FINAL AS-ADMINISTERED SCENARIOS

FOR THE DUANE ARNOLD EXAMINATION - NOVEMBER 2002

Appendix D	Scenario Outline	Form ES-D-1 Equivalent
Facility: DAEC	**Scenario No.: 1** (ILC ESG 14) Significantly Modified	**Op-Test No.:** 2002 ILC EXAM
Examiners:		**Operators:**

Initial Condition: Reactor startup in progress at approximately 9% power. EHC Pressure Set is at 940 psig. IRM F has failed downscale and is bypassed.

Turnover:

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Place a RWCU bed in service.
2		N (RO)	Transfer the MODE switch to RUN.
3		R (RO)	Withdraw control rods to approximately 12% power.
4		I/C (RO)	Control rod 22-39 will not move with normal drive water pressure.
5		I/C (SRO)	Two "C" main steam line high flow DPIS will fail low, due to equalizing valve found open.
6		I/C (RO)	The in-service CRD pump trips.
7		N (RO)	Start of the "A" CRD pump.
8		I/C (BOP)	The HPCI Turbine will receive a spurious initiation signal.
9		M (ALL)	Torus Leak on HPCI Suction Line and eventual ED.
10		I/C (BOP)	The first Core Spray fill attempt will not work, broken stem on valve. The second Core Spray fill line will work but will not keep up with the leak.
11		I/C (BOP)	If ED is anticipated #1 BPV will fail to open.

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

NMC Committed to Nuclear Excellence	EVALUATION SCENARIO GUIDE (ESG)

SITE: DAEC

MODE SWITCH TO RUN/ PLACE RWCU BED IN SERVICE/MSL DP CELL FAILURE/ ROD PULL/STUCK ROD/CRD PUMP TRIP/HPCI AUTO INITIATION/TORUS LEAK/EOP 3/CS TO TORUS FILL FAILURE/#1 BPV FAILURE/ED **ESG ILC 14 REV. 0**

PROGRAM: OPERAITONS **#:**

COURSE: ILC **#:** 50007

TOTAL TIME: 2 HOURS

Developed by:	*Instructor*	9/14/02 *Date*
Validated by:	*SME/Instructor*	9/14/02 *Date*
Reviewed by:	Thomas R. Zimmerman for *Operations Manager*	9/14/02 *Date*
Approved by:	Dean Curtland *Training Supervisor-Operations*	9/17/02 *Date*

MODE SWITCH TO RUN/ PLACE RWCU BED IN SERVICE/MSL DP CELL FAILURE/ ROD PULL/STUCK ROD/CRD PUMP TRIP/HPCI AUTO INITIATION/TORUS LEAK/EOP 3/CS TO TORUS FILL FAILURE/#1 BPV FAILURE/ED, Rev. 0

Guide Requirements

Training Resources:	Simulator Floor Instructor Booth Instructor Phone Talker
References:	1. IPOI-2 2. ITS 3. OI-878.2 4. OI-261 5. ARP 1C05A, D-6 6. OI 878.8 7. OI-644 8. ARP 1C05A, A-7 9. OI-255 10. ARP 1C07B, B-9 11. OI 304.1 12. EOP-1 13. IPOI-5 14. OI-150 15. OI-152 16. ACP 1410.10 17. AOP 255.1 18. EOP 1
Evaluation Method:	Performance Mode

SCENARIO SUMMARY:

Current plant operating status.

Reactor startup is in progress at approximately 9% power. EHC Pressure Set is at 940 psig. IRM F has failed downscale and is bypassed.

Scenario segments

- Event 1 (N) Place a RWCU bed in service. (BOP)
- Event 2 (N) Transfer the MODE switch to RUN. (RO) (SRO)
- Event 3 (R) Withdraw control rods to approximately 12% power. (RO) (SRO)
- Event 4 (I/C) Control rod 22-39 will not move with normal drive water pressure. (RO)
- Event 5 (I/C) Two "C" main steam line high flow DPIS will fail low, due to equalizing valve found open. (SRO)
- Event 6 (I/C) The in-service CRD pump trips.(RO)
- Event 7 (N) Start of the "A" CRD pump. (RO)
- Event 8 (I/C) Inadvertent Start of the HPCI Turbine.
- Event 9 (M) Torus leak on HPCI Suction line and eventual ED
- Event 10 (I/C) The first Core Spray fill attempt will not work, broken stem on valve. The other Core Spray fill line will work but will not keep up with the leak.
- Event 11 (I/C) If ED is anticipated #1 BPV will fail to open

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ Crew Evolutions:

- None

⇒ RO (NSOE, ANSOE)

- Task 11.03 Place a RWCU F/D in service.
- Task 10.01 Start a CRD pump under normal conditions.
- Task 101.14 Respond to a complete loss of CRD water flow.
- Task 5.07 Shutdown under auto or manual turbine trip. HPCI
- Task 72.07 Withdraw control rods using group notch.
- Task 79.01 Operate the IRM system during a plant startup.
- Task 93.08 Place the Mode Switch in Run from Startup/Hot Standby when power is between 5-12 %.
- Task 93.22 Perform immediate operator responses to a reactor scram.
- Task 94.02 Respond to no rod movement.
- Task 95.44 Perform actions of RC/L of EOP-1.
- Task 95.46 Perform actions of RC/P of EOP-1.
- Task 95.48 Rapid depressurization with bypass valves
- Task 95.59 Perform T/L leg of EOP 2 for a rising torus level.

⇒ Shift Supervisor (SS)

- Task 1.01 Direct routine crew and control room activities.
  - 1.01.02 Coordinate operator activities.
  - 1.01.03 Ensure control room activities conform to ACP 1410.1 Conduct of Operations.
- Task 1.03 Determine the reportability of the event.
- Task 1.06 Conduct Shift Brief.
  - 1.06.01 Announce that the crew brief is starting.
  - 1.06.02 Conduct the shift briefing.
  - 1.06.03 Solicit additional comments from each crewmember.
  - 1.06.04 Announce that the briefing is complete.
- Task 1.02 Determine operability of Tech Spec required components.

- 1.02.02 Determine if the instrument, component, or system is operable.
- 1.02.03 Declare the instrument, component and/or system inoperable, enter the correct Condition. If applicable, determine and direct performance or performance of the required SRs,

♦ Task 1.21 Direct crew response to off normal event/accidents.

- 1.21.01 Evaluate the event, determine the cause, and develop mitigation strategies.
- 1.21.02 Recognize and prioritize data relevant to the accident.

♦ Task 4.07 Direct crew actions to place the Mode Switch in Run from Startup/Hot Standby when power is between 5-12 %.

- 4.07.01 Supervise the crew to place the Mode Switch in Run.

♦ Task 4.21 Direct crew actions to perform the immediate operator responses to a reactor scram.

- 4.21.03 Direct operator performance of IPOI-5 immediate actions.

♦ Task 5.02 Direct crew response to no control rod movement.

- 5.02.01 Direct operators to perform immediate and follow-up actions of AOP 255.1 for no rod movement.
- 5.02.02 Direct operators to commence normal control rod movement IAW control rod withdrawal sequence.

♦ Task 6.44 Direct crew response for performance of the RC/L leg of EOP-1.

- 6.44.01 Direct operator actions to maintain RPV level between 170″ and 211″ using the Table 1 injection systems.

♦ Task 6.46 Direct crew response for performance of the RC/P leg of EOP-1.

- 6.46.04 Direct operator actions to augment RPV pressure control with other steam loads, SRVs, or RWCU.
- 6.67.01 Direct entry into EOP 3.
- 6.67.11 Determine if RPV pressure reduction will decrease leakage into secondary containment.
- 6.48.01 Direct operator actions to rapidly depressurize the RPV with the turbine bypass.
- 6.55.03 Direct operator actions to prevent injection from HPCI if not required for adequate core cooling and prevent injection from core spray and RHR pumps not required to assure adequate core cooling.
- 6.60.01 Direct operator actions to raise torus water level using HPCI and/or core spray if they are not required for adequate core cooling and maintain torus water level above 7.1 feet.

Scenario Objective(s):

1. Place a RWCU bed in service..
2. Transfer the MODE switch to RUN
3. Withdraw control rods to approximately 12% power.
4. Enter AOP 255.1 for no rod motion.
5. T.S. call for MSL Flow instruments failure.
6. Start a CRD pump following the loss of the running CRD pump.
7. Secure the HPCI Turbine following and inadvertent initiation.
8. ED based on Torus Level reaching 7.1 ft.
9. Determine First CS system will not fill the Torus switch to the other CS system
10. Determine SEP 307 is not working correctly

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 Non-Nuclear Instrumentation System

1.1 SIMULATOR SET UP:

a. Verify the following audits have recently been completed:
   (1) Procedure racks – **ILC Procedures**
   (2) EOP Key locker and Defeat packages
b. Reset to IC 9. (Mode switch is in Startup at ≈ 5% power).
c. Go to RUN.
d. Place the Recirc and Feedwater (Startup & Master) controllers in auto.
e. At the PPC
   (1) Substitute final feed water points B030 through B033 to 80 °F.
   (2) **NOTE THAT THESE SUBSTITUTIONS MUST BE REMOVED AT THE END OF THE SCENARIO.**
f. 1C05 Control panel setup:
   (1) Pull rods to Step 25 position 20 and allow the simulator to set for a while. (Roll back panel recorders)
   (2) After the plant is stable verify APRM readings on 1C05 are between 5 and 12%
   (3) Bypass F IRM.
   (4) Shift two IRM recorders to fast speed.
   (5) Place the ROD OUT magnet on the Rod Movement switch.
   (6) Mark up a pull sheet for the current rod positions.
g. Other Control panel setups:
   (1) Raise EHC Pressure Set to 940 psig.
   (2) Remove keys from Condenser High Backpressure bypass switches.
   (3) Verify RWCU draining has been secured.
   (4) Establish chest warming. (4.0 on potentiometer)
   (5) Remove the "B" RWCU F/D from service.
   (6) Roll Recorders
   (7) Pump the sumps.
   (8) **Start Drywell inerting.**
h. Tags: (Fill out needed information)
   (1) Remove LOR Cycle Tags and Degraded Instruments.
   (2) Place warning tag on F IRM.

CONTINUED ON NEXT PAGE

i. Provide the following documentation:
   (1) A Working Copy of IPOI-2 marked through Step 4.3 (9).
   (2) Mark up OI 693.1 to Step 3.4(2)
   (3) Mark up OI 573 to Step 3.2(12)
j. Plant Process Computer:
   (1) Provide Group display 32 on one terminal
   (2) Display SPDS on the terminal near 1C14.
k. Insert SETUP Malfunctions.
l. Insert SETUP overrides.
m. Verify RWM in operate.
n. Verify 1C80 condensate demin annunciator is reset.
o. Reset HPCI High Level Trip.
p. Reset Recirc 45% runback.
q. Verify SJAEs are in Automatic.
r. At 1C23, place 1P52B HS to Start.
s. Verify OG system pressure is normal.
t. Verify only one 1V-EF-18 is running.
u. Have INOP package for HPCI available in STP file (STP 3.5.1-08).
v. Place a copy of OI 261 in Booth for reference during RWCU evolution **Event 1**
w. Verify Shift Turnover form is filled out for both SRO and RO positions.

1.2 MALFUNCTIONS:

ILC14 or (craig1)

Time	Malfunction No.	Malfunction Title	ET	Delay	F. Sev.	Ramp	I. Sev.
T=0	**nm04f**	F IRM Failed Downscale			0		
T=0	**rd03039**	Rod 30-39 blade stuck					
T=0	**rx020623**	Rod worth change			0.22		
T=0	**rx022239**	Rod worth change			0.22		
T=0	**rx023823**	Rod worth change			0.22		
T=0	**rx022207**	Rod worth change			0.22		
As Dir	**rd11b**	B CRD Pump trip	**1**				
When called for	**hp01**	HPCI Auto Initiate	**3**	N/A	**.2**	**600**	0
When HPCI in SB	**pc14**	Primary Containment Torus leak	N/A	N/A	N/A	N/A	N/A
AS required	**tc06a**	#1 BPV Failure	**4**	N/A	**0**	N/A	As is

1.3 OVERRIDES:

Time	Override No.	Override Title	ET	Delay	Value	Ramp
T=0	**AN:IC35B(14)**	**1K14**	NA	N/A	**ON**	N/A

1.4 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	ET	Delay	Value	Ramp
As Dir	**cs 01**	V-21-1 'A' CS SUCTION FROM CST VLV	NA	O	**.1**	0
As Dir	**cs 02**	V-21-2 'B' CS SUCTION FROM CST VLV	NA	O	**.1**	0
T=0	**pc02**	N_2 purge	N/A	N/A	**Open**	N/A

1.5 EVENT TRIGGER DEFINITIONS:

Trigger Number	Trigger File Name	Trigger Logic Statement	Trigger Word Description
4	N/A	**zditcbpvjincr .ge. 1**	BPV opening jack push button depressed
others	N/A	Manually Activated	N/A

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

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

3.1 If this scenario is used in performance mode: OTI 105

4 COMPLETE A TURNOVER SHEET AS FOLLOWS:

⇒ Day of week and shift

- Weekday, Dayshift

⇒ Weather conditions

- Mild spring day

⇒ Plant power levels 9.5 % Pwr

- MWt 155
- MWe 0
- CORE FLOW 12.8 Mlb/Hr

⇒ Thermal Limit Problems/Power Evolutions

- It's been 5 days since a reactor scram due to a keyed radio in the Reactor Bldg.
- Mode Switch in STARTUP.
- Two IRM recorders are in fast speed.
- Rods are at Step 25, position 20
- Final FW Temperatures B030, B031, B032 and B033 are substituted at 80°F.

⇒ Existing LCOs, date of next surveillance

- None

⇒ STPs in progress or major maintenance

- Heatup/Cooldown Log has been secured.
- STP 3.5.1-09 for HPCI operability was performed SAT.
- STP 3.5.3-06 for RCIC operability was performed SAT.

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

- F IRM became inoperable at 0300; AR and a Priority 1 Work Request card submitted.

⇒ Comments, evolutions, problems, etc.

- At IPOI-2, Step 4.3 (10) the reactivity watch is stationed at 1C05.
- ≈50% on #1 Bypass Valve.
- Mechanical Vacuum Pump is secured.
- Condenser High Backpressure switches have been removed.
- Pressure Set is at 940 psig.
- Turbine Chest Warming in progress up to Step 3.4(2) in OI 693.1.
- MSIVs were not closed during the shutdown.

- 400# Inspection completed satisfactorily. No Problems.
- One extra NSPEO is being held over to place the "B" RWCU F/D in service.
- Drywell Inerting is in progress up to Step 3.2(12) in OI 573.
- "B" SBGT is running.

⇒ Startup Orders

- At 5 to 12 % power perform the following:
  - Transfer the Mode Switch to RUN
- "B" RWCU F/D has been pre-coated and is ready to be returned to service after you take the watch.
- Withdraw rods to >70% open on #1 Bypass Valve for I&C. A Bypass Valve position card was replaced and Techs will enter the heater bay to verify position.
- I & C Techs are gathering information from the Start up Feed Reg. valve. As a result we are to leave the Start up Feed Reg. Valve in service as long as possible. OI-644 states that it should be shifted before 1.4 E6 Mlb/hr feed flow.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
0:00 Shift Turnover	Phone Talker: • Provide Shift Turnovers to the SRO and ROs.	• Get familiar with plant conditions.
Place a RWCU bed in service **Event 1 (N)**	**BOP** will place "RWCU in service. **Role-play** as the inplant Second Assistant to place the "B" RWCU bed in service. When asked perform the following: Tell the control room operator that you are ready to take the ISOLATE switch from OPEN to ISOLATE, and back to OPEN. Now you are ready to dial up the flow control thumb wheel. At the instructor station perform the following AFTER you state that you will now start dialing up the thumb wheel: **Call up drawing window CU1 then select "B" bed and select INSERVICE.**	**OSS** will direct that the "B" RWCU F/D be placed inservice. • SS should stop control rod withdrawal since operation of RWCU with control rod withdrawal could both add reactivity. **BOP** will perform the following: • Get in touch with the inplant operator. • Hold the RWCU pump HS in the start position. • Increase flow to the RWCU system by dialing up the thumb wheel on 1C04. • When flows are balanced, and the Second announces that he has his bed thumb wheel full open, release the pump HS. (RO Task 11.03)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Mode switch to RUN **Event 2 (N)**	**RO** will place the MODE switch in run. **Role Play** HP: • Operators should call to inform you after the Mode Switch is in RUN. **Role Play** chemist: • Operators should call to inform you after the Mode Switch is in RUN.	Crew will determine that the situation is right to place the MODE Switch to the RUN position. **OSS** will direct that the MODE Switch be placed in RUN. (SRO 4.07) **RO** will perform the following: • Verify all APRMs 5 – 12 % power • Verify no APRM DS lights are on. • Annunciators 1C05A, C-8 and 1C05B C-7 are clear. • Place one APRM recorder on each RPS bus on APRM • Transfer Mode Switch to RUN: (RO 93.08) • Place all recorders to APRM • With draw the IRMs (RO 79.01) • Return IRM/APRM recorders to slow speed • Secure the reactivity monitor. **Crew** should: • Inform HP that radiation areas should be upgraded. • Inform chemist that Mode Switch is in RUN.
Rod Withdrawal Briefing **Event 3 (R)**	**RO** will commence Rod Withdrawal. Phone Talker: • Role Play Reactor engineer for pre-rod movement briefing.	**OSS** will perform the following: • Review the rod group and their insert/withdraw limit. • Conduct a Pre-Rod-Movement brief. (SRO 1.06)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Rod withdrawal	RO will identify a stuck control rod and carry out AOP actions.	**RO** will perform the following IAW IPOI 2: • Withdraw control rods. (RO 72.07) Perform rod overtravel checks at position 48 for each rod.

