
  ATC will identify this problem. When selected and driven in, the rod will become un-stuck and will fully insert.

Event 8:

- When Emergency Depressurization is performed, only 1 of 3 ADS SRVs open. Operator must open additional SRVs until a total of 3 are open.

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

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	INITIAL CONDITIONS (IC): • Mode: 1 • Power: 100% • Pressure: 1000 psig	ATC BOP SRO	
	1. <u>SIMULATOR SET UP</u> Reset to IC 284 per SIMULATOR INPUT SUMMARY and Manual Setting and Instructions		
	2. **<u>SHIFT BRIEF</u>** Verify crew performs walk down of control boards and reviews turnover checklists. **When asked for out plant status provide the following** <u>Turbine Building Status</u>: 5 Condensate F/D are in service, 'C' demin has highest d/p indication at 3.8 psid. All other conditions are normal. <u>Reactor Building Status</u>: All conditions are normal. At the completion of the shift brief inform the CRS that their crew has the duty.		CDF is GREEN, XCEL condition is GREEN. B RPS MG secured due to a bearing problem; B RPS being supplied by Alternate source. Reactor Bldg. to Torus Vacuum Breaker Test is due. Procedure is in progress, step 1 is complete. The following support is available: Day Shift <u>Operations</u>: normal crew compliment plus 3 relief crew NLOs <u>Maintenance</u>: Support available upon request <u>Engineering</u>: Support available upon request <u>Management</u> Support available upon request

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 1	**3. <u>RB to Torus Vacuum Breaker Test:</u>** a. Role play I&C Technician if necessary. DPIS readings for step 1 are provided. b. When AO-2380 is taken to OPEN, verify **Trigger 1** goes active and the following go active: a) Malfunction **02-S74-02**, AO-2380 handswitch open position goes True b) Remote **02-DS162-02**, AO-2380 green lamp off (False) after 11 seconds c. Role Play Ops Mgr as necessary for new LCO. Will call the Plant Mgr and NRC Resident	BOP	Perform Test 0141 (Reactor Building to Torus Vacuum Breaker Operability Check) • Verifies DPIS 2572 and 2573 are reading less than 0. (Step 1) • Open and time AO-2379. (Step 2). This switch must be held in the open position or the valve will auto close. • Close and time AO-2379. (Step 2) • Open and time AO-2380. (Step 3). This switch must be held in the open position or the valve will auto close. • Attempt to close and time AO-2380. (Step 3) • Report to the CRS that AO-2380 will <u>NOT</u> close. <u>Key Parameter Response</u>: Valve won't Auto Close. <u>Key Alarms</u>: None <u>Auto Actions</u>: None Evaluate Tech Spec 3.6.1.6 • Determine T.S. 3.6.1.6 Condition A is applicable; a 72 hour LCO to close the Vacuum Breaker.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 2	4. APRM #4 fails Upscale		Key Parameter Response: APRM 4 upscale
	a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 3**.		Key Alarms: 5-A-30 (APRM Hi Hi INOP Ch 4, 5, 6), 5-B-5 (Reactor Auto Scram Channel B), 5-A-3 (Rod Withdraw Block)
	1) Verify the following Malfunction goes active:		Auto Actions: RPS B half scram.
	a) **NI13D**, APRM #4 Upscale	ATC	• Informs CRS • Observes #4 APRM HI HI/INOP light and #4 APRM recorder full scale • Observes RPS channel 'B' trip (1/2 scram)
		BOP	• Observes and reports HI HI light lit and meter full scale and INOP light NOT lit
		CRS	Evaluate TS 3.3.1.1 and TRM 3.3.2.1
	b. If called, respond as the Ops Manager, Plant Manager, and/or System Engineer		• Determine from Table 3.3.1.1-1 that the required number of channels, 2 per trip system, are available and Condition A.1 is met with the ½ scram. TRM 3.3.2.1 Req'd. Action A.1. Rod Block function must be restored in 7 days. • Provides crew brief • Directs APRM 5 unbypassed and APRM 4 bypassed and ½ scram reset
	NOTE: The scram is reset IAW ARP 5-B-5		

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
		ATC	Unbypasses # 5 and bypasses #4 APRM and resets the ½ scram
Event 3	**5. Loss of Steam Supply to an SJAE.** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 5**. NOTE: General Instructions for abnormal procedures allow the CRS to direct steps out of order. This may be done if the crew immediately recognized the loss of steam supply to 11 SJAE.		Key Parameter Response: Degrading Condenser Vacuum Key Alarms: 7-A-20 (Offgas Annunciator) and 252-A-46 (11 SJAE Steam Supply Press Low Trip) Auto Actions: AO-1085A closes.
	1) Verify the following Malfunctions go active: a) **MC04B**, Loss of Steam to SJAE b) **MC03**, Condenser air in-leakage at 0.5% 2) When requested to open the Mechanical Vacuum Pump suction valves, Role Play the in-plant operator as necessary. a) Wait until RPR has been initiated for at least 3 minutes. Open the MVP Suction valves modifying REMOTE FUNCTION **MC06 to 100%**	BOP	Perform actions from C.4-B.06.03.A (Decreasing Condenser Vacuum) • Trip HWC by placing HS-4148 (HWC System Control) on OFF • Notify the Chemist that HWC is out of service • Notify Radiation Protection Personnel of changing radiological conditions in MVP Room • Direct an in-plant operator to open MVP Suction Valves, OG-22-1and OG-22-2 • Identify that PI-1246 reading is NOT normal

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	b. When Rapid Power Reduction with Recirc has been completed, restore SJAE pressure using Remote Function: 1) MC01, #11 SJAE PCV Bypass MS-24-1 to 18%		• Take manual control of PC-1246 and attempt to restore SJAE Sup pressure to 120-130 psig • Dispatch an in-plant operator to locally bypass the failed PCV using MS-24-1
Event 3	6. Loss of Steam Supply to an SJAE.	BOP	• When SJAE Supply pressure is restored to 120-130 psig, reset the SJAE supply trip using PB-1085 (SJAE Isolation Trip Reset) • Confirm that Offgas and Condenser Vacuum parameters return to normal
Event 4	7. Rapid power Reduction is performed for the loss of Main Condenser vacuum NOTE: If called, respond as the Ops Manager, Plant Manager, and/or System Engineer concerning notification of the event.	CRS ATC	Directs and supervises Rapid Power Reduction for Step 1 of C.4-B.06.03.A Performs Rapid Power Reduction per C.4.F • Reduces recirculation flow • Does NOT go below 35Mlb/hr

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5	**8. RBCCW Pump Trip** Note: #12 Pump handswitch taken to stop during IC setup to defeat auto start feature. White Auto Start light is overridden on. Verify this white light goes out when 12 RBCCW pump is started. a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 7** 1) Verify the following Malfunction goes active: a) **SW01A**, RBCCW Pump #11 Trip b. Role Play the Reactor Bldg operator as necessary	 BOP CRS	Key Parameter Response: Lowering RBCCW pressure Key Alarms: 6-B-32 (RBCCW Low Disch Press) Auto Actions: None, standby pump fails to start. • Check RBCCW Header Pressure, PI-1399 • Refer to C.4-B.02.05.A (Loss of RBCCW Flow) • Verify an RBCCW Pump is running. Pump must be taken to START because auto-start feature has failed. Direct Response to loss of RBCCW flow
Event 5 (cont'd)	*9. RWCU restoration after RBCCW Pump Trip **(OPTIONAL)*** ***NOTE:*** *RWCU isolates very quickly (≈12 seconds) upon loss of RBCCW to NRHX.* ***NOTE:*** ***RWCU*** *restoration is **OPTIONAL**. When directed by the lead evaluator, **START EVENT 6**.*	*BOP*	*Respond to Annunciator C04-B31 (Cleanup Demin Temp Hi-Hi)* • *Verify Auto Actions* o *Cleanup Return CLOSED, MO-2399* o *Cleanup Dump to Condenser CLOSED, MO-2404*