Event 4 (I/C)	**NOTE**: When the 1C05 operator gets to ROD 30-39, it will STICK. They may attempt to drive the rod again with normal drive pressure. The rod will still not move.	**RO** will inform the OSS that Rod 30-39 will not move when a drive signal is given to it.
		OSS will direct that the Actions of AOP 255.1 for no rod movement be performed. (SRO 5.02) (SRO 1.21)
		The **RO** will perform the following: (RO 94.02)
		• Verify that there is no rod block
		• Verify power to the RMCS
		• Verify the rod attempting to be driven is actually selected.
		• Demand a Rod Pattern Log and verify control rod positions.
		• Verify the following CRD parameters are approximately at their normal values:
		  • CRD pump flow at FC-1814, is 40 gpm
		  • Charging water header pressure at PI-1816A is 1500 psig
		  • Drive water pressure at PI-1825A is 260 psid
		• Raise drive pressure to 310-350 psid and attempt to move the rod
		  • Note that the rod will move.
		• Restore CRD drive water pressure to normal

IMPORTANT!	**NOTE:** **The Booth operator must Watch and Wait for the operator to increase drive water pressure.** **When the operator increases drive water pressure IAW AOP, then:** **Delete malfunction: rd022239**	

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
After the Rod withdrawal begins. **Event 5 (I/C)** "C" MS line high flow dp switches failed low. M-114(B-2)	The SRO will make T.S. call on an inop steam line DPIS. **ROLE PLAY as 2nd assistant and** call the control room and tell them that "C" MS line DPIS 4436 C and D on rack 1C-126B are still pegged low, and all others are positive DP. It appears that DPIS 4436C manifold equalizing valve PDIS4436C-V-35 is open, and the line is warm to the touch. **NOTE:** If asked to close the valve wait about 1minute and then report the valve is closed and the reading on DPIS 4436 C and D are about ½ of what the others are reading. **ROLE PLAY as I & C** When contacted, inform the crew that it will take about 30 minutes to correct the lineup and verify operability of the detectors.	**OSS** and Crew determine that the failure of the main steam flow DPIS will not affect RPV level control. **OSS** will perform the following: • Review TS and determine that each MS line has 4 inputs, the loss of these 2 requires 2 entries into an LCO. (3.3.6.1 Condition A bases). • This will be a 24-hour LCO to fix the problem. If not fixed in 24 hours TS 3.3.6.1.C & D will require the MS line isolated in the next 12 hours. • Direct an operator to fill out a Work Request Card (SRO 1.01)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

After AOP 255.1 is complete and rod pull is recommenced following some rod withdrawals or as directed by the lead examiner:
"B" CRD Trips
 	
Event 6 (I/C)
	The RO will recognize the "B" CRD pump has tripped.
	
	After AOP 255.1 is complete and the rod pull has continued:
	
	ET1
	
	rd11b
	
	This will trip the B CRD pump.
	
	Role Play NSPEO at 1A4:
	
	• CRD pump motor differential overcurrent.
	
	Role Play NSPEO in Reactor Bldg.:
	
	• Report that motor end pump bearing is very hot.
	
	• Isolate the Reference Leg Backfill as directed. Verify RPV level control selected to B Level when isolating A GEMAC and to A Level when isolating B GEMAC.
	
	• Make reports as necessary for the start of the A CRD pump. (No further complications)
	
	Role play as Rx Engineer IF ASKED:
	
	• All rod scram times were within limits during the last time test.
		RO will identify that the B CRD pump tripped and report it to the SS (RO 101.14)
		
		OSS will direct the following: (SRO 1.21)
		
		• Determine the cause of the trip.
		
		• Start the idle CRD pump IAW OI 255
		
		• Monitor computer points W092 and W093 for bearing temperatures above 180 F (1C05A-A7)
		
		• Consult TS. (SRO 1.02)
		
		  • Determine that the plant is not is an LCO until one Accumulator pressure lowers to < 940 psig. Then:
		
		  • 3.1.5 Condition A, 8 hours to declare either 'slow' **OR** 'inop'.
		
		  • When 2 or more accumulators inoperable, then:
		
		  • 3.1.5 Condition B, 1 hour to restore charging water pressure to >940 **AND** 1 hour to either declare the rod 'slow' **OR** 'inop' (SRO 1.02)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Start of a CRD pump **Event 7 (N)**	When directed, throttle the discharge valve of the idle CRD pump by performing the following: ***Call up screen RD1, and close the A CRD discharge valve*** *ROLE PLAY* ***as the 2nd assistant, and inform the control room that the discharge valve of the A CRD pump is throttled to ½ turn open.*** After the start perform the following: Call up screen RD1, and open the A CRD discharge valve.	**RO** will perform the following to start the idle CRD pump (RO 10.01) • Isolate the Reference Leg Backfill System. (NSPEO) • Check oil level. (NSPEO) • Throttle discharge valve to ½ turn open. (NSPEO) • Adjust flow controller to 0 gpm in MANUAL. • Start A CRD pump. • Slowly open the Discharge valve. (NSPEO) • Vent the Discharge Filters. (NSPEO) (Next segment may begin before remaining steps can be completed.) • Throttle open MO-1830, Drive Water ΔP. • Raise CRD flow to 40 gpm with flow controller in Manual, Then shift to AUTO. • After Accumulator have charged, Adjust Drive ΔP to 260 psig. • Verify CRD Return line MO-1833 is full open. • Start up GEMAC Reference Leg Backfill System. (NSPEO)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
3 min after the CRD pump is recovered or as directed by the lead examiner:	**Event 7 (I/C).** The crew will respond to an auto initiation of the HPCI system. **Booth Instructor:** Be ready to delete the next malfunction to prevent RPV level from reaching 211".	**Crew** will recognize that HPCI has inadvertently initiated. **(CRITICAL)** **Crew** will respond to an auto initiation of HPCI. **SRO** will verify by TWO independent sources that RPV level is satisfactory, then Direct that HPCI be secured, per ACP 1410.1, "Conduct of Operations."
Event 8 (I/C)	**ET2** Activate EVENT TRIGGER # 2: Verify the following become active: **IMF hp01**	**BOP** will secure HPCI with the initiation signal present. Carry out QRC for Tripping HPCI.
IMPORTANT!!!	**After HPCI starts** remove the malfunction so RPV level does not go out high. Delete Malfunction: **hp01**	

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

When HPCI is tripped or as directed by the Lead Examiner:
 	
Event 9 (M)
	After HPCI is tripped
	The crew will respond to a unisolable leak from the Torus in the HPCI suction piping
	
	ET3
	
	Activate EVENT TRIGGER # 3: Verify the following become active:
	
	pc14
	Increase as required for ED.
	
	Role-Play - if sent investigate report the Torus area has water on the floor and it is rising.
	
	Role-Play - if sent to locate the leak report the leak is at the HPCI suction piping at the Torus and can not be isolated
		Crew will respond to the Torus Low level alarm.
		
		SRO will enter EOP 2 and direct the crew to:
		• Control Torus water level between 10.1 and 10.4 ft using only those systems not required for adequate core cooling
		• Raise Torus water level with:
		  • Core Spray OI 151
		  • HPCI OI 152
		• Maintain Torus water level above 7.1 ft
		• When determined Torus level will not remain above 7.1 ft
		  • Enter EOP 1
		  • ED
		Manually scram the reactor when Torus water level cannot be maintained above 7.1 ft. **(CRITICAL)**
		Enter ED when Torus water level cannot be maintained above 7.1 ft. **(CRITICAL)**
		
		SRO will enter EOP 3 on Area water level above Max Normal Operating Water Level Limit and direct the following:
		• Operate available sump pumps to restore and maintain water level below the Max Normal Operating Water Level Limit.
		• Isolate ALL systems discharging into the area except system required to be operated by EOPs or required to suppress a fire.
		• **BOP** will direct the in-plant operator to fill the Torus with Core Spray.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 10 (I/C)	The Core Spray valve to fill the Torus will not open **Role-Play** as the in-plant operator sent to open the Core Spray to CST suction valve. When told to line up to fill the Torus from the CST wait about 2 minutes then call back and report the valve stem is broken and the valve will not open. **Role-Play** as the in-plant operator if sent to open the second Core Spray valve and report the valve is opened to the directed number of turns and you hear flow noise.	**BOP** direct the in-plant operator to Raise Torus Level with the Core Spray System. When the first valve will not open the BOP will probably tell the OSS and the in-plant operator should be directed to the other Core Spray system.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

3Event 11 (I/C)	If ED is anticipated # 1 BPV will fail closed.
	
	NOTE:
	When the BPV opening jack push button is depressed verify event trigger 4 goes active.
	
	ET4
	
	# 1 BPV will not open.
	#2 BPV will open.
		SRO will direct SEP 307 due to ED anticipation.
		BOP will perform SEP 307
		• Verifies not 2 psig signal
		• Verifies MSIV is open
		• Verifies EHC pump is running
		• Determines Condenser is available
		• Depress and hold the opening jack pushbutton until both BPV #! And #2 are full open.
		  • BOP must recognize BPV #1 is not opening.
		  • BPV # 2 will open
		• BOP is also allowed to:
		  • Depress the BPV test push button
		  • Verify the READY TO SELECT light is on
		  • Depress and hold the select BPV-2 pushbutton to open #2 BPV.
		• Verify RPV pressure is lowering.

When a cooldown of the RPV has been initiated or as directed by the lead examiner,	• Place the simulator in FREEZE.	None

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

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

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Event 1 Placing a RWCU F/D in service	**BOP** • Verify that the F/D has been placed in HOLD. • Verify RWCU flow of 70 to 85 gpm on FI-2747. • Place the running RWCU pump handswitch in the START position and hold it there. • Increase pump speed to maintain 75 to 85 gpm flow through the beds. • When flows are stable 65-85 on "B" RWCU Bed, release the RWCU pump handswitch.	OI 261 Rev 46 Section 6.3 Step 1 Step 2 Step 8 Step 10 (NOTE) Step 13 Step 15	RWCU placed in service IAW OI 261. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Event 2
 	
Mode Switch to RUN
	RO Transfer Mode Switch to RUN:
	• Verify all APRMs 5%-12%.
	• Verify no APRM downscale lights are on.
	• Verify MSL low-pressure annunciators are reset. (1C05 A, C-8 and 1C05B, C-7)
	• Place one APRM recorder on each RPS channel to APRM.
	• Take Mode Switch to RUN record date and time.
	• Place remaining Recorders in APRM on at a time.
	• Withdraw IRM Detectors.
	  • Power on
	  • IRMs selected
	  • DRIVE OUT depressed and held.
	• Return recorders to slow speed.
	• Secure Second Licensed operator at 1C05.
	• Inform HPs and chemists that the Mode Switch is in RUN and Rad areas should be upgraded.
		• IPOI-2 Rev71, section 4.3
		• Step (10)
		
		• OI-878.2, Rev 20.
		  • Section 4.1 **or**
		  • Section 6.2
		
		• IPOI-2, Step (11,12)
			Prerequisites for taking the MODE switch to run verified and MOD switch taken to RUN.
			
			Sat_____
			Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Event 3
 	
Rod withdrawal
	OSS reviews the rod group and their insert/withdraw limit.
	• Conduct a Pre-Rod-Movement brief.
	  • Announce that the crew brief is starting.
	  • Conduct the shift briefing.
	  • Solicit additional comments from each crewmember.
	  • Announce that the briefing is complete.
	RO
	• Withdraw control rods to 10 – 15% power, or 25 % on second BPV.
	
	• Perform rod overtravel checks at position 48 for each rod.
		IPOI-2, Rev 71
		P&L 6
		
		IPOI-2
		Step 4.3 (14, 16)
		
		IPOI-2,P&L 10
			Pre Rod Brief conducted IAW IPOI-2 P&L #6 or equivalent procedure reference.
			
			Sat_____
			Unsat_____
			
			Control Rod Withdrawal performed IAW IPOI-2
			
			Sat_____
			Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Event 4
 	
No Rod movement with normal drive pressure
	RO
	• Verify that there is no rod block
	• Verify power to the RMCS
	• Verify the rod attempting to be driven is actually selected.
	• Demand a Rod Pattern Log and verify control rod positions.
	• Verify the following CRD parameters are approximately at their normal values:
	  • CRD pump flow at FC-1814, is 40 gpm
	  • Charging water header pressure at PI-1816A is 1500 psig
	  • Drive water pressure at PI-1825A is 260 psid
	• Raise drive pressure to 310-350 psid and attempt to move the rod
	  • Note that the rod will move.
	• Restore CRD drive water pressure to normal (250 to 265)
		AOP 255.1 Rev 23
		Step 1
		Step 2
		Step 3
		Step 4
		Step 5
		Step 7
		Step 12
		Note: top of page 10
			Control Rod Withdrawal performed stopped and AOP 255.1 actions correctly implemented.
			
			Sat_____
			Unsat_____

Event 5 Failure of the "C" main steam line instrument As directed by Lead Evaluator when power change is adequate.	**SRO** During the power increase, a call will come in stating that two DPIS for MS C are still downscale, and all others are normal. • Determines that feedwater level control will not be affected. • Initiate a Work Request Card.	M-114 (B-2) TS 3.3.6.1.A (or D) TS table 3.3.6.1-1 (1.c)	T.S. correctly identified. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Event 6
 	
CRD Trip
	RO
	
	• Determine the cause of the B CRD pump trip by:
	  • Monitor alarm "B" CRD PUMP 1P-209B LO SUCT PRESSURE (1C05A B-7)
	  • If necessary send an operator to the 1A4 breaker.
	  • Monitor Computer points W092 and W093 for any bearing temp >180
	• If due to causes 1.1-1.5 start the A CRD pump per OI 255
	The Aux man will call the control room and inform them that there is a Differential Overcurrent flag on the CRD pump breaker.
	SRO will make the following TS determination:
	• Initially they are in NO spec.
	• After the first accumulator pressure falls to <940 psig, they enter:
	  • 3.1.5 Condition A, 8 hours to declare either 'slow' or 'inop'
	• After the second accumulator pressure falling to <940 psig, they enter:
	  • 3.1.5 Condition B, 1 hour to restore charging water header pressure to >940 psig AND declare it either 'slow' or 'inop' within 1 hour.
		ARP 1C05A, A-7 Rev 6
		
		Step 3.1
		
		Step 3.2
		
		Technical Specification
			CRD pump trip correctly identified and applicable ARP 1C05A A-7 actions completed.
			
			Sat_____
			Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Event 7 Start of a CRD Pump	**RO** • Isolate the Reference Leg Backfill System. (NSPEO) • Check oil level. (NSPEO) • Throttle discharge valve to 1/2 turn open. (NSPEO) • Adjust flow controller to 0 gpm in MANUAL. • Start A CRD pump. • Slowly open the Discharge valve. (NSPEO) • Vent the Discharge Filters. (NSPEO) (Next segment may begin before remaining steps can be completed.) • Verify >1200 psig charging water pressure. • Raise CRD flow to 40 gpm with flow controller in Manual, Then shift to AUTO. • When FC-1814 properly controlling level shift to AUTO. • Verify CRD Return line MO-1833 is full open. • Start up GEMAC Reference Leg Backfill System. (NSPEO) • Place Hand switch on 1C05 as directed • Place Hand switch on 1C05 as directed	OI-255, Rev 49 Step 3.2 1a • Step 1b • Step 1c • Step 1d • Step 1e • Step 1f • Step 2 • Step 3 • Step 4 • Step 5 • Step 6 • Step 7 OI 880 Rev 9 Section 5.3 Step 1 Step 4 Section 3.4 Step 1 Step 4	"A" CRD pump returned to service IAW OI-255. GEMAC Reference Leg Backfill system removed and returned to service IAW OI-880 Section J. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Event 8 HPCI Initiation	**Crew** will recognize that HPCI has inadvertently initiated. **(CRITICAL)** Crew will respond to an auto initiation of the HPCI. **SRO** will verify that RPV level is satisfactory, then • Direct that HPCI be secured. **BOP** will secure HPCI with the initiation signal present. • Depress and Hold REMOTE TURBINE TRIP pushbutton SV-2259. • Verify TURBINE STOP VALVE HV-2201 closed • When turbine speed reaches 0 rpm, place 1P-218 AUX OIL PUMP handswitch HS-2256 in the PULL-TO-LOCK position. • Verify TURBINE CONTROL VALVE HV-2200 closed. • Verify annunciator 1C03C (A-6) is activated • Release HS-2259 push button. • Verify MO-2312 HPCI INJECT VALVE closed. • Verify MO-2318 MIN FLOW BYPASS VALVE closed.	OI 152 QRC 2 Rev 0 Immediate Action Step 1 Step 1a Step 1b Step 1c Step 1d Step 1e Follow-up Action Step 1 Step2	**Crew** will recognize that HPCI has inadvertently initiated. **(CRITICAL)** Sat_____ Unsat_____ Response to HPCI auto initiation and trip HPCI. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Event 9
 	
Torus water level reduction entry into EOP 2,3 and 1
	Crew will respond to the Torus Low level alarm.
	