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
			o *Cleanup Dump to Radwaste CLOSED, MO-2405*
	a. When requested to close Demin Flow Control valves and place Demins in HOLD, use the following REMOTES:		o *Both Cleanup pumps TRIPPED*
			o *Recognize the cause of the high-high temperature condition, loss of RBCCW*
	1) RU01B, #11 Demin Flow CV to 0		• *Notify Shift Supervision and System Engineer*
	2) RU02B, #12 Demin Flow CV to 0		*Restore Cleanup to service per B.2.2-05 G.9*
	3) RU03, #11 Demin to OUT SER		• *Dispatch an in-plant operator to close Demin Flow Control valves and place Demins in HOLD*
	4) RU04, #12 Demin to OUT SER		
	10. Operator actions to restore RWCU may be more than what is necessary to complete an evaluation. Begin the next event:		• *Notify Shift Chemist of high-high temperature condition*
	a. When directed by the Lead Evaluator ***Or***		• *Place Switch 12A-S7 in BYPASS*
	b. When the BOP requests in-plant operator assistance to return the RWCU demins to service.		• *Verify Reactor Power <1772 MWt.*
			• *OPEN Demin Bypass, MO-2400*
			• *Throttle open Cleanup Return until dual position indication, MO-2399*

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 5 (cont'd)	*11. RWCU restoration after RBCCW Pump Trip*		• *Throttle (fully) OPEN NRHX RBCCW out, MO-3501* • *Start 11 or 12 RWCU Pump* • *When NRHX out is <125°F, return 12A-S7 to NORMAL*
Event 6	**12. Loss of LC 101** a. When directed by the lead evaluator, INSERT MANUAL **TRIGGER 9**. 1) Verify the following Malfunctions go active: a) **ED06A**, Loss of LC 101 b) **CH22A**, SDV Vent failure to isolate c) **CH22B,** SDV Drain failure to isolate	BOP CRS	Key Parameter Response: Loss of power to LC-101 Key Alarms: 8-B-26 (No.101 Trans 480V Bkr Trip) Auto Actions: Full Scram due to a complete loss of RPS • Identify that Breaker 52-101 to LC 101 is open • Perform actions from C.4-B.9.7.A (Loss of Power to LC-101 or its MCCs • Notify Shift Supervision • Direct actions from C.4-B.9.7.A • Initiate an investigation to determine the cause of the loss of power • Correlate the loss of MCC-111 with the loss of RPS Scram using plant knowledge of Table MCC-111

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 6 Scram	13. Reactor Scram response (ATC): **NOTE: The scram is the result of the loss of LC-101 which was providing RPS power through A MG Set and the Alternate transformer.**	ATC	Actions per C.4-A (Reactor Scram): • Place Mode Switch in SHUTDOWN. • Verify all Control Rods are inserted to or beyond position 04. 1 Rod remains full out (See Event 7) • Provides scram script to CRS Reports when Reactor level drops to less than 9" EOP entry condition. • Monitor Reactor Power o Insert SRM and IRM detectors. o Switch recorders from APRM to IRM. o Range down on IRMs as necessary. • Verify SDV Vent and Drain Valves closed. • Reports to CRS that SDV Vent and Drain Valves are NOT closed.