	SRO will enter EOP 2 and direct the **BOP** to:
	• Control Torus water level between 10.1 and 10.4 ft using only those systems not required for adequate core cooling
	• Raise Torus water level with:
	  • Core Spray OI 151
	  • HPCI OI 152
	• Maintain Torus water level above 7.1 ft
	• When determined Torus level will not remain above 7.1 ft
	  • Enter EOP 1
	  • ED
	Manually scram the reactor when Torus water level cannot be maintained above 7.1 ft. **(CRITICAL)**
	Enter ED when Torus water level cannot be maintained above 7.1 ft. **(CRITICAL)**
	
	SRO will enter EOP 3 on Area water level above Max Normal Operating Water Level Limit and direct the following:
	• Operate available sump pumps to restore and maintain water level below the Max Normal Operating Water Level Limit.
	• Isolate ALL systems discharging into the area except system required to be operated by EOPs or required to suppress a fire.
	• **BOP** will direct the in-plant operator to fill the Torus with Core Spray.
		EOP 2 Rev 9
		T/L-1
		T/L-3
		T/L-4
		T/L-5
		Enter EOP 1 Concurrently
		T/L-6
		
		EOP 1 Rev 9
		RC-2
		RC-3
		RC/L-1
		RC/P-1
		
		Anticipate ED per CRS after RC/P-1
		
		RC/P-2
		RC/P-4
		RC/P-5
		
		EOP 3 Rev 15
		SC/L-1
		SC-2
		SC-3
		SC-4
		SC-8
			Manually scram the reactor when Torus water level cannot be maintained above 7.1 ft. **(CRITICAL)**
			
			Sat_____
			Unsat_____
			
			Enter ED when Torus water level cannot be maintained above 7.1 ft. **(CRITICAL)**
			
			Sat_____
			Unsat_____
			
			(SEP 307) **Event 10**

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Event 10	**BOP** direct the in-plant operator to Raise Torus Level with the Core Spray System. Per OI 151. • Verify CST level >10 ft. • Verify Torus suction valves Open • Monitor Torus Level When the first valve will not open the BOP will probably tell the OSS and the in-plant operator should be directed to the other Core Spray system. **Note: Level will still lower in the Torus.**	OI 151 Rev 36 Section 11.0 Step 1 Step 2 Step4	One Core Spray System Lineup to fill the Torus from the CSTs. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Event 11	**BOP** will attempt to perform SEP 307. # 1 BPV will not open but #2 BPV will open.
	• Verify at least one set of MSIVs open
	• Verify an EHC pump is running
	• Verify Main Condenser is available
	• Depress and hold the "BYPASS VALVE OPENING JACK SELECTOR "INCREASE" pushbutton until BPV-1 and 2 are open
	• OPTIONAL
	  • Depress the BYPASS VALVE TEST "TESTNG" pushbutton
	  • Verify the REAY TO SELECT light is on
	  • Depress and hold the SELECT BPV-2 pushbutton until BYPASS VALVE OPENING JACK indicate 100% open
	  • Verify RPV pressure is decreasing
	When ED is directed the BOP will place the Handswitch for 4 ASD/SRVs to open and verify that 4 ADS/SRV are open.
		SEP 307 Rev 1
		Step 2
		Step 3
		Step 4
		Step 5
		Step 6 Optional
			#2 BPV is open.
			Sat_____
			Unsat_____

	SRO will: • Declare an Unusual Event - HU1.	EPIP 1.1	EAL declaration Sat_____ Unsat_____

CREW GRADING ATTACHMENT

ESG __ILC 14_____ Rev. __0_____

Operator Name	Position	Evaluator
	Shift Manager	
	Shift Supervisor	
	STA	
	Reactor Operator	
	1st Assistant	
	B.O.P. 1st Assistant	

Management Representative/Lead Evaluator _____

Crew Critical Tasks

Task Statement	SAT	UNSAT
1. Crew will recognize that HPCI has inadvertently initiated.		
2. Manually scram the reactor when Torus water level cannot be maintained above 7.1 ft.		
3. Enter ED when Torus water level cannot be maintained above 7.1 ft.		

Individual Competency Identifiers

1. Performing Reactor Mode change to Mode 1
2. Restoring RWCU filter to service
3. Stuck control rod
4. CRD pump trip
5. Respond to HPCI auto initiation.
6. Determination of EOP 2 entry on Torus Low water level
7. Determine Torus level will not be able to be maintained >7.1 ft enter EOP 1 and ED
8. Recognize CST to CST isolation valve failure
9. Recognize SEP 307 Failure
10. EAL deceleration

Attach to crew grading worksheet, OTI-105, Attachment 12 when complete.

OSG VALIDATION CHECKLIST

Scenario # ESG ILC 14 Rev. 0

1 ____ Verify that if not run from a protected IC that setup information is provided to reproduce the stated initial conditions.

2 ____ Verify that all stated objectives are identified in the body of the OSG.

3 ____ Verify that turn over sheets are completed, and are in agreement with both the narrative summary and shift turnover information sheet. Turn over sheets are not required for initial license scenarios.

4 ____ Verify that if the scenario requires documents to be provided to the crew, that they are filled out as appropriate (i.e., if an STP is used, it is filled out).

5 ____ If this is the initial validation or the revision affects ramp times, event triggers, malfunctions, overrides, remote functions or procedure changes could affect the scenario, then validate the scenario for proper response using a crew. It is preferable to use a crew unfamiliar with the scenario whenever possible. Verify the following while running the scenario:

- The scenario runs as written and all tasks are performed.
- The stated time line agrees with actual times.
- Critical task statements clearly define the expected plant and student response. They should also be written so that they are achievable as written. If any question exists, it is preferable to have operations management participate in the validation.
- Anticipated instructor role play/cues are identified
- Management expectations are captured and re-enforced.
- Verify administrative documentation requirements (i.e., CMARs / ARs) are identified.
- Verify reportability requirements (i.e., ESF actuations) are identified.
- Verify Technical Specification items / LCO declarations are correct.
- If procedure steps may cause confusion or disagreement between higher-level procedures and OIs/ARPs that operations management is consulted.

6 ____ Shutdown scenarios include shutdown risk assessment, time to boil calculations, and shutdown status board information.

_____ _____
SME/Instructor Date

_____ _____
SME/Instructor Date

_____ _____
SME/Instructor Date

Appendix D	Scenario Outline	Form ES-D-1 Equivalent
Facility: DAEC	Scenario No.: 2 (ESG ILC 9)	Op-Test No.: 2002 ILC EXAM
Examiners:		Operators:

Initial Condition: The plant is at 75% power. 1A3 is being powered from the Standby Transformer and is ready to be swapped to the Startup Transformer. 4 LPRMs are bypassed.

Turnover:

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Transfer 1A3 from the Standby Transformer to the Startup Transformer.
2		R (RO)	The SOC requests a power increase of 60 MWE.
3		I/C (RO) N (RO)	An LPRM fails upscale. This will require the crew to bypass the LPRM and make an operability call on the LPRMs APRMs.
4		I/C (BOP)	An accident in the plant damages PDIS 2245, a HPCI Steam Line Flow Instrument. This causes an isolation of the HPCI outboard valves, requiring entry into TS 3.3.6.1, Condition A, and they will also declare HPCI inoperable in accordance with TS 3.5.1, Conditions F.
5		I/C (RO)	The "A" Recirc MG develops an oil leak, which will trip the Recirc pump. The pump trip will place the plant in the Buffer region and the crew will follow the guidance provided in AOP 255.2 and STP 3.4.1-02, to monitor the RPV for instabilities.
6		M (ALL) M (ALL)	A LOCA begins. The stresses placed on the Recirc system from the trip result in a leak inside the Primary Containment. When the crew will scram the plant, an open circuit transfer results in the loss of condensate and feed. With HPCI unavailable and RCIC unable to maintain RPV level, ALC and ED are performed.
7		I/C (RO)	RCIC flow controller fails to operate in automatic mode. RCIC speed can be manually controlled.
8		I/C (BOP)	Two ADS SRVs fail to open during ED.

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

NMC Committed to Nuclear Excellence | EVALUATION SCENARIO GUIDE (ESG)

SITE: DAEC

TRASFER 1A3 FORM THE S/B TO S/U TRANSFORMER/RAISE POWER WITH RECIRC/LPRM UPSCALE/INADVERTENT HPCI ISOLATION/SLO/RCIC FAILURE/ALC ED/SRV FAILURE ESG ILC 9 REV. 2

PROGRAM: OPERATIONS **#:**

COURSE: ILC **#:** 50007

TOTAL TIME: 2 HOURS

Developed by:	*Instructor*	9/14/02 *Date*
Validated by:	*SME/Instructor*	9/14/02 *Date*
Reviewed by:	*Operations Manager*	9/14/02 *Date*
Approved by:	*Training Supervisor-Operations*	9/17/02 *Date*

Retention: Life of policy = 10yrs.
Retain in: Training Program File

Disposition: Reviewer and Approver

Guide Requirements

Training Resources:

Simulator
Simulator Booth Instructor
Phone Talker
Simulator Floor Instructor

References:

1. STP 3.8.1-04
2. IPOI-3
3. ARP 1C05A, C-4
4. OI-878.3
5. ARP 1C03C, A-9
6. TS
7. AOP 672.3
8. IPOI-4
9. OI-563
10. STP 3.4.1-02
11. ARP 1C04A, B-3
12. ARP 1C04A, A-4
13. STP 3.4.2-02-SLO
14. IPOI-5
15. ARP 1C05A, D-1
16. EOP-1
17. EOP-2
18. ALC
19. ED
20. OI-150
21. ACP114.5
22. ACP 1402.3
23. AOP 639
24. ARP 1C06B, A-1

Evaluation Method:

Performance Mode

SCENARIO SUMMARY:

Current plant operating status.

The plant is at 75% power. 1A3 is being powered from the Standby Transformer and is ready to be swapped to the Startup Transformer. 4 LPRMs are bypassed.

Scenario segments

- (Event 1-N) Transfer 1A3 from the Standby transformer to the Startup Transformer. (**SRO/BOP**)
- (Event 2-R) The SOC requests a power increase of 60 MWE. (**RO**)
- (Event 3-I) An LPRM fails upscale. This will require the crew to bypass the LPRM and make an operability call on the LPRMs for the APRMs. (**RO**)
- (Event 4-I) An accident in the plant damages PDIS 2245, a HPCI Steam Line Flow Instrument. This causes an isolation of the HPCI outboard valves, requiring entry into TS 3.3.6.1, Condition A, and they will also declare HPCI inoperable in accordance with TS 3.5.1, Conditions F. (**SRO**)
- (Event 5-C) The "A" Recirc MG develops an oil leak, which will trip the Recirc pump. The pump trip will place the plant in the Buffer region and the crew will follow the guidance provided in AOP 255.2 and STP 3.4.1-02, to monitor the RPV for instabilities. (**SRO/RO**)
- (Event 6-M) A LOCA begins. The stresses placed on the Recirc system from the trip result in a leak inside the Primary Containment. (ALL)
- (Event 6-M) When the crew scrams the plant, an open circuit transfer results in the loss of condensate and feed. With HPCI unavailable and RCIC unable to maintain RPV level, ALC and ED are performed. (ALL)
- (Event 7-I) RCIC flow controller fails to operate in automatic mode. RCIC speed can be manually controlled. (**RO**)
- (Event 8-C) Two ADS SRVs fail to open during ED. (**BOP**)

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ Crew Evolutions:

- None

⇒ RO (NSOE, ANSOE)

- 4.02 RCIC - Verify auto initiation.
- 15.10 Transfer essential bus from startup to standby transformer.
- 80.01 Bypass an LPRM
- 93.11 Raise reactor power by 10% with Recirc flow when >35% power.
- 93.21 Perform a fast power reduction
- 93.22 Perform immediate operator responses to a reactor scram.
- 95.14 Perform EOP Defeat 4.
- 95.21 Perform EOP Defeat 11.
- 95.26 Perform EOP Defeat 16.
- 95.44 Perform the actions of RC/L of EOP-1.
- 95.46 Perform the actions of RC/P of EOP-1.
- 95.61 Perform the T/T leg of EOP-2
- 95.63 Perform the DW/T leg of EOP-2
- 95.64 Perform the DW/P leg of EOP-2
- 95.74 Perform ALC when injection systems are lined up and available.
- 95.80 Perform Emergency Depressurization using SRVs.
- 99.11 Respond to "A" RECIRC MG DRIVE MOTOR TRIP OR OVERLOAD.

⇒ Shift Supervisor (SS)

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

- ♦ 4.10 Direct crew actions to Raise reactor power by 10% with Recirc flow when >35% power.
  - • 4.10.01 Direct the control room crew to raise reactor power using Recirc flow.
  - • 4.10.02 Monitor the power assent.
- ♦ 4.20 Direct crew actions to perform a fast power reduction form 100 to ≈35% power.
  - • 4.20.01 Direct operator performance of the fast power reduction actions.
- ♦ 4.21 Direct crew actions to perform the immediate operator responses to a reactor scram.
  - • 4.21.03 Direct operator performance of IPOI-5 immediate actions.
- ♦ 5.03 Direct Crew Responses to Power/Reactivity Abnormal Change condition.
  - • 5.03.04 Direct operator actions to control the malfunctioning system or component.
  - • 5.03.05 Confirm the rod pattern, thermal limits and reactor power are within the allowed range.
  - • 5.03.06 Direct any STPs that are required for the new plant status.
- ♦ 6.14 Direct Crew response to perform EOP Defeat 4.
  - • 6.14.01 Direct operator actions to perform EOP Defeat 4.
- ♦ 6.21 Direct Crew response to perform EOP Defeat 11.
  - • 6.21.01 Direct operator actions to perform EOP Defeat 11.
- ♦ 6.26 Direct Crew response to perform EOP Defeat 16.
  - • 6.26.01 Direct operator actions to override the containment sample valves Group 3 isolation using EOP Defeat 16.
- ♦ 6.44 Direct crew response for performance of the RC/L leg of EOP-1.
  - • 6.44.01 Direct operator actions to maintain RPV level between 170″ and 211″ using the Table 1 injection systems.
- ♦ 6.46 Direct crew response for performance of the RC/P leg of EOP-1.
  - • 6.46.04 Direct operator actions to augment RPV pressure control with other steam loads, SRVs, or RWCU.
- ♦ 6.62 Direct Crew response for performance of the T/T leg of EOP-2.
  - • 6.62.01 Direct operator actions to place RHR in the Torus cooling mode.
- ♦ 6.63 Direct Crew response for performance of the DW/L leg of EOP-2.
  - • 6.63.01 Direct operator actions to maintain drywell temp <150° using drywell cooling systems and bypassing the main intake coils if necessary.

- 6.63.03 Direct operator actions to secure the running Recirc pumps, initiate drywell sprays using RHR pumps not required continuously for adequate core cooling and verify drywell cooling fans have tripped.

♦ 6.64 Direct Crew response for performance of the DW/P leg of EOP-2.

- 6.64.02 Direct operator actions to Initiate Torus sprays using RHR pumps not required continuously for adequate core cooling.

♦ 6.74 Direct Crew response for performance of ALC when injection systems are lined up and available.

- 6.74.01 Direct operator actions to lineup and inject with all available injection systems/subsystems.
- 6.74.04 Direct operator actions to maximize injection with all available injection systems/subsystems and alternate injection systems until RPV level is rising.

♦ 6.78 Direct Crew response for performance Emergency Depressurization.

- 6.78.03 Confirm Torus level is >4.5 ft.
- 6.78.04 Direct operator actions to emergency depressurize the RPV.

Scenario Objective(s):

1. Transfer 1A3 for the S/B to S/U Transformer
2. Raise power with Recirc.
3. Respond to an LPRM upscale.
4. Respond to an inadvertent HPCI isolation.
5. Respond to A Recirc pump trip.
6. Respond to a LOCA.
7. Take manual control of RCIC.
8. Perform ALC/ED.
9. Respond to an SRV failure to open during an ED.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 Non-Nuclear Instrumentation System

1.1 SIMULATOR SET UP:

a. Verify the following audits have been completed:
   (1) Procedure racks.
   (2) EOP Key locker and Defeat packages.
b. Reset to IC 23. (75% MOL)
c. Set up Event Trigger.
d. Go to RUN **and reduce power 30 MWE**.
e. Place the Recirc and Feedwater controllers in auto.
f. Have 2 yellow stickies ready, one for Relay E41A-K33, and the other for E41A-K35. On the Sticky, write "RELAY TRIPPED". Give these to the Evaluator that is following the BOP operator, and inform him that he will place these on the relays at 1C39.
g. Control Panels:
   (1) Adjust main generator VARs to 100 lagging.
   (2) Verify PPC Group Display 15 on one terminal.
   (3) Place clean pull sheet on 1C05.
   (4) Pump the Drywell sumps.
h. Restore Malfunction File ILC9.
i. Restore Override File ILC9.
j. Transfer 1A3 to the Standby Transformer.
k. LPRMs: Bypass the following LPRMs
AND
remove the LPRM points from scan on the PPC or 3D Cases will be incorrect.
   (1) 4C-08-09 LPRM A
   (2) 4A-32-25 APRM D
   (3) 4B-24-09 APRM A
   (4) **2A-16-33 APRM E**
l. Adjust APRM GAFs.
m. Use the SAIC terminal to set thermal limits as is.
n. Verify all points returned to scan. The crew will be deleting a point during this scenario.
o. Tags:
   (1) Remove LOR Cycle Tags and Degraded Instruments.
p. Provide the following documentation:
   (1) A marked-up list of bypassed LPRMs.

1.2 MALFUNCTIONS:

ILC9

Time	Malf	Description	Delay	Ramp	ET	Value	Final
SETUP	**rc03**	RCIC FLOW AUTO CONTROLLER FAILS IN AUTOMATIC	0	0	**1**	As is	**0.20**
As Dir.	**rr15a**	RECIRC LOOP RUPT- DESIGN BASES LOCA AT 100%- LOOP A (NRVI)	0	**15:00**	**2**	As is	**0.15**
As Dir.	**nm072425a**	LPRM CHANNEL FAILS- LPRM 24-25-A	0	0	**4**	As is	**1.0**
As Dir.	**eg01a**	MAIN GENERATOR TRIP- PRIMARY LOCKOUT (286/P)	0	0	**1**	N/A	**N/A**
As Dir.	**fw09a**	REACTOR FEEDWATER PUMP TRIP- PUMP A	0	0	**5**	N/A	**N/A**
As Dir.	**fw09b**	REACTOR FEEDWATER PUMP TRIP- PUMP B	0	0	**5**	N/A	**N/A**
As Dir	**AN 1C03C(29)**	1C03C (D-02) ANNUNCIATOR BOX (4HX9W)	0	0	**6**		**ON**
As Dir	**AN 1C03C(9)**	1C03C (A-09) ANNUNCIATOR BOX (4HX9W)	0	0	**6**		**ON**
As Dir	**AN 1C03C(17)**	1C03C (B-08) ANNUNCIATOR BOX (4HX9W)	0	0	**6**		**ON**

1.3 OVERRIDES:

ILC9

Time	Override	Description	Delay	Ramp	ET	Value	Final
SETUP	Z DI **AD HS-4405**	ADS PSV4405,C MSL,1140 PSI (AUTO,OPEN)	0	0	**N/A**	AUTO	**AUTO**
SETUP	Z DI **AD HS-4400**	ADS PSV4400,A MSL,1130 PSI (AUTO,OPEN)	0	0	**N/A**	AUTO	**AUTO**
SETUP	Z DI **RR HS-4665A**	MG SET LUB OIL 1P-202A	0	0	**7**	AUTO	**STOP/RST**
SETUP	Z DI **RR HS-4666A**	MG SET LUB OIL 1P-202B	0	0	**7**	AUTO	**STOP/RST**
SETUP	Z LO **RR HS-4666A(1)**	MG SET LUBE OIL PUMP 1P-202B (GREEN)	0	0	**7**	AS IS	**OFF**
SETUP	Z LO **RR HS-4666A(2)**	MG SET LUBE OIL PUMP 1P-202B (AMBER)	0	0	**7**	AS IS	**OFF**
SETUP	Z LO **RR HS-4666A(3)**	MG SET LUBE OIL PUMP 1P-202B (RED)	0	0	**7**	AS IS	**ON**
SETUP	Z LO **RR HS-4667A(1)**	MG SET LUBE OIL PUMP,1P-202C (GREEN)	0	0	**7**	AS IS	**OFF**
SETUP	Z LO **RR HS-4667A(2)**	MG SET LUBE OIL PUMP,1P-202C (AMBER)	0	0	**7**	AS IS	**OFF**
SETUP	Z LO **RR HS-4667A(3)**	MG SET LUBE OIL PUMP,1P-202C (RED)	0	0	**7**	AS IS	**ON**
SETUP	Z LO **RR HS-4665A(2)**	MG SET LUBE OIL PUMP 1P-202A (AMBER)	0	0	**7**	AS IS	**OFF**
SETUP	Z DI **RR HS-4667A**	MG SET LUB OIL 1P-202C	0	0	**7**	AUTO	**STOP/RST**
SETUP	Z DI **HP HS-2239**	STEAM LINE ISOL MOV-2239	0	0	**6**	AUTO	**CLOSE**
SETUP	Z DI **HP HS-2322**	PUMP SUCTION MOV-2322 (SP)	0	0	**6**	AUTO	**CLOSE**
SETUP	Z DI **HP HS-2242**	HP HS-2242 MANUAL ISOLATION	0	0	**6**	TRANSI /OFF	**ON**
SETUP	Z LO **HP HS-2240**	AUTO ISOLATION SIGNAL - (A)	0	0	**6**	AS IS	**ON**
SETUP	Z LO **MS PCIS-LBIHPCI**	PCIS GROUP 6 B LOGIC ISOLATION SIGNAL HPCI	0	0	**6**	AS IS	**ON**
SETUP	Z LO **HP XFV-2246C(1)**	HPCI STEAM SUPPLY PRESS XFV LITES (GREEN)	0	0	**6**	AS IS	**ON**
SETUP	Z LO **HP XFV-2246C(2)**	HPCI STEAM SUPPLY PRESS XFV LITES (RED)	0	0	**6**	AS IS	**OFF**

1.4 REMOTE FUNCTIONS:

Time	Remote	Title	Value
During the MG set oil leak **Event 6**	**rr05a**	'A' RECIRC SCOOPE TUBE LOCK UP(LOCK,UNLOCK)	LOCK

1.5 EVENT TRIGGER DEFINITIONS:

Trigger Number	Trigger File Name	Trigger Logic Statement	Trigger Word Description
1	N/A	rpdis1shutdown(1) .ge. 1	Mode Switch to S/D
2	N/A	Manually Activated	N/A
4	N/A	Manually Activated	N/A
5	N/A	Manually Activated	N/A
6	N/A	Manually Activated	N/A
7	N/A	Manually Activated	N/A

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

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

3.1 If this scenario is used in performance mode: OTI 105

4 COMPLETE A TURNOVER SHEET AS FOLLOWS:

⇒ Day of week and shift

- Weekday, 19-07 shift

⇒ Weather conditions

- Mild spring weather

⇒ (Plant power levels)

- 70 % Power
- 1370 MWT
- 440 MWE
- CORE FLOW 36 Mlb/Hr.

⇒ Thermal Limit Problems/Power Evolutions

- None

⇒ Existing LCOs, date of next surveillance

- T.S. 3.8.1.A. STP 3.8.1-01 is due in 20 hours.

⇒ STPs in progress or major maintenance

- The Standby Transformer is powering 1A3.
  Maintain 1X4 and Both SBDGs operable.
  Electricians completed repair on 1A302 breaker.
  1A302 has been verified operable and the Gap is sat.
  The system Engineer requested that we wait until after turn over to transfer 1A3 to the Startup Transformer and is standing by outside 1A3.

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

- LPRM 4C-08-09, in LPRM A cabinet was reading low. REs recommended bypassing it until a OD-1 can be run tomorrow. Now a total of 4 LPRMs bypassed.

⇒ Comments, evolutions, problems, etc.

- No extra personnel on shift.
- Helpers working until midnight on plant cleanup.
- Have been load following at night lately.
- Place 1A3 on the Startup Transformer following Shift turnover.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	• Provide Shift Turnovers to the **SRO** and **ROs**.	• Get familiar with plant conditions. **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover. (SRO 1.01)
Transfer 1A3 to the Startup Transformer. **Event 1**	**Role Play** System Engineer if needed. You are standing by for the Transfer of 1A3 to the Startup Transformer.	**SRO** direct the **BOP** to Transfer 1A3 from the Standby to Startup Transformer per OI 304.2 **BOP** Will Transfer 1A3 from the Standby to Startup Transformer per OI 304.2 Rev 43 Section 7.4
(After the Startup Transformer is supplying 1A3 or as directed by the Lead Examiner. **Event 2** Load Increase.	**Role Play** System Dispatcher: • Raise 60 MWE and maintain KVARS steady. There is a need for Grid power, so raise power at a rate of 5 MWE/min.	**SRO** will direct that the **RO** raise reactor power with Recirc at a rate of 3-5 MWE/min, in accordance with IPOI 3. SRO 4.10 **RO** will raise reactor power with Recirc by performing the following: • Raise Power with Recirc. • Maintain KVAR loading. • Monitor total core power by APRMs, Steam Flow and Feed Flow. RO 93.11 The **SRO** will monitor the power increase. SRO 4.10

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
When power change is complete or as directed by the Lead Examiner. LPRM Upscale **Event 3**	When 1A3 transfer is complete. **ET 4** Activate Event Trigger # 4 and verify the following malfunction becomes active: **nm072425a** **100% Severity** **0 Ramp** **Role play** as the RE and inform the crew that they should bypass the LPRM and that you will check it when you run the OD-1 tomorrow.	**RO** will respond to ARP 1C05A (C-4), LPRM Upscale, and possibly 1C05A (C-2) APRM UPSCALE: • Determine the location of the failed LPRM. • Run an "Official Case" to verify that no thermal limits have been exceeded. • Using Appendix 1 of OI 878.3, determine where the LPRM is and if the loss of the LPRM affects APRM operability. • Will determine that with 3A-24-25 inoperable, the "C" APRM is still operable. • Will obtain **SRO** permission to bypass the LPRM. Task 80.01 **SRO** will direct that LPRM 24-25 be bypassed in accordance with OI 878.3. **RO** and **BOP** will bypass the LPRM by performing the following: • Bypass affected APRMs. • Bypass the affected LPRM and observe the 'white' bypass light on. • Notify the RE of the bypassed LPRM. • Delete computer point from scan per OI-831.4. • If necessary, adjust the GAFs. • Unbypass the affected APRMs. • Write a Work Request Card on the bypassed LPRM. **SRO** checks TS 3.3.1.1, Tbl. 1, Function 2b, and bases B.3.3.1.1 page B.3.3-9 and determines that the plant is not in violation of TS.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
After LPRM is bypassed or as directed by the Lead Examiner. HPCI **Event 4**	**ET 6** Activate Event Trigger # 6. **Role play** plant Helper Forman: • A new Helper was moving the floor plug crane on the Rx Bldg. 1st Floor South and he swung the hook into the instrument rack and damaged a gage, PDIS 2245. There was a small water leak from the gauge but it has stopped now. **Role Play** NSPEO and confirm the damage as necessary. **Role play** with **RO** verifying the relays in the back panel, and **cue** him that: **E41A K33 and E41A E35 are tripped.**	**BOP** will respond to the alarms on the HPCI panel and investigate. • Verify HPCI isolation. • Determine the cause of the isolation. • Determine Primary Containment Isolation Valve Instrumentation is inoperable and perform the following: • Enter TS 3.3.6.1 Condition A, from table 1 Function 3A, and realize that they have 24 hours to place the function in trip, and that it is already there. • Determine that HPCI is inoperable with the steam line closed, and enter TS 3.5.1 Condition F, a 14 day LCO and verify RCIC operable, by administrative means, immediately. (SRO 1.02)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

After T.S. determination or as directed by the Lead Examiner.
SLO
Event 5
	Role Play NSPEO
	A line going to the fluid coupler is cracked approximately ½ of the way around and leaking badly. The leak can not be isolated.
	The crew will do one of two things.
	• Remove the A Recirc MG set from service, and leave the B operating where it is,
	OR
	• Perform a fast power reduction IAW IPOI 4 to remove the A unit.
	NO MATTER which path the crew elects to take, wait 3 min from the report of an oil puddle, then simulate the loss of lube oil by performing the following:
	ET 7
	Activate Event Trigger # 7: This will turn off both MG set lube oil pumps.
		RO will take the call and report to the Crew that there is a leak on the "A" Recirc M-G set on a line going to the Fluid Coupler.
		• Crew will discuss the need to:
		  • Rapidly remove the M-G set.
		  • Perform "A" Recirc MG Fluid drive oil high temp ARP, 1C04A (B-3).
		  • Crew may perform IPOI 4 fast power reduction to remove the MG set. Note that this may drive them into the buffer or exclusion zone. (RO 93.21, SRO 4.20)
		• After the trip of the MG set, the crew will:
		  • **SRO** will voice that if any undamped oscillations on the APRM occur, that a manual reactor scram be inserted.
		  • Perform "A" Recirc MG Drive Motor Trip or overload ARP 1C04A, (A-4). (RO 99.11)
		  • Verify MG set motor and field breakers are OPEN.
		  • Verify open the discharge bypass and close the discharge valve for 5 minutes.
		  • Determine the cause of the trip.
		  • Immediately perform STP 3.4.1-02, SLO procedure.
		  • Check for entry into exclusion or buffer regions of power to flow map.
		  • Exit via the STP guidance, (prepare to insert rods to lower the load line to less than 75%).
		  • If they reduced power via IPOI 4, they may be in the Exclusion Zone. IF they are they will insert rods to lower load line to <75%.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

When the crew begins SLO STP
 	
Event 6
 	
LOCA
 	
When the reactor is scrammed,
	Start the LOCA by performing the following:
	
	ET 2
	
	Activate Event Trigger # 2: verify that the following malfunction becomes active:
	
	rr15a
	
	This will start a leak that will go to 15% Severity over a 15:00 Ramp.
	
	Verify Event Trigger # 1 becomes active.
	
	Increase **rr15a** as necessary to force the crew to ED
	
	After the Generator lock out, insert the following malfunctions to keep the Feed water pumps from restarting:
	
	Activate Event Trigger # 5 and verify that the following malfunctions become active:
	
	FW09A and B
	
	When the **RO** calls and asks you to throttle the Condensate pump discharge valve, **do not give them the Condensate** system until after the ED.
		Crew will:
		
		• When the Drywell approaches 2 psig they will manually scram the reactor.
		
		SRO will direct and the ROs will perform the following:
		
		• IPOI-5 Immediate actions. (RO 93.22) (SRO 4.21)
		• EOP-1. (RO 95.44 & 46) (SRO 6.44 & 6.46)
		  • Maintain level 170 to 211" using:
		  • CRD, RCIC, SBLC
		  • Override CV-4371A. (RO 95.21) (SRO 6.21)
		• Perform EOP-2. (RO 95.63 & 64) (SRO 6.62)
		  • Maximize Torus cooling when >95°F. (RO 95.61) (SRO 6.62)
		  • Install Defeat 4 and bypass the main intake coils. (RO 95.14) (SRO 6.14 & 6.63)
		  • Spray the Torus. (RO 95.64) (SRO 6.64)
		  • Spray the Drywell. (RO 95.63)(SRO 6.63)
		  • Install Defeat 16 and restore DW sampling. (RO 95.26) (SRO 6.26)
		
		Crew will determine that there was an OPEN transfer of the non-essential busses. The **SRO** will direct and the ROs will perform the following:
		
		• Attempt to restore Condensate and Feed.
		• Send an operator to throttle the Condensate pump discharge valve so that the stem is 1 to 1½ inch open.
		• Start the pump and have the inplant operator throttle open the discharge valve.
		• Attempt to start the Feed water pump.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

RCIC
 	
Event 7
	Increase **rr15a** as necessary to force the crew to ED	EOP 1 Actions:
		In an attempt to restore RPV level the **SRO** will direct and the **RO** will perform:
		• Line up and inject RCIC into the RPV for level control.
		• **RO** will identify that RCIC is not producing rated flow with the flow controller in AUTO. (RO 4.02)
		• Shift to MANUAL and adjust speed to maximize RCIC flow.
		• As level lowers:
		  • Start both CRD pumps and maximize flow.
		  • Start SBLC and inject into the RPV.