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 7	14. One Control Rod fails to scram and remains full out. a. As requested, use REMOTE FUNCTION **CH22** to close CRD-14 b. When the ATC places the ROD MOVEMENT CONTROL switch to ROD IN to insert Rod 22-51, verify Trigger 11 goes active and MALFUNCTION **CH02_119**, Stuck Rod 22-51, is deleted.	ATC	Insert Rod 22-51 • Recognize that the scram can NOT be reset due to RPS power being lost with the loss of MCC-111 • Direct an in-plant operator to manually close CRD-14 • Bypass the RWM • Select and insert the full out rod
Event 6 Scram	15. Reactor Scram response (BOP): **NOTE:** Part B may be delayed or not performed based on the priority of the radiation conditions.	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 8N4 & 8N5. • Trip the Main Turbine. • Verify the Generator Field Breaker Open. • Start the Turbine Aux Oil Pump. • Verify Turbine Exhaust Hood Sprays in service. • Verify Main Steam Pressure Control or Low-Low Set is controlling Reactor Pressure.

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SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
Event 6	16. Scram Discharge Volume leak	BOP	Perform the actions of EOP-1300 (Secondary Containment Control)
	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).		• The BOP will respond to and report annunciators o 3-B-56 (High Area Temp Steam Leak) o 4-A-11 (Reactor Building Hi Radiation) • Enter C.4-B.02.04.A, Steam Leaks Outside Primary Containment. • Directs evacuation of area or entire reactor building. • Reports RWCU room radiation levels and room temperatures are rising • Keeps the CRS informed of Secondary Containment parameter values and trends
		BOP/ ATC	• Attempts to manually close SDV isolation valves • If directed to anticipate Blowdown, takes the Turbine PRO to OPEN
		CRS	Enters EOP-1300 (Secondary Containment Control) • Direct isolation of the SDV • Monitors Secondary Containment parameters

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	{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.}		CRS May anticipate Blowdown per a C.5-1100 Override Statement and direct RPV pressure be lowered using the Turbine Bypass Valves • Recognizes when 2 area radiation levels have exceeded Max Safe • Enters and directs EOP-2002 (Blowdown) • Verifies Torus level > -5.9 ft. • Directs that 3 ADS SRVs be opened
Event 8	17. Alternate Depressurization **{When Emergency Depressurization is required, operate additional SRVs as necessary to achieve a total of 3 open SRVs.}**	BOP	Perform Emergency Depressurization • When directed by CRS, take 3 ADS SRVs to OPEN • Recognize that SRV C & D did NOT open • Informs the CRS of the failure • Use Alternate Depressurization systems o Open 2 non-ADS SRVs until a total of 3 SRVs are open • Monitor RPV Pressure and Level • Proceed to Cold Shutdown

SCENARIO TIME-LINE:			
SEQ	SEQUENCE OF EVENTS / INSTRUCTOR NOTES	CREW POS	EXPECTED STUDENT RESPONSES
	18. When the conditions are stabilized or at discretion of lead instructor/evaluator 19. End the scenario by placing the simulator in freeze	Crew:	• Remain in simulator for potential questions from evaluator. • No discussion of scenario or erasing of procedure marking is allowed.

SIMULATOR INPUT SUMMARY							
Manual Trigger	**Type**	**Code**	**Description**	**Delay**	**Ramp**	**Final Severity or Value**	**Event Trigger**
5	Malfunction	MC04B	Loss of steam supply to #11 SJAE CV-1242			True	
9	Malfunction	ED06A	Loss of LC 101			True	
9	Malfunction	CH22A	SDV Vent failure to isolate			True	
9	Malfunction	CH22B	SDV Drain failure to isolate			True	
5	Malfunction	MC03	Condenser Air In-leakage			0.5%	
Initial Condition	Malfunction	CH02_119	Stuck Rod 22-51			True	11 ZD_CRDIN
7	Malfunction	SW01A	RBCCW Pump #11 Trip			True	
Initial Condition	Malfunction	AP08C	C SRV (RV2-71-C) stuck closed	0	0	True	
Initial Condition	Malfunction	AP08D	D SRV (RV2-71-D) stuck closed	0	0	True	
3	Malfunction	NI13D	APRM #4 Upscale			True	
Initial Condition	Override	02-S74-02	RB to Torus Vacuum Breaker Handswitch Open Position			True	1 ZD_PC800
Initial Condition	Override	02-DS162-02	AO-2380 Green Lamp	00:00:11		False (Off)	1 ZD_PC800
Initial Condition	Override	02-DS163-02	AO-2380 Red Lamp	00:00:11		True (On)	1 ZD_PC800