Entry into ALC **Event 8**	If called as the NSPEO to throttle the Condensate pump discharge valve, **WAIT** until after the ED, then: Use remote functions **FW05 Close** for the B pump and **FW06 Close** for the A pump This will close the condensate discharge. **AFTER the ED**, call and report that the valve is closed to 1 and ½ inch open, and that the pump is ready for a start.	**SRO** will determine that RPV level cannot be maintained, and enter ALC. Once in ALC the **SRO** will direct and the ROs will perform the following: • Lock out ADS. • Line up injection sources per ALC. (RO 95.74) (SRO 6.74) • ED after 15″, but before –25 inches **(Critical).** (RO 95.80) (SRO 6.78) • Open 4 ADS SRVs • Identify PSV 4405 and PSV 4400 fail to open, and open both LLS SRVs **(Critical).** • Maximize injection to restore RPV level to greater than 15 inches. (SRO 6.74)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
RPV/F	None	**Crew** will monitor for entry into SAT Curve. If entry into the sat curve, then perform the following actions: • **SRO** will: • Inform the crew that they are in the sat curve. • Tell them that the only level instruments that they are to use are the 'Flood ups' and the 'GEMACs', and to increase the monitoring of those level instruments. • Tell them that they must subtract 23 inches from the current level indications on the usable instruments, and that the corrected level is the level that all decisions will be based off of.
END	When RPV level and/or pressure are stable, place simulator in FREEZE.	None

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

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

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Transfer 1A3 to the Startup Transformer. **Event 1**	**SRO** direct the **BOP** to Transfer 1A3 from the Standby to Startup Transformer per OI 304.2 • **SRO** should note T.S. conditions for the Transfer. **BOP** Will Transfer 1A3 from the Standby to Startup Transformer per OI 304.2 Rev 43 Section 7.4 • Identify there are T.S. considerations for this transfer. • Bus Transfer switch to manual • Sync scope switch to on for 1A302 • Sync Scope near 12 o'clock and phase lights off • Incoming volts within 8 volts of running volts • Select phase 1 on both S/U and S/B amp meters • Close in Breaker 1A302 • Check for equal amperage • Open Breaker 1A301 • Sync switch to OFF • Check each phase on Startup Transformer for proper amps • Check each phase voltage about 4160 VAC • Place Bus Transfer breaker mode selector switch to AUTO • Inform **SRO** transfer is complete.	T.S. 3.8.1 Condition A AND T.S. 3.8.2 Condition B While Bus 1A3 Transfer breaker mode selector switch is in MANUAL **OI 304.2 Rev 43** Section 7.4 Step 1 2 3 4 5 6 7 8 9 10 11 12	Startup Transformer Supplying 1A3 Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Raising load **Event 2**	**RO** Prior to raising power, the crew may adjust the APRM GAFs. (The criteria for adjusting the APRMs is a + or – 2% power) • Maintain KVAR loading. • Monitor total core power by APRMs, Steam Flow and Feed Flow. • Monitor local power with the LPRMs on the 4-rod display.	**IPOI-3, Rev. 55** Section 4.0, Step (14) Applicable from Section 3.0 Step (5) Step (6)	Power increased with Recirc. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
LPRM Upscale **Event 3**	**RO** • Determine which LPRM is upscale. (3A-24-25) • Confirm the upscale condition by selecting a nearby control rod. • Monitor 4-Rod display LPRM power. • Notify RE and comply with the TRM for LHGR. • Run an Official 3D Case to verify LPRM is not listed as failed and to verify thermal limits are not being violated. • Verify that LPRM can be bypassed without making the C APRM inop.	**ARP 1C05A, C-4,** Rev. 5 Step 3.2 Step 3.2.a Step 3.2.b Step 3.2.c Step 3.3 Step 3.4 & 5 Step 3.7	LPRM 3A-24-25 identified as upscale. Sat_____ Unsat_____
LPRM Upscale Bypassing an LPRM	With **SRO** permission, bypass the LPRM per OI-878.3. • Bypass C & D APRMs. • Take the mode selector on the LPRM card to BY. • Observe 1C37 white bypassed light is on. • Notify RE that LPRM is bypassed. • If necessary, adjust APRM gains. • Unbypass APRMs. • Delete the associated computer point from scan per OI-831.4. • Initiate a work request card.	**OI-878.3, Rev 21** Step (21) Step (4) Step (5) Step (7) Step (8) Step (9) Step (10) Step (11)	LPRM 3A-24-25 Bypassed. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

HPCI
 	
Event 4
	BOP
	• Verify that MO-2239 is closed.
	• Verify HS-2240 Amber light is on.
	• Determine the cause of the isolation.
	  • A helper will call the control room and inform them that a lifting device slammed into the PDIS and broke it.
	  • They will go to ARP 1C03C B-8 and look at Relay E41A-K33, High Steam Line DP, tripped and from ARP 1C03C, A-9, HPCI isolation, look at Relay E41A-K35, tripped.
	  • Depending on when the CUE comes from the Driver, the Crew may look at the HPCI steam leak detection temperatures to see if there is a steam leak
	• Initiate a Work Request Card.
	• Notify **SRO** and determine TS:
	  • TS section 3.5.1 Condition F, 14 day and verify RCIC operable, by administrative means, immediately. (for the HPCI inoperable, the **SRO** may pull out STP 3.5.1-08, this documents that RCIC is operable)
	  • TS section 3.3.6.1 Condition A 24 hours
	  • Note that the problem is the broken instrument, the valve did its job, and therefore entry into 3.6.1.3 is not necessary, only a log entry for HPCI Steam Flow DPIS inoperable and HPCI Steam Line Low Pressure inoperable
	• Initiate an AR.
		ARP 1C03C, A-9, Rev. 6
		Step 3.1
		Step 3.3
		Step 3.4
		
		Step 4.1
		Step 4.2
		TS Section 3.5.1 Condition F.
		
		TS Section 3.3.6.1 Condition A.
			Tech Spec determination correct.
			
			Sat_____
			Unsat_____
			
			Evaluator Note:
			If operators are sent to look at relays E41A-K33 and
			E41A-K35
			after they locate the relays tell them the relays are tripped.

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

SLO
 	
Event 5
	RO
	• (Possible, as there are no alarms alarming) Reduce A Recirc pump speed to minimum and manually trip Breaker 1A104, in anticipation of high bearing and or oil temps.
	
	• Check for entry into exclusion or buffer regions of power to flow map. Consult AOP 255.2 for guidance.
	If the crew plots themselves in the buffer region, their guidance is to, run a SOL case on the PPC, and monitor for instabilities.
	• Verify 1A104 and A MG field breakers are open.
	• Stabilize RPV water level.
	• Secure A Recirc pump.
	  • Verify Disch Bypass is open.
	  • Close pump Disch valve.
	  • Re-open pump Disch valve after 5 minutes.
	• If desired to limit the cooldown of the idle loop, the crew may close CV-1804A, Mini Purge Isolation valve
	• Determine the cause of the trip.
	  • There is nothing in the procedure that tells the operators to secure the oil pumps, however it is a good operations practice, and should be done.
	• Verify Supply fan 1V-SF-12 in AUTO or START.
		ARP 1C04A, C-6, Rev. 3
		Steps 3.8.a, b& c
		
		ARP 1C04A, A-4, Rev. 15
		Step 3.2
		Step 3.3
		Step 3.4
		Step 3.5
		Step 3.6
		Step 3.7
		Step 3.8
		Step 3.9
			ARP actions for Recirc pump trip completed.
			
			Sat_____
			Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
SLO continued	**BOP** • Start STP 3.4.1-02, SLO procedure. • Determine stability on Power to Flow Map. • (If fast power reduction performed) Determine that entry into the Exclusion Zone has been made. • Exit the region by inserting control rods • (If no fast power reduction) Monitor the plant for undamped oscillations. • Start STP 3.4.2-03 Daily jet pump operability for-SLO. • Comply with TS. • Enter 3.4.1, Condition D, requires that Recirc be in compliance with the LCO conditions in 24 hours. (i.e. STP 3.4.1-02).	Step 3.10 STP 3.4.1-02 Rev.4 Step 7.1.1 Step 7.1.2 Step 7.1.3 Step 3.11 Step 3.12 TS Section 3.4	SLO STPs are directed. Sat_____ Unsat_____
LOCA Reactor Scram **Event 6**	**RO** • Initiate a backup manual scram • Place the Mode Switch in Shutdown. • Verify flux decreasing. • Initiate a level setback by pushing the "Manual level setback to 175" on 1C05. • Verify Recirc is run back to minimum. • Verify all control rods fully inserted. • Insert all IRMs and SRMs.	**IPOI-5, Rev. 34** Section 3.2 Step (1) Step (2) Step (3) Step (4) Step (5) Step (6) Step (7)	IPOI 5 immediate actions complete. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

LOCA
EOP 1
 	
Event 6 (cont.)
	SRO/RO
	Recognize EOP-1 entry on RPV low level.
	• Verify Group 2, 3, & 4 isolation.
	• Verify CS, LPCI, & SBDG initiations.
	• Override CV-4371A.
	• Verify LLS stabilizes RPV pressure.
	• Restore RPV level 170-211 inches with Table 1 systems:
	  • Both CRD pumps
	  • RCIC
	• Restore RPV level 170-211 inches with Table 2 systems:
	  • SBLC
	• Transition to ALC/ED.
		EOP-1, Rev. 9
		Step RC-3
		
		Step RC/P-1
		Step RC/P-2
		Step RC/L-1
		
		Step RC/L-1
		
		Step RC/L-1
			RPV level >170 inches
			
			Sat_____
			Unsat_____

RCIC **Event 7**	**RO** Identify that RCIC is not producing rated flow with the flow controller in AUTO. • Place FIC-2509 in BAL. NOTE: due to the situation, the next step may be bypassed, and the speed of the RCIC turbine will be controlled by step (3) • Use the manual adjust knob to match the red pointer with the controller setpoint. • Shift to MAN. • Adjust speed to maximize RCIC flow.	**OI-150, Rev. 43** Section 10.1 Step 2.a Step 2.b Step 2.c Step 3	RCIC injecting at rated flow. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
LOCA EOP-2	**SRO/BOP** • Spray the Torus. • Secure B Recirc pump and spray the Drywell when permitted. Verify Drywell fans shutdown. • Maximize Drywell cooling by installing Defeat 4 and bypassing main intake coils. • Maintain DW air Temp <280°F with Drywell sprays, if necessary. • Maximize Torus cooling when >95°F. • Maintain Torus level < 13.5 ft. • Install Defeat 16 and monitor DW H2 & O2.	**EOP-2, Rev. 8** PC/P-4 PC/P-6 DW/T-3 DW/T-5 T/T-3 T/L-1 PCH-1	RPV level >170 inches Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

LOCA
ALC/ED
 	
Event 8
	SRO/BOP
	• Lock out ADS.
	• Line up Table 1A and 2A systems for injection (i.e. CRD, SBLC, Core, RHR, and Condensate pumps).
	• Wait until RPV level drops to 15″.
	• Before level reaches -25":
	• Emergency Depressurize.
	  • Emergency depressurize (**critical**)
	  • Verify Torus level > 4.5 ft.
	BOP
	  • Open 4 ADS SRVs.
	• Determine that 1 Core Spray and 1 other ECCS pump are available.
	• Inject into the RPV to restore and maintain level greater than + 15" and exit ALC.
		ALC, Rev. 2
		ALC-1
		Step ALC-2
		Step ALC-5
		Step ALC-6
		Step ALC-8
		Step ALC-10
		
		ED, Rev. 2
		Step ED-6
		Step ED-7
		Step ED-8
		
		Step ALC-11
		Step ALC-12
			ED Directed and one SRV Hand switch in open before RPV level < –25 inches **(critical)**
			Sat_____
			Unsat_____
			
			Identify PSV 4405 and 4400 failed to open, and open both LLS SRVs. **(critical)**
			Sat_____
			Unsat_____

	SRO • Crew will be aware that they are, or may be, in the SAT curve and increase monitoring of RPV level. • The only level instruments that they are to use are the 'Flood ups' and the 'GEMACs', and they are to monitoring for any oscillations. • They must subtract 23 inches from the current level indications on the usable instruments, and that the corrected level is the level that all decisions will be based off of.	**Caution #1 EOP 1**	Sat Curve entry identified if entered. Sat_____ Unsat_____
EAL	FA-1	**EAL Board**	

CREW GRADING ATTACHMENT

ESG ___ILC 9_____ Rev. __1_____

Operator Name	Position	Evaluator
	Shift Manager	
	Shift Supervisor	
	STA	
	Reactor Operator	
	1st Assistant	
	B.O.P. 1st Assistant	

Management Representative/Lead Evaluator _____

Crew Critical Tasks

Task Statement	SAT	UNSAT
1. ED Directed and one SRV open before RPV level < –25 inches		
2. Identify PSV 4405 and 4400 failed to open, and open both LLS SRVs		
3.		
4.		
5.		
6.		

Individual Competency Identifiers

1.

2.

3.

Attach to crew grading worksheet, OTI-105, Attachment 12 when complete.

OSG VALIDATION CHECKLIST

Scenario # ESG ILC 9 Rev. 1

1 ____ Verify that if not run from a protected IC that setup information is provided to reproduce the stated initial conditions.

2 ____ Verify that all stated objectives are identified in the body of the OSG.

3 ____ Verify that turn over sheets are completed, and are in agreement with both the narrative summary and shift turnover information sheet. Turn over sheets are not required for initial license scenarios.

4 ____ Verify that if the scenario requires documents to be provided to the crew, that they are filled out as appropriate (i.e., if an STP is used, it is filled out).

5 ____ If this is the initial validation or the revision affects ramp times, event triggers, malfunctions, overrides, remote functions or procedure changes could affect the scenario, then validate the scenario for proper response using a crew. It is preferable to use a crew unfamiliar with the scenario whenever possible. Verify the following while running the scenario:

- The scenario runs as written and all tasks are performed.
- The stated time line agrees with actual times.
- Critical task statements clearly define the expected plant and student response. They should also be written so that they are achievable as written. If any question exists, it is preferable to have operations management participate in the validation.
- Anticipated instructor role play/cues are identified
- Management expectations are captured and re-enforced.
- Verify administrative documentation requirements (i.e., CMARs / ARs) are identified.
- Verify reportability requirements (i.e., ESF actuations) are identified.
- Verify Technical Specification items / LCO declarations are correct.
- If procedure steps may cause confusion or disagreement between higher-level procedures and OIs/ARPs that operations management is consulted.

6 ____ Shutdown scenarios include shutdown risk assessment, time to boil calculations, and shutdown status board information.

_____ _____
SME/Instructor Date

_____ _____
SME/Instructor Date

_____ _____
SME/Instructor Date

Appendix D	Scenario Outline	Form ES-D-1 Equivalent
Facility: DAEC	**Scenario No.: 3** (ESG ILC 7)	**Op-Test No.:** 2002 ILC EXAM
Examiners:		**Operators:**

Initial Condition: The plant is operating at 1420 MWT in preparation for MSIV testing.

Turnover:

Event No.	Malf. No.	Event Type*	Event Description
1		I/C (RO)	Shortly after the crew takes control of the plant, the "C" APRM will slowly fail upscale resulting in a half scram.
2		N (BOP)	Operators perform MSIV Trip Closure Time Check, STP 3.6.1.3-03.
3		I/C (BOP)	"A" Outboard MSIV will not indicate full closed. The crew should declare CV-4413 inoperable and comply with Tech Spec 3.6.1.3.A, which requires the inboard MSIV to be closed and deactivated in 8 hours.
4		I/C (RO)	While the OSS is researching the MSIV LCO, the B Feed Reg Valve controller begins to fail closed. Operators will take manual control and restore RPV level.
5		I/C (BOP)	Air in-leakage into the Main Condenser results in Main Condenser High Backpressure
6		R (RO)	In response to the condenser backpressure, the crew will reduce reactor power in accordance with IPOI 4 fast power reduction.
7		I/C (SRO)	The air in-leakage will increase to the point where a manual reactor scram should be performed.
8		M (ALL)	Control Rods fail to insert. Operators perform EOP ATWS. Control rods may be manually driven for a short while, but other RIPs are unsuccessful until the scram air header is vented. RPV level is lowered to < +87". If Power/Level control conditions exist, RPV level should continue to be lowered. EOP-2 is entered on high Torus Water Temperature. Torus Cooling should be maximized. When RPV level is lowered < 64", Torus Cooling capability will be lost.
9		I/C (RO)	RWCU fails to isolate when SBLC is initiated. Operators should manually close the isolation valves or bypass the filter demins.
10		I/C (BOP)	ATWS pressure control is a problem because the Turbine Bypass valves fail to operate.

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

NMC Committed to Nuclear Excellence

EVALUATION SCENARIO GUIDE (ESG)

SITE: **DAEC**

MSIV TESTING/APRM FAILURE/FRV FAILURE/CONDENSER HIGH BACKPRESSURE/ATWS/POWER-LEVEL CONTROL/RWCU ISOLATION FAILURE/TURBINE BPV FAILURE ESG ILC 7 REV. 2

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

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

TOTAL TIME: **2 HOURS**

Developed by:	*Instructor*	9/14/02 *Date*
Validated by:	*SME/Instructor*	9/14/02 *Date*
Reviewed by:	*Operations Manager* for	9/14/02 *Date*
Approved by:	*Training Supervisor-Operations*	9/17/02 *Date*

Retention: Life of policy = 10yrs.
Retain in: Training Program File

Disposition: Reviewer and Approver

Guide Requirements

Training Resources:

Simulator
Simulator Booth Operator
Phone Talker
Simulator Floor Instructor

References:

1. STP 3.6.1.3-03
2. Technical Specifications
3. ARP 1C05A, A-2
4. ARP 1C05A, B-2
5. ARP 1C05A, D-1
6. ARP 1C07B, B-1/C-1
7. IPOI-4
8. EOP-1
9. EOP-2
10. ATWS
11. OI-153
12. OI-416
13. OI-454
14. OI-149
15. OI-644
16. OI-878.4
17. ED
18. ACP 1410.10

Evaluation Method:

Performance Mode

SCENARIO SUMMARY:

Current plant operating status.

The plant is operating at 70% power in preparation for MSIV testing.

Scenario segments

- (Event 1 I) Shortly after the crew takes control of the plant, the "C" APRM will slowly fail upscale resulting in a half scram. (RO/SRO)
- (Event 2 N) Operators perform MSIV Trip Closure Time Check, STP 3.6.1.3-03. (SRO/BOP)
- (Event 3 I) "A" Outboard MSIV will not indicate full closed. The crew should declare CV-4413 inoperable and comply with Tech Spec 3.6.1.3.A, which requires the inboard MSIV to be closed and deactivated in 8 hours. (SRO/BOP)
- (Event 4 I) While the SS/SM are researching the MSIV LCO, the B Feed Reg Valve controller begins to fail closed. Operators will take manual control and restore RPV level. (RO)
- (Event 5 C) Air in-leakage into the Main Condenser results in Main Condenser High Backpressure. (SRO/BOP)
- (Event 6 R) In response to the condenser backpressure, the crew will reduce reactor power in accordance with IPOI 4 fast power reduction. (SRO/RO)
- (Event 7 C) The air in-leakage will increase to the point where a manual reactor scram should be performed. (SRO)
- (Event 8 M) Control Rods fail to insert. Operators perform EOP ATWS. Control rods may be manually driven for a short while, but other RIPs are unsuccessful until the scram air header is vented. RPV level is lowered to < +87". If Power/Level control conditions exist, RPV level should continue to be lowered. (ALL)
- (Event 8 M) EOP-2 is entered on high Torus Water Temperature. Torus Cooling should be maximized. When RPV level is lowered < 64", Torus Cooling capability will be lost. (ALL)
- (Event 9 C) RWCU fails to isolate when SBLC is initiated. Operators should manually close the isolation valves or bypass the filter demins. (RO)
- (Event 10 C) ATWS pressure control is a problem because the Turbine Bypass valves fail to operate. (BOP)
- It is possible to approach the Torus Heat Capacity Temperature Limit, in which case the crew should reduce RPV pressure to maintain below the HCTL.
- The scenario ends when all rods have been inserted, and the plant is stable.

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ Crew Evolutions:

- None

⇒ RO (NSOE, ANSOE)

♦	1.07	Perform Surveillance Test Procedures.
♦	1.12	Perform Moore Controller Functions
♦	2.06	Perform normal Torus Cooling.
♦	6.02	Perform manual startup/initiation (SBLC).
♦	8.11	Manually delay or interrupt ADS auto initiation.
♦	81.03	Bypass an APRM
♦	81.04	Return a bypassed APRM to service
♦	93.21	Perform Fast Power Reduction
♦	93.22	Perform the Immediate Operator responses to a reactor scram
♦	95.03	Perform reactor scram using the RPS test switches.
♦	95.07	Perform reactor scram using the individual scram test switches.
♦	95.08	Insert control rods by increasing CRD cooling flow and pressure.
♦	95.09	Insert control rods by manually driving control rods.
♦	95.21	Perform EOP Defeat 11.
♦	95.25	Perform EOP Defeat 15.
♦	95.27	Perform EOP Defeat 17.
♦	95.50	Perform /L to Control RPV Level during an ATWS..
♦	95.51	Perform Power/Level control.
♦	95.56	Perform /P to control RPV pressure during an ATWS.
♦	95.57	Perform /Q to reduce reactor power or scram the reactor.
♦	95.61	Perform the T/T leg of EOP-2.
♦	95.80	Perform an Emergency Depressurization using SRVs.
♦	99.25	Respond to condenser high backpressure.

⇒ Shift Supervisor (SS)

- ♦ 1.01 Direct routine crew and Control room activities.
- ♦ 1.02 Determine operability of Tech Spec required components.
- ♦ 1.06 Conduct a Shift Brief
- ♦ 1.17 Coordinate Operations/others Surveillance Test activities.
- ♦ 1.21 Direct crew response to off normal events/accidents
- ♦ 4.20 Direct Crew Actions to Perform a Fast Power Reduction from 100% to Approximately 35% Power.
- ♦ 1.01 Direct routine crew and Control room activities.
- ♦ 1.02 Determine operability of Tech Spec required components.
- ♦ 1.06 Conduct a Shift Brief.
- ♦ 1.17 Coordinate Operations/others Surveillance Test activities.
- ♦ 1.21 Direct crew response to off normal events/accidents
- ♦ 4.20 Direct Crew Actions to Perform a Fast Power Reduction from 100% to Approximately 35% Power.
- ♦ 4.21 Direct crew actions to perform the immediate operator responses to a reactor scram.
- ♦ 6.03 Direct crew response to perform reactor scram using the RPS test switches.
- ♦ 6.05 Direct crew response to perform reactor scram by venting the scram air header.
- ♦ 6.07 Direct crew response to perform reactor scram using the individual scram test switches.
- ♦ 6.08 Direct crew response to insert control rods by increasing CRD cooling flow and pressure.
- ♦ 6.09 Direct crew response to insert control rods by manually driving control rods.
- ♦ 6.21 Direct Crew response to perform EOP Defeat 11.
- ♦ 6.50 Direct Crew Response to Perform /L to Control Level During an ATWS.
- ♦ 6.51 Direct crew response to perform Power/Level control.
- ♦ 6.56 Direct crew response to perform /Q to reduce reactor power or scram the reactor during an ATWS.
- ♦ 6.57 Direct crew response to perform /P to control RPV pressure during an ATWS.
- ♦ 6.62 Direct Crew response for performance of the T/T leg of EOP-2.
- ♦ 6.78 Direct Crew response for performance Emergency Depressurization.

Scenario Objectives:

1. Perform a surveillance test.
2. Make Tech Spec determinations.
3. Respond to a Feed Reg valve controller failure.
4. Respond to Main Condenser high backpressure.
5. Perform ATWS EOP with component failures.
6. Perform ATWS Power/Level Control.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 Non-Nuclear Instrumentation System

1.1 SIMULATOR SET UP:

a. Set Event Trigger definitions.
b. Reset to IC 23. (75% MOL)
c. Go to RUN.
d. Verify power is <1460 MWT per STP 3.6.1.3-03.
e. Place the Recirc and Feedwater controllers in auto, verify zero bias on FRVs
f. Restore Malfunction File ILC7.
g. Restore Override File ILC7.
h. **LPRMs: Bypass the following LPRMs:**
   (1) 4C-08-09 LPRM A
   (2) 4A-32-25 APRM D
i. Control Panels:
   (1) Check APRM GAFs.
   (2) Place the clean pull sheet on 1C05.
   (3) Pump the Drywell sumps.
   (4) Ensure that alarm typer works.
j. Provide a Working Copy of STP 3.6.1.3-03.
k. Verify "B" and "C" RBCCW pump HS in START
l. Restore all points to scan using "RESAP". Crews during the scenarios may delete this point from scan.

1.2 MALFUNCTIONS:

ILC7

Time	Malfunction No.	Malfunction Title	ET	Delay	F. Sev.	Ramp	I. Sev.
Setup	**rp05a**	Auto scram failure	**6**	0	N/A	0	N/A
Setup	**rp05b**	Manual scram failure	N/A	0	N/A	0	N/A
Setup	**rp05c**	ARI failure	N/A	0	N/A	0	N/A
Setup	**rp05d**	RPS fuse removal failure	N/A	0	N/A	0	N/A
Setup	**rp05e**	Individual scram test switches failure	N/A	0	N/A	0	N/A
Setup	**nm08c**	APRM Upscale	**3**	0	**1.0**	**60**	N/A
Setup	**ms28b**	MO-2701 failure to isolate	N/A	0	N/A	0	N/A
Setup	**ms28c**	MO-2740 failure to isolate	N/A	0	N/A	0	N/A
As dir	**tc06a**	Bypass valve #1 failure	1	0	**0**	0	N/A
As dir	**tc06b**	Bypass valve #2 failure	1	0	**0**	0	N/A
Setup	**ms07b**	MSIV fast/slow time	N/A	0	**0.30**	0	Asis
As dir	**ms05b**	A MSIV OUTBD disc failure	**4**	0	**0.90**	3	Asis
As dir	**rd13**	Scram Air Header leak	**5**	0	**1.0**	**45**	N/A
As dir	**mc04a**	Main condenser air inleakage	**6**	0	**0.015**	**600**	0.005
As dir	**fw12b**	B Feed Reg Valve Failure	**7**	0	**0**	**600**	N/A
As dir	**rd11b**	B CRD Pump Trip	**1**	**45**	N/A	0	N/A
As dir	**rd11a**	A CRD Pump Trip	**8**	0	N/A	0	N/A
As dir	**mc04b**	Main condenser air inleakage	**1**	0	**0.20**	**20**	N/A
As dir	**ms28a**	MO-2700 failure to isolate	N/A	0	N/A	0	N/A

1.3 OVERRIDES:

ILC7

Time	Override No.	Override Title	ET	Delay	Value	Ramp
Setup	LO **MS HS-4413A(2)**	A MSIV Outbd indication	**4**	0	**ON**	0
Setup	LO **MS CV-4413(2)**	A MSIV Outbd indication, Mimic	**4**	0	**ON**	0
As dir.	LO **MS HS-4413A(1)**	A MSIV Outbd indication	**4**	0	**ON**	0
As dir	LO **MS CV-4413(1)**	A MSIV Outbd indication Mimic	**4**	0	**ON**	0
As dir	DI **TC BPVTSTG**	Bypass valve test	N/A	0	**OFF**	0

1.4 REMOTE FUNCTIONS:

None

1.5 EVENT TRIGGER DEFINITIONS:

Trigger Number	Trigger File Name	Trigger Logic Statement	Trigger Word Description
1	N/A	**rpdis1shutdown(1).ge.1**	Mode Switch to Shutdown
4	N/A	**msvpcv4413 .le. 0.9**	"A" MSIV outboard to close.
others	N/A	Manually Activated	N/A

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

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

3.1 If this scenario is used in performance mode: OTI 105

4 COMPLETE A TURNOVER SHEET AS FOLLOWS:

⇒ Day of week and shift
- Saturday, Evening

⇒ Weather conditions
- Mild spring day.

⇒ Plant power levels
- 75% Power
- 1420 MWt
- 470 MWe
- 38.4 Mlb/Hr CORE FLOW

⇒ Thermal Limit Problems/Power Evolutions
- Power reduction to <1460 MWt for STP3.6.1.3-03.

⇒ Existing LCOs, date of next surveillance
- None

⇒ STPs in progress or major maintenance
- MSIV Trip Closure Time Check, STP 3.6.1.3-03

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- None

⇒ Comments, evolutions, problems, etc.
- LPRMs 4C-08-09 and 4A-32-25 are inop
- No extra personnel.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
0:00 Shift Turnover	Provide Shift Turnovers to the SRO and ROs.	• Get familiar with plant conditions. • SRO will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover. (SRO 1.01, 1.06)
3:00 APRM Failure **Event 1**	**NOTE:** If the crew immediately commences STP 3.6.1.3-03(Event 2) Wait until the T.S. call is made for Event 3 then start Event 1. When the crew assumes the watch, start the APRM failure as follows: **ET 3** Activate Event Trigger 3: Verify that the following malfunction becomes active: **nm08c** This will ramp the "C" APRM to 100 over the next 60 seconds **Ensure the B002 is restored to scan after each scenario!!!!!**	Crew will respond to 1C05A (A-2), "A" RPS AUTO SCRAM, as follows: • Identify the cause of the ½ scram. • Correct the cause. • Reset the half scram Crew will respond to 1C05A (B-2), APRM A, C, OR E UPSCALE TRIP OR INOP, as follows: • Monitor indications on 1C05 and 1C37 to determine which APRM is upscale or inop • Suspend testing in progress on other RPS instrumentation. • Investigate the cause of the failure, initiate a Work Request Card, and comply with TS. 3.3.1.1 (Table 3.3.1.1-1) and TRM Section T.3.3.2 (SRO 1.02) • In this instance, TS requires that 2 APRMs be operable, therefore the APRM can be bypassed and no further TS is required • With the permission of the OSS, bypass the APRM. • Delete from scan the associated computer point (B002) • Reset the half scram. (RO 81.03 & 81.04)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
MSIV Testing **Event 2** MSIV Failure **Event 3** This is the second valve that should be tested per the STP.	When the operator takes the handswitch for CV-4413 "MSIV A OUTBOARD" to close, **ET 4** Activate Event trigger 4: Verify that the correct malfunction and overrides become active.	Shift Supervisor/Manager • Perform a Pre-Job Brief. (SRO 1.06) CREW • Verify Prerequisites. (RO 1.07) (SRO 1.17) • Take MSIV handswitches to close and time the closures. • Record closure times and verify 3-5 seconds. • Identify that when the hand switch for CV-4413 is taken to Close, CV-4413 will indicate an intermediate position. • Identify approximately 500,000-lbm/hr steam flow in the "A" MSL. • Notify SS of problem encountered. • The crew should declare CV-4413 inoperable, based on the dual indication, and steam flow, and comply with Tech Spec 3.6.1.3.A, which requires the inboard MSIV to be closed and deactivated in 8 hours. (SRO 1.02) • Initiate Work Request Card and AR. (SRO 1.17)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
After the SRO begins research on the MSIV LCO or when directed by the Lead Examiner, Feed Reg Valve Failure **Event 4**	**ET 7** Activate Event Trigger 7: verify that the following malfunction becomes active: **fw12b** *This will cause the "B" feed reg valve to slowly fail closed* (Note: It will take ≈2.5 minutes to reach the RPV low level alarm setpoint.) Allow time for the crew to complete their administrative actions on both the MSIV and Feed Reg. Valve before proceeding to the next segment.	• Identify that RPV level is lowering. The actions for this event are located in the ARP for 1C05A (D-1) RPV HI/LO level recorder alarm. Note that the operator may take these actions prior to the alarm alarming. • Check Feed Reg. Valves for proper operation. • Identify that B Reg. valve is failing closed and shift controller to manual. (Depress M/A pushbutton) (RO 1.12) • Restore RPV level to between 186-195 inches. • Initiate a Work Request Card and an AR

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

After RPV level is stabilized or as directed by the Lead Examiner
High Backpressure
 	
Event 5
 	
Event 6
 	
Event 7
	ET 6
	
	Activate Event Trigger 6: Verify the following malfunction becomes active:
	
	mc04a, rp05a - for ATWS
	
	This will start a slow air leak into the main condenser.
	
	(Note: It will take
	≈3 minutes for the condensers to equalize
	≈4 minutes to reach the Offgas alarm
	≈7 minutes to the Backpressure alarm
	≈7 minutes to turbine trip)
	
	The main condenser air leak will get bigger
		Crew will recognize the rise of condenser backpressure.
		
		The SRO will direct and the RO will perform the following:
		• Identify increasing Main Condenser backpressure. (RO 99.25)
		  • Determine rate of change.
		  • Respond to Offgas panel trouble and identify high system flow.
		  • Dispatch operators to check on plant equipment and listen for air in-leakage
		• SRO will direct that the Operators begin Fast Power Reduction IAW IPOI 4. (SRO 4.20)
		• The RO will Reduce Recirc Flow to 27Mlb/Hr in accordance with IPOI 4, while maintaining RPV level 186-211 inches. (RO 93.21)
		
		When the crew reaches 27Mlb/Hr flow they will assess the plant conditions.
		The SRO will set limits on when to scram the plant if condenser backpressure continues to rise. (SRO 1.21)
		The crew will determine that the condenser backpressure is still rising.
		SRO will direct, and the ROs will perform the following:
		• Manually scram reactor and carry out the actions of IPOI 5. (SRO 4.21, RO 93.22)

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

When the reactor scram has been attempted,
 	
Event 8
	Role Play in-plant personnel as necessary.
	