SIMULATOR INPUT SUMMARY							
Manual Trigger	**Type**	**Code**	**Description**	**Delay**	**Ramp**	**Final Severity or Value**	**Event Trigger**
Initial Condition	Malfunction	C-04-B19	SUPP VAC RELIEF V2380 OPEN			ON	1 ZD_PC800
Initial Condition	Override	04-A1DS126-02	RBCCW Pump #12 White Lamp			ON	2 ZD_RBBST
Initial Condition	Override	01-DS121-02	C SRV Red Lamp			Off	
Initial Condition	Override	01-DS124-02	D SRV Red Lamp			Off	
*Initial Condition	Remote	PP02_120	RPS B Transfer to Alternate			Alternate	
*Initial Condition	Remote	TC01	Hood spray Valve			NORMAL	
As Requested	Remote	MC01	#11 SJAE PCV Bypass MS-24-1			18%	
As Requested	Remote	CH22	Close CRD-14			0%	
As Requested	Remote	RU01B	#11 Demin Flow CV			0%	
As Requested	Remote	RU02B	#12 Demin Flow CV			0%	
As Requested	Remote	RU03	#11 Demin			OUT SER	
As Requested	Remote	RU04	#11 Demin			OUT SER	
As Requested	Remote	MC06	Mechanical Vacuum Pump suction Valves			100%	

* = Built into IC and NOT shown on summary

Manual Setting and Instructions:

1. Reset to IC 284
2. Verify Event Trigger definitions:
    a. Trigger 1 as ZD_PC800
    b. Trigger 11 as ZD_CRDIN
3. Verify Initial Conditions
    a. APRM 2 and 5 are bypassed.
    b. RPS B being supplied by Alternate Source.
4. Verify Malfunctions, Overrides per Simulator Input Summary.
5. Verify availability of Procedure 0141 (Reactor Building to Torus Vacuum Breaker Operability Check) with Step 1 completed. DPIS 2573 reads – 10" and DPIS 2573 reads – 10" .

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(This table may be modified based on site simulator)

Attach the following site-specific information as necessary:

- Simulator Set-up Checklist (before and after training)
- Pre-evaluation Brief Guide (for evaluations only)
- Post-evaluation Critique (for evaluations only)
- Turnover Log

Historical Record: New create

SIMULATOR SETUP CHECKLIST (IC *)

Before Training or Evaluation:

- ☐ Simulator in Training Load
- ☐ Alarm Sound "ON" on simulator console
- ☐ Simulator reset to correct IC (malfunctions, remotes, overrides entered per guide)
- ☐ MTF-7100-051 (Attendance Record) available
- ☐ Chart recorders operating and forwarded
- ☐ Tags hung per simulator guide (Caution, Danger, Info)
- ☐ Pens, paper, markers, available
- ☐ Turnover Sheet, LCO log, PRA sheet as applicable
- ☐ SPDS terminals operating
  - ☐ Verify that SPDS is the EOF has "MPIRT" in the lower right corner of display.
    - ☐ Verify "SPIRT" does NOT appear in the lower right corner. (If it does, contact John Shriver)
    - ☐ Check for outside air temperature approximately the same as real air temperature on the SPDS (another indication that the SPDS is indicating Live data or Simulator data).
- ☐ Process Computer alarm screen up and clear
- ☐ Numac alarms reset and displays off
- ☐ RWCU filter demin flows set to desired flow (approx. 80 gpm)
- ☐ RWCU temperature set between 115° and 118°F
- ☐ Generator MVAR loading ≤50 MVAR delivered
- ☐ Turbine lube oil temperature between 111° and 113°F
- ☐ Reactor water level control is in 3 element and Median selected (unless IC specifies a different configuration)
- ☐ Status board updated
- ☐ Verify all Hi / Hi-Hi alarms are reset on C-37 for neutron monitors.