	Verify ET 1 becomes active on Mode switch
	
	mc04b 0.20, ramp 20 sec.
	The B CRD pump trips in 45 sec.
	rd11b
	Allow the A CRD to be started and run for about 3 min, or **when ever rods start to drift**, which ever is sooner. Then perform the following:
	ET 8
	Activate Event Trigger 8: Verify that the following malfunction becomes active:
	rd11a
		The crew will determine that the plant did not scram and that an electrical ATWS is in progress.
		The SRO will direct and the ROs will perform the following:
		• For ATWS
		  • Lockout ADS. (RO 8.11) (SRO 6.50)
		  • **(CRITICAL) With a reactor scram required, reactor not shutdown, and conditions for ADS blowdown are met, inhibit ADS**
		  • Install Defeat 15. (RO 95.25 &27) (SRO 6.50)
		  • Control RPV level -25"-211". (RO 95.50) (SRO 6.50)
		  • At the beginning of the transient, the SRO may give a narrower level band, for example, 158" in auto
		  • The RO will have to manipulate RPV level control with one feed reg valve in Manual.
		  • Take Mode Switch to Shutdown. (SRO 6.56)
		  • Verify Recirc at minimum speed. (RO 95.57)(SRO 6.56)
		  • Initiate ARI and verify Recirc pumps are tripped. (RO 95.57) (SRO 6.56)
		  • The Recirc pumps will not trip automatically, and the RO will have to manually trip the Recirc MG sets if RPT did not automatically trip them following the turbine trip.
		  • Inject with SBLC prior to exceeding BIIT. (RO 95.57)(SRO 6.56).
		• **(CRITICAL) With a reactor scram required and the reactor not shutdown, take action to reduce power by injecting boron and/or inserting control rods**

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

ATWS continued
 	
Event 8 Continued
		• Attempt to shut the reactor down by performing the following:
		  • Attempt to Insert control rods by manually driving rods, until both CRD pumps trip. (RO 95.09) (SRO 6.09)
		  • De-energize RPS with test switches. (RO 95.03) (SRO 6.03)
		  • Scram Test switches. (RO 95.07) (SRO 6.07)
		  • Vent scram Air header. (SRO 6.05)
		  • Increase CRD cooling flow and pressure. (RO 95.08) (SRO 6.08)
		• Individual Identify Power>5% with RPV level > +87″.
		• **(Critical) During an ATWS with reactor power above 5% or unknown and RPV water level above +87", enter Power/Level Control for Thermal/Hydraulic Instability and terminate and prevent injection into the RPV from Condensate/Feedwater, HPCI, RHR, CS, and Alternate Flooding Systems, (Table 2B), until RPV level is below +87" and conditions are met to re-establish injection.**
		  • Terminate/prevent injection until RPV level is < +87″.(Cond & Feed, HPCI, RHR, CS) (RO 95.51) (SRO 6.51)
		  • If necessary, continue to lower level until <5% or 15″ or all SRVs closed with DW Pressure <2#.) (RO 95.51) (SRO 6.51)
		  • Reestablish injection and maintain >-25″ with Table 1B systems. (RO 95.51) (SRO 6.51)
		• **(Critical) When performing Power/Level Control and conditions are met to re-establish injection, use available Table 1B injection systems to maintain RPV water level between the level established in step /L-2 and -25".**

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event 10		• For ATWS pressure control:
		  • Override CV-4371A. (RO 95.21) (SRO 6.21)
		  • Terminate SRV cycling. (RO 95.56) (SRO 6.57)
		  • Identify that EHC/Bypass valves are not controlling.
		  • Take action to stabilize RPV pressure.
		• Augment RPV pressure control by opening MSL drains.

ATWS SBLC/RWCU failure **Event 9**	None	The SRO will direct and the RO will perform the following: • Inject SBLC into the RPV by placing the SBLC hand switch in PUMPS A & B RUN. (RO 6.02) • Verify system initiation. • Identify that RWCU fails to isolate. • Manually close MO-2701 & MO-2740 or bypass RWCU Demins. (SRO 6.56)
ATWS EOP2	**Role Play** in-plant personnel as necessary.	The SRO will direct and the ROs will perform the following actions of EOP 2: (Note: that the only Primary Containment parameter that will be of concern will be the Torus water temperature). • Identify EOP-2 entry 95°F Torus Water Temperature. (RO 95.61) • Maximize Torus Cooling. (RO 2.06) (SRO 6.62) • Maintain Torus water temperature < Heat Capacity Limit. • If Torus water temperature cannot be maintained below HCTL, maintain RPV pressure below HCTL.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
ATWS EXIT	**Vent the Scram** Air Header when the following conditions exist: • RPV Level is Stable. • RPV Pressure is stable • SBLC is injecting. • There is no threat to exceed the Torus HCTL. **ET 5** Activate Event Trigger 5: Verify that the following malfunction become active: **rd13**	• Identify all rods inserted. • Secure SBLC. • Enter EOP-1.
END	When all rods have been inserted, RPV Pressure and Level are stable, and notifications completed, place the simulator in FREEZE.	None

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

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

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

APRM "C" upscale half scram
 	
Event 1
	RO
	• Check Scram group A and B lights to determine if a full scram has occurred.
	• Verify Scram Group A 1 2 3 4 indicating lights are off.
	• If only a half scram has occurred verify the following:
	  • That conditions will not degrade to the point where a Full Scram is necessary.
	  • That no scram set point has been exceeded with out a scram signal.
	  • Manually scram if one of the above has occurred.
	• Correct the cause of the RPS Auto Scram.
	• Reset the half scram.
		ARP 1C05A (A-2) Rev. 9
		Step 3.1
		Step 3.3
		Step 3.7
		Step 3.9
		Step 3.10
		Step 4.1
			NOTE: If the crew immediately commences STP 3.6.1.3-03(Event 2) Wait until the T.S. call is made for Event 3 then start Event 1.

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Bypassing the APRM and resetting the half scram	**RO**
	• Check Scram group A and B lights to determine if a full scram has occurred.
	• Monitor APRM indications on 1C05 and 1C37 to determine which APRM is downscale.
	• If it is determined that the APRM is failed:
	  • Determine the cause, initiate a Work Request Card, and comply with TS, TRM.
	  • With permission, bypass the affected APRM.
	  • Reset the half scram.
	• Place the APRM Bypass switch for APRM to be bypassed in the BYPASS position.
	• Observe that the bypass light on both 1C37 and 1C05 are on for the bypassed APRM.
	• The Crew may delete from scan the associated computer point (B002)
		ARP 1C05A (B-2) Rev. 6
		Step 3.1
		Step 3.3
		Step 3.5
		Step 3.7
		Step 3.8
		Step 4.1
		
		OI 878.4 Rev 22 Section 6.0
		Step 1
		Step 2
		Step 3
			"C" APRM bypassed and ½ Scram reset.
			
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

MSIV Testing
 	
Event 2
	SRO / BOP
	• Perform a Pre-Job Brief.
	• Verify Prerequisites:
	  • No other testing.
	  • <1460 MWt.
	  • All MSIVs open.
	  • 1C15 &1C17 relays energized.
	• Verify <1460 MWt.
	• Take MSIV handswitches to close and time the closures.
	• Record closure times and verify 3-5 seconds.
	• Identify the failure CV-4413 to indicate closed.
	• Notify SS of problem encountered.
		STP 3.6.1.3-03 Rev. 2
		Step 6.2
		Step 6.3
		Step 6.5
		Step 6.6
		Step 7.1 (1-13)
		Step 7.2 (1-3)
		STP is stopped at step 7.2.3due to valve failure.
			STP performed correctly up to step 7.2.3. Identify MSIV failure.
			
			Sat_____ Unsat_____

MSIV Failure **Event 3**	**SRO** • Declare CV-4413 inoperable and comply with Tech Spec 3.6.1.3.A, which requires the inboard MSIV to be closed and deactivated in 8 hours. • Initiate Work Request and AR.	**TS 3.6.1.3.A** STP 3.6.1.3-03	Tech Spec determination is correct. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Feed Reg Valve **Event 4**	**RO** Identify that RPV level is lowering. • Check Feed Reg Valves for proper operation and restore to maintain RPV level 186-195. • Identify that B Reg valve is failing closed and shift controller to manual. (Depress M/A pushbutton) • Initiate a Work Request Card.	**ARP 1C05A D-1** Rev. 5 Step 3.1 Step 3.2 Step 3.4 Step 3.5 Step 4.1	RPV level being controlled in green band in automatic. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Loss of Vacuum
 	
Event 5
 	
Event 6 (R)
 	
Event 7
	SRO/BOP
	• Respond to Offgas panel trouble and identify high system flow.
	  • At panel 1C34 confirm the Offgas high flow condition for >40 scfm and verify in service recombiner A/B temp normal.
	  • At 1C07B check Main condenser vacuum, if lost perform ARP 1C07B, D-9.
	  • If a failure of PC 4150 is suspected send an operator to verify PC 4150 is set at 350 psig.
	• Identify increasing Main Condenser backpressure.
	• Determine rate of change.
	• **AOP 672.1** may be entered due to Offgas indications.
	RO
	• Operators will begin Fast Power Reduction.
	  • Reduce Recirc Flow to 27Mlb/Hr while maintaining RPV level 186-211 inches.
	  • Insert control rods to lower load line. (Possible)
	SRO
	• Once the power reduction is completed the SRO determines the condenser backpressure is approaching the scram setpoint and orders a Reactor Scram.
		1C34 B-8 Rev. 6
		Step 3.1
		Step 3.3
		Step 3.6
		
		ARP 1C07B B-1/D-9/C-1, Rev. 6
		Step 3.1
		Step 3.2
		Step 3.4
		Step 3.5
		Step 4.2 –6
		
		IPOI-4 Rev 57
		Section 6.0
		Step 1
			Note: These ARP have the same actions.
			
			Loss of condenser vacuum Identified
			
			Sat_____ Unsat_____
			
			Reactor Scram prior to automatic scram.
			
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

ATWS
 	
Event 8
	SRO/RO/BOP
	Identify an Electrical ATWS.
	
	• Lockout ADS.
	• Install Defeat 15.
	• Control RPV level -25"-211".
	  • Note the level band directed will probably be narrower than the above
	• Take Mode Switch to Shutdown.
	• Verify Recirc at minimum speed.
	• Initiate ARI and verify Recirc pumps are tripped.
	  • The crew will have to trip the one Recirc pump
	• Inject with SBLC prior to exceeding BIIT.
	  • 1C05 operator will determine that RWCU did not isolate and manually isolate it.
	• Attempt to Insert control rods:
	  • De-energize RPS with test switches.
	  • Individual Scram Test switches.
	  • Vent scram Air header.
	  • Increase CRD cooling flow and pressure.
	  • Manually drive rods.
		EOP-1 Rev. 9
		CRS Following RC-3
		ATWS Rev. 10
		/-1
		/-2
		/Q-1
		/Q-2
		/Q-3
		/Q-5
		/Q-6
		/Q-7
		/Q-8
		/Q-10
		/P-1
		/P-2
		/P-4
		/L-1
		/L-2
		/L-3
		/L-5
			(CRITICAL) With a reactor scram required, reactor not shutdown, and conditions for ADS blowdown are met, inhibit ADS
			
			Sat_____ Unsat_____
			
			(CRITICAL) With a reactor scram required and the reactor not shutdown, take action to reduce power by injecting boron and/or inserting control rods
			
			Sat_____ Unsat_____
			
			(Critical) During an ATWS with reactor power above 5% or unknown and RPV water level above +87", enter Power/Level Control for Thermal/Hydraulic Instability and terminate and prevent injection into the RPV from Condensate/Feedwater, HPCI, RHR, CS, and Alternate Flooding Systems, (Table 2B), until RPV level is below +87" and conditions are met to re-establish injection.
			
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

ATWS continued.	**SRO/BOP**
	The following is performed in the ATWS RPV level leg. During an ATWS, if power is > 5% and RPV level is greater than 87", the possibility of reactor instabilities exist, therefore level is lowered to 87", this is 2 feet below the feed water spargers. This raises the final feed water temperature, increases voids, lowers power, and decreases the possibility of core instabilities.
	• Identify Power>5% with RPV level > +87".
	  • Terminate/prevent injection until RPV level is < +87". (Cond & Feed, HPCI, RHR, CS)
	  • If necessary, continue to lower level until <5% or 15" or all SRVs closed with DW Pressure <2#.
	  • Maintain >-25" with Table 1B systems.
	• Override CV-4371A.
	• Terminate SRV cycling.
			(Critical) When performing Power/Level Control and conditions are met to re-establish injection, use available Table 1B injection systems to maintain RPV water level between the level established in step /L-2 and -25".
			
			Sat_____ Unsat_____

Event 10	**BOP** Identify that EHC/Bypass valves are not controlling. • Augment RPV pressure control by opening MSL drains.	**This Should be identified during Step /P-4**	Identify BPVs not responding. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

SBLC/RWCU failure
 	
Event 9
	RO
	• Place SBLC switch in PUMPS A & B to RUN.
	• Verify system initiation.
	  • Pump red lights on/ green off.
	  • Squib valve lights off.
	  • Discharge pressure >RPV pressure.
	  • Combined flow >52.4 gpm.
	• Identify that RWCU valves, MO-2701 & MO-2740 isolate.
	  • Both MO-2700, MO-2701 and MO-2740 fail to isolate, the crew will manually close them or bypass filter demins.
	• Verify SBLC tank lowering.
		OI-153 Rev. 30
		Section 4.0
		Step 1
		Step 2
		Step 3 (RWCU Failure to Isolate)
		Step 4
		Step 5
			RWCU Isolated.
			
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

EOP-2
 	
Event 8 continued
	SRO/BOP
	Identify EOP-2 entry 95°F Torus Water Temperature.
	
	• Maximize Torus Cooling.
	  • Start ESW pumps.
	  • RHRSW pumps started.
	  • RHRSW flow adjusted to 2000-2600 gpm per pump.
	  • Start or verify four RHR pumps.
	  • Verify Min Flow valves open when <2000 gpm.
	  • Open Outboard Torus Cooling valves.
	  • Throttle Torus Cooling/Test valves to 9600 gpm on each loop.
	  • Close Heat Exchanger Bypass valves.
	• Maintain Torus water temperature < HCTL.
	• If Torus water temperature cannot be maintained below HCTL, maintain RPV pressure below the HCTL.
		EOP-2 Rev. 9
		T/T-1
		T/T-2
		T/T-4
		T/T-5
		
		OI-454 QRC 1 Rev 1
		Immediate actions
		Step 1
		Step 2
		
		OI-416 QRC 1 Rev 1
		Immediate actions
		Step 1
		Step 2
		Step 3
		Step 4
		Step 5
		Step 6
		Follow-up Actions
		Step 1
		
		OI-149 QRC 2 Rev 0
		Immediate Actions
		Step 1
		Step 2
		Step 3
		Step 4
		Step 5
			Torus Cooling Maximized.
			
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
ATWS EXIT	• Identify all rods inserted. • Secure SBLC. • Enter EOP-1.	**ATWS**	
EAL	• SA-2	**EAL Board**	

CREW GRADING ATTACHMENT

ESG _ILC 7_____ Rev. __1_____

Operator Name	Position	Evaluator
	Shift Supervisor	
	Reactor Operator #1	
	Reactor Operator #1	

Management Representative/Lead Evaluator _____

Crew Critical Tasks

Task Statement	SAT	UNSAT
1. **With a reactor scram required, reactor not shutdown, and conditions for ADS blowdown are met, inhibit ADS**		
2. **With a reactor scram required and the reactor not shutdown, take action to reduce power by injecting boron and/or inserting control rods**		
3. **During an ATWS with reactor power above 5% or unknown and RPV water level above +87", enter Power/Level Control for Thermal/Hydraulic Instability and terminate and prevent injection into the RPV from Condensate/Feedwater, HPCI, RHR, CS, and Alternate Flooding Systems, (Table 2B), until RPV level is below +87" and conditions are met to re-establish injection.**		
4. **When performing Power/Level Control and conditions are met to re-establish injection, use available Table 1B injection systems to maintain RPV water level between the level established in step /L-2 and -25".**		

Individual Competency Identifiers

1. Identify the failed APRM, refer to TS/TRM and appropriate ARPs and OIs and bypass the failed APRM.
2. Identify the failed MSIV, refer to appropriate TS, and determine that the inboard MSIV must be closed and deactivated in 8 hours.
3. Identify and control RPV water level with a failed controller input.
4. Diagnose the air inleakage, and perform IPOI 4 rapid power reduction to lower power. When it is determined that an automatic scram will occur, the crew should attempt to manually scram prior to the automatic scram.
5. Recognize the failure to scram, and EOP 1/ATWS entry, and perform appropriate actions to insert rods. (initially one CRD pump will be available to drift/drive rods in)
6. As power is lowering, control RPV level such that a high RPV level turbine trip does not occur ("B" FRV is in manual).
7. The crew should recognize the failure of the bypass valves to control pressure, and manually open drains to assist in pressure control.
8. The crew should inject SBLC, and recognize the failure of RWCU to isolate, and manually isolate RWCU.
9. When the crew has entered Power/level control, level should be stabilized below 87 inches, but above –25 inches.
10. If RPV level goes below 64 inches, LPCI logic will prevent RHR operation in torus cooling without 2 psig DW pressure.
11. If RPV level goes below 64 inches, DW cooling will be lost, due to isolation of the well water to the coolers. This could result in 2 psig DW pressure, and high DW temperature.

Attach to crew grading worksheet, OTI-105, Attachment 12 when complete.

OSG VALIDATION CHECKLIST

Scenario # ESG ILC 7 Rev. 1

1 ____ Verify that if not run from a protected IC that setup information is provided to reproduce the stated initial conditions.

2 ____ Verify that all stated objectives are identified in the body of the OSG.

3 ____ Verify that turn over sheets are completed, and are in agreement with both the narrative summary and shift turnover information sheet. Turn over sheets are not required for initial license scenarios.

4 ____ Verify that if the scenario requires documents to be provided to the crew, that they are filled out as appropriate (i.e., if an STP is used, it is filled out).

5 ____ If this is the initial validation or the revision affects ramp times, event triggers, malfunctions, overrides, remote functions or procedure changes could affect the scenario, then validate the scenario for proper response using a crew. It is preferable to use a crew unfamiliar with the scenario whenever possible. Verify the following while running the scenario:

- The scenario runs as written and all tasks are performed.
- The stated time line agrees with actual times.
- Critical task statements clearly define the expected plant and student response. They should also be written so that they are achievable as written. If any question exists, it is preferable to have operations management participate in the validation.
- Anticipated instructor role play/cues are identified
- Management expectations are captured and re-enforced.
- Verify administrative documentation requirements (i.e., CMARs / ARs) are identified.
- Verify reportability requirements (i.e., ESF actuations) are identified.
- Verify Technical Specification items / LCO declarations are correct.
- If procedure steps may cause confusion or disagreement between higher-level procedures and OIs/ARPs that operations management is consulted.