Continued on Back

SIMULATOR SETUP CHECKLIST (IC *)
(Continued)

Before Evaluation Only:

- ☐ Videotape in VCR and setup to record (Taped evaluations only)
- ☐ Exam signs posted on all simulator doors
- ☐ Evaluation team briefed
- ☐ SEC contacted if participating
- ☐ Determine individual responsible for SEC duties if SEC NOT participating
- ☐ Phone volume at Instructor Console in the Simulator Control Room turned down

After Training for the Day

- ☐ Simulator reset to IC-15
- ☐ Tags removed from control panels
- ☐ Exam/Training signs turned around
- ☐ Procedures cleaned and put away
- ☐ Headsets turned off and put away
- ☐ Recorders stopped
- ☐ Phone volume at Instructor Console in the Simulator Control Room returned to normal

Simulator Scenario Development Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include justification for the no answer or the corrective action needed to correct the discrepancy after the item.

1. The scenario contains objectives for the desired tasks and relevant human performance tools.	Yes	No
2. The scenario identifies key parameter response, expected alarms, and automatic actions associated with the induced perturbations.	Yes	No
3. The scenario content adequately addresses the desired tasks, through simulator performance, instructor-led training freezes, or both.	Yes	No
4. Plant PRA initiating events, important equipment, and important tasks are identified.	Yes	No
5. Turnover information includes a Daily At Power or Shutdown Safety Risk Assessment.	Yes	No
6. The scenario contains procedurally driven success paths. Procedural discrepancies are identified and corrected before training is given.	Yes	No
7. The scenario guide includes responses for all anticipated communications to simulated personnel outside the Control Room, based on procedural guidance and standard operating practices. Include estimated completion times and/or notes for use of time compression.	Yes	No
8. The scenario includes related industry experience. SOER, SER and similar OE recommendations are clearly identified and fully addressed.*	Yes	No
9. The scenario guide incorporates verification of Operator Fundamental application.*	Yes	No
10. Training elements and specific human performance elements are addressed in the scenario critique guide to be used by the critique facilitator. The critique guide includes standards for expected performance.*	Yes	No

Developer and Reviewer: Once checklist is completed and deficiencies are corrected, sign the cover page.

* For evaluations these items may be marked NO without justification.

Simulator Scenario Validation Checklist

Mark with an X Yes or No for any of the following. If the answer is No, include an explanation after the item.

1. The desired initial condition(s) could be achieved.	Yes	No
2. All malfunctions and other instructor interface items were functional and responded to support the simulator scenario.	Yes	No
3. All malfunctions and other instructor interface items were initiated in the same sequence described within the simulator scenario.	Yes	No
4. All applicable acceptance criteria were met for procedures that were used to support the simulator scenario.	Yes	No
5. During the simulator scenario, observed changes corresponded to expected plant response.	Yes	No
6. Did the scenario satisfy the learning or examination objectives without any significant simulator performance issues, or deviations from the approved scenario sequence? If learning objective(s) could not be satisfied, identify the objectives in the Simulator Action Request	Yes	No
7. Evaluation: The simulator is capable of being used to satisfy learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.	Yes	No

Discrepancies noted (Check "none" or list items found) ☐ None
SMAR = Simulator Action Request

SMAR:_____ SMAR:_____ SMAR:_____ SMAR:_____

Comments:_____

_____

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Validator: Sign the cover page only after noted discrepancies are corrected or compensatory actions are taken to ensure quality training.

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		Auto Actions: AO-1085A closes.