6 ____ Shutdown scenarios include shutdown risk assessment, time to boil calculations, and shutdown status board information.

SME/Instructor	Date
SME/Instructor	Date
SME/Instructor	Date

NMC Committed to Nuclear Excellence

EVALUATION SCENARIO GUIDE (ESG)

SITE: DAEC

DECREASE REACTOR POWER/ STARTUP OF "A" RHRSW/ESW PUMPS/ ROD DRIFT/RWM ROD POSITION SUBSTITUTION/GROUP 3/LOSS OF ANNUCIATOR 1C05/XFV-4642A INDICATES DUAL POSITION/ /GRID INSTABILITY/LOCA

ESG ILC 15 REV. 0

PROGRAM: OPERATIONS **#:**

COURSE: ILC **#:** 50007

TOTAL TIME: 90 MINUTES

Developed by:	*Instructor*	9/14/02 *Date*
Validated by:	*SME/Instructor*	9/19/02 *Date*
Reviewed by:	*Operations Manager*	9/14/02 *Date*
Approved by:	*Training Supervisor-Operations*	9/17/02 *Date*

Retention: Life of policy = 10yrs. Disposition: Reviewer and Approver
~~Retain in: Training Program File~~

DECREASE REACTOR POWER/ STARTUP OF "A"RHRSW/ESW PUMPS/ ROD DRIFT/RWM ROD POSITION SUBSTITUTION/GROUP 3/LOSS OF ANNUCIATOR 1C05/XFV-4642A INDICATES DUAL POSITION/ /GRID INSTABILITY/LOCA, **Rev. 0**

Guide Requirements

References:

1. OI-416
2. OI-454
3. ARP 1C03B[29]
4. Tech Spec
5. ACP 1410.1
6. ACP 1410.7
7. ACP 1402.3
8. ARP 1C05B (C-8)
9. ARP 1C04B (A-1)
10. IPOI 5
11. EOP 1
12. EPIP 1.1

Evaluation Method:

Performance Mode

DECREASE REACTOR POWER/ STARTUP OF "A"RHRSW/ESW PUMPS/ ROD DRIFT/RWM ROD POSITION SUBSTITUTION/GROUP 3/LOSS OF ANNUCIATOR 1C05/XFV-4642A INDICATES DUAL POSITION/ /GRID INSTABILITY/LOCA, **Rev. 0**

SCENARIO SUMMARY:

Current plant operating status.

The plant is operating at 90% power. HPCI is in day 9 of 14, it has been repaired but is awaiting the operability testing. There is no other inoperable equipment.

Scenario segments

- Event 1 (R) 1C05 operator will lower reactor load by 60 MWe. (RO)
- Event 2 (N) BOP operator will startup the "A" RHRSW and "A" pumps for vibration data collection. (BOP)
- Event 3 (I/C) Rod drift occurs due to loss of position indication. (RO)
- Event 4 (N) Insert a substitute value in the RWM. (RO)
- Event 5 (I/C) XFV-4642A alarms and indicates dual. The BOP operator will investigate to determine if the XFV is isolated. The SRO will determine that this is a reportable event. The SRO must also make an operability determination of the valve. (SRO/BOP)
- Event 6 (I/C) A group 3B isolation occurs due to Fuel pool rad monitor failing. (BOP)
- Event 7 (I/C) 1C05 losses alarm power and does not alarm the Group 3. (RO)
- Event 8 (M) A grid disturbance will result in a degraded grid voltage. (ALL)
- Event 9 (I/C) The "A" EDG will start, but not load on to the bus and the "B" EDG will start, but the "B" ESW pump will not. (BOP)
- Event 10 (I/C) When directed to install defeat 4, the BOP will determine that it will not work. (BOP)
- Event 11 (M) The scram will cause a small LOCA to occur inside the PC requiring Torus and D/W sprays. (ALL)

TASKS ASSOCIATED WITH SIMULATOR EXERCISE:

⇒ Crew Evolutions:

- None

⇒ RO (NSOE, ANSOE, XANSOE)

- 93.12 Lower Reactor Power with Recirc Flow when Above 35% Power.
- 30.01 Startup RHRSW System.
- 1.04 Respond to Annunciators.
- 93.22 Perform immediate operator responses for reactor scram
- 2.06 Perform normal torus cooling.
- 95.44 Perform actions of RC/L of EOP-1.
- 95.46 Perform actions of RC/P of EOP-1.
- 95.63 Perform D/W/T leg of EOP 2.
- 95.64 Perform D/W/P leg of EOP 2.
- 8.04 Perform manual operation of ADS. (possible)

⇒ SRO

- 1.02 Determine Operability for Tech Spec Required Components.
  - 1.02.02 Determine if the instrument, system or component is operable.
  - 1.02.03 Declare the instrument, component or system inoperable, enter them correct LCO, and determine and direct performance of the LCO STP.
- 1.11 Ensure the conduct of plant operations and maintenance are in compliance with administration procedures.
  - 1.11.03.02 Differentiate between a Routine Report, Non routine Report, Immediate Notification Event, Reportable Event and a Licensee Event Report.
- 1.21 Direct crew response to off-normal events
  - 1.21.02 Recognize and prioritize data relevant to the accident or event
  - 1.21.04 Conduct periodic crew briefings to include plant status, priorities, and key ongoing activities.
- 4.21 Direct crew actions to perform the immediate operator responses to a reactor scram.
  - 4.21.01 Direct the operator to insert a manual scram.
  - 4.21.02 Direct the confirmation that the reactor is shutdown.

- 4.21.03 Direct the operator performance of the IPOI 5 immediate actions

♦ 5.11 Direct crew response to loss of RPS AC power condition.

- 5.11.02 Check Automatic actions for immediate concerns.
- 5.11.03 Direct performance of the follow-up actions.

♦ 5.38 Direct crew response to a loss of Offsite power.

- 5.38.01 Check automatic actions and conditional statements for immediate concerns.
- 5.38.02 Direct operator actions to mitigate the consequences of a loss of offsite power and to stabilize plant parameters.

♦ 6.44 Direct crew response for performance of the RC/L leg of EOP-1.

- 6.44.01 Direct operator actions to maintain RPV level between 170″ and 211″ using the Table 1 injection systems.

♦ 6.46 Direct crew response for performance of the RC/P leg of EOP-1.

- 6.46.04 Direct operator actions to augment RPV pressure control with other steam loads, SRVs, or RWCU.

♦ 6.63 Direct crew response for performance of the DW/T leg of EOP 2.

- 6.63-04 Direct operator actions to secure running recirc pumps, initiate DW sprays using RHR not required for adequate core cooling, and verify fans shutdown.

♦ 6.64 Direct crew response for performance of the DW/P leg of EOP 2.

- 6.64.02 Direct operator actions to initiate Torus sprays using RHR not required for adequate core cooling.

♦ 6.21 Direct Crew response to perform EOP Defeat 11.

- 6.21.01 Direct operator actions to perform EOP Defeat 11.

⇒ Shift Manager (SM)

None

⇒ STA

None

DECREASE REACTOR POWER/ STARTUP OF "A"RHRSW/ESW PUMPS/ ROD DRIFT/RWM ROD POSITION SUBSTITUTION/GROUP 3/LOSS OF ANNUCIATOR 1C05/XFV-4642A INDICATES DUAL POSITION/ /GRID INSTABILITY/LOCA, **Rev. 0**

Goal:

Scenario Objective(s):

1. Reactor power decrease
2. Startup of "A" ESW and "A" RHRSW pumps
3. Group 3 Isolation on Fuel Pool Rad Monitor Failure
4. Loss of 1C05B Annunciator power
5. XFV isolation and LPCI loop select inop
6. Respond to degraded off site power source.
7. Ensure that one stable power source will continue to supply power to an Essential bus.
8. Determine Defeat 4 Failure.
9. Respond to a LOCA

DECREASE REACTOR POWER/ STARTUP OF "A"RHRSW/ESW PUMPS/ ROD DRIFT/RWM ROD POSITION SUBSTITUTION/GROUP 3/LOSS OF ANNUCIATOR 1C05/XFV-4642A INDICATES DUAL POSITION/ /GRID INSTABILITY/LOCA, **Rev. 0**

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 Non-Nuclear Instrumentation System

1.1 SIMULATOR SET UP:

a. Reset to **IC 20**
b. Restore Malfunction File **ESG15**.
c. Restore Override File **ESG15**.
d. Verify that the Pull sheet is on 1C05 and current rod position identified.

1.2 MALFUNCTIONS:

ESG15

Time	Malfunction No.	Malfunction Title	ET	Delay	F. Sev.	Ramp	I. Sev.
0	**rm02re4131b**	RE-4131B REFUEL POOL LEVEL B	**1**	0	**1**	0	As is
0	**an011c05b**	CONTROL ROOM ANNUNCIATOR PANEL 1C05B	**1**	0	N/A	N/A	N/A
AS req.	**AN:1C03C[29]**	XFV System "B" Hi Flow	**4**	N/A	**ON**	N/A	N/A
As Dir	**ed03**	POWER GRID VOLTAGE TRANSIENT(NORMAL GRID VOLTAGE=0.5)	**2**		**0.28**	**180sec**	**.50**
T=0	**dg02a**	A EDG fails to auto close on bus 1A3	**2**				
T=0	**sw12b**	"B" ESW pump fails to start	**2**				
T=0	**rr15a**	RECIRC LOOP RUPT-DESIGN BASES LOCA AT 100%-LOOP A (NRVI)	**3**		**.02**	**120sec**	As is
As Dir	**rd04a1835**	CR RPIS REED SW FAILUREOPEN-ROD 18-35	**5**	0	**20**	**0**	As is

1.3 OVERRIDES:

ESG15

Time	Override No.	Override Title	ET	Delay	Value.	Ramp
0	Z LO **RR HS4642A[GREEN]**	XFV 4642A	**4**	N/A	**ON**	N/A
SETUP	Z DI **PC HS4321A[NORMAL]**	Defeat 4 Key Lock			**Norm**	
SETUP	Z DI **PC HS4321B[NORMAL]**	Defeat 4 Key Lock			**Norm**	
	Z LO **RR HS4642A[2]**	JP3 AND JP4 RISER DP XFV-4642A (RED)	**4**		**OFF**	

1.4 REMOTE FUNCTIONS:

None

1.5 EVENT TRIGGER DEFINITIONS:

As noted on Malfunction Table all manually inserted.

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

BOOTH / FLOOR INSTRUCTOR ACTIONS

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

3.1 If this scenario is used in performance mode: OTI 105

DECREASE REACTOR POWER/ STARTUP OF "A"RHRSW/ESW PUMPS/ ROD DRIFT/RWM ROD POSITION SUBSTITUTION/GROUP 3/LOSS OF ANNUCIATOR 1C05/XFV-4642A INDICATES DUAL POSITION/ /GRID INSTABILITY/LOCA, **Rev. 0**

COMPLETE A TURNOVER SHEET AS FOLLOWS:

⇒ Day of week and shift
- Today
- Days

⇒ Weather conditions if different from actual conditions
- Clear
- Cool

⇒ Plant power levels
- 93 % Power
- MWT 1785
- MWE 617
- CORE FLOW 46.2 lbm/hr

⇒ Thermal Limit Problems/Power Evolutions
- System Operations Center wants a decrease of 60 MWe

⇒ Existing LCOs, Date Of Next Surveillance
- HPCI is inop Day 9 of 14

⇒ STPs in progress or major maintenance
- None

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- HPCI is inop due to MO 2239 failure to meet ASME testing requirements. MO 2239 was disassembled and restored. All of the HPCI tags have been removed and the HPCI system has been restored. HPCI is available.
- There is a meeting in 2 hours to brief the HPCI operability test to be run later this shift.

⇒ Comments, evolutions, problems, etc.
- There are no extra personnel
- The System Engineer has requested increased vibration data on the "A" RHRSW pump. After shift turnover the Electricians would like you to start "A" RHRSW pump.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
	Provide the students' time to walkdown the panels and then provide the shift turnover.	The students will walkdown the panels and then participate in a shift turnover. **SRO** will conduct a Shift Brief.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 1	Event 1 is performed to evaluate a significant reactivity manipulation. **Note:** If this is taking both ROs and the floor instructor wants to continue. **Role play** as the Load Dispatcher and call the control room. Inform the OSS that he want us to stop the power reduction for the time being due to another unit tripping.	**SRO** Provide the 1C05 operator a pre-evolution brief on lowering reactor power. **SRO** will direct the RO to lower generator load by 60 MWe using the Reactor Recirculation System. **RO** will lower generator load by 60 MWe using the Recirc System in accordance with IPOI 3. • Reduce Recirc MG Set speed in small increments • Maintain Recirc Loop flows balanced
Event 2	Event 2 will be used to evaluate a normal evolution. The BOP operator will start up the RHRSW and ESW Systems. If needed : **Role-play** as electricians and call the Control room and ask when can we expect the "A" RHRSW pump run to start? **Role-play** as the Aux operator: When "A" ESW pump is started report the pump and strainer are sat. The auto vent is closed and strainer dp is 0.4 psid. **And** When "A" RHRSW pump is started report the pump and strainer are sat. The auto vent is closed and strainer dp is 0.6 psid.	**SRO** will direct the BOP to startup the "A" RHRSW and "A" ESW pumps. **BOP** will startup the "A" ESW pump in accordance with OI-454. **BOP** will startup the "A" RHRSW pump in accordance with OI-416.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 3	Rod 18-35 losses position indication resulting in a rod drift. **ET 5** Activate event trigger # 5: Verify the following becomes active **rd04a1835** If contacted as the RE **Role-play** and acknowledge the abnormal rod pattern and if asked if it is OK to move the rod to check position tell them there is no problem with moving the control rod. Also if asked where to position the rod tell them the rod can be left at position 18 until we run a predictor case and then we can decide on the rod pattern.	**SRO** directs the 1C05 operator to carry out the actions of the ARP for Rod Drift. 1C05 Operator respond to Rod Drift Annunciator. • Select the rod • Verify no rod motion
Event 4	Substitute the Rod Position in the RWM If contacted as the RE **Role-play** and allow the crew to substitute the rod position.	**SRO** after determining the correct rod position direct the 1C05 operator to substitute the rod position in the RWM 1C05 operator enters the substituted rod position in the RWM.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
When the control rod position has been substituted or as directed by the lead evaluator **Event 5**	Event 4 will be used to evaluate an Instrument/Component failure. The crew will respond to a failed excess flow check valve. **ET 4** Activate event trigger # 4: Verify the following become active **LO RR HS4642A[GREEN]** **AN:1C03B[29]** **Role play** as NSPEO and report that there is no indication of a leak on 1C121B if directed by the control room to go there. **NOTE:** PDIS 4642 is reading ZERO if asked. **Role play** as I&C: If requested to aid in trouble shooting say that you will go to the valve to look at it.	**BOP** • Report that the valve indicates dual. • Contact NSPEO and HP to determine if a leak exists. **SRO** determine that the XFV is inoperable. *Using Technical Specifications, determine that with LPCI loop select and HPCI both inoperable, HPCI or LPCI must be restored to operable status within 72 hrs.* The SRO will determine that an ESF actuation has occurred and a 4 hour notification will need to be performed. Exact portions of 10 CFR 50.72 and 10 CFR 50.73 need not be identified and the report does not need to be made. T.S. 3.3.5.1 Table 1 Function 2.J. T.S. 3.3.5.1 condition C3 24 hours to restore or LPCI subsystem is inop. T.S. 3.5.1.H 72 hours to restore HPCI or LPCI subsystems.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
As directed by the lead examiner, **Event 6**	Events 6 and 7 will evaluate an Instrument/Component failure causing a Group 3B isolation and the loss of alarm power to 1C05B **ET 1** Activate event trigger # 1:Verify the following malfunctions become active: **rm02re4131b** **an011c05b** If I&C is called for assistance **Role Play** as I&C Technician The Fuel Pool Rad Monitor has a bad card and we should be able to replace it within 30 minuets. **Event 7** Once the crew identifies the fuse to 1C05B is the likely cause for the alarm power failure tell the crew that fuse F2 is blown and fuses are on hand and F2 can be replaced. **Clear the malfunction for the loss of Alarm power to 1C05B.**	**SRO** Direct the BOP operator to determine the cause of the Group 3 isolation. **SRO** Direct the 1C05 operator to perform the actions AOP 302.2 "Loss of Alarm Power" **BOP** Recognize determine the cause of the Group 3 isolation is the failure of the Fuel Pool Rad monitor. **RO** determine that the loss of alarm power to 1C05B is either a fuse in the panel or a switch out of position. **SRO** determines that the CV-4371A is inoperable and complies with ACP 1410.7 and determines that it must be returned to operable within 72 hours or must be de-energized (and isolated). (TS 3.6.1.3.C) **SRO** should also determine that the group 3 isolation is a 4 hour reportable event in accordance with ACP 1402.3.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Once the Group 3 cause is identified and 1C05B power is restored or as determined by the Lead Examiner
 	
Grid Disturbance
 	
Event 8
 	
Event 9
	Begin the grid disturbance
	
	ET2
	Activate event trigger # 2: Verify the following become active
	
	ed03
	dg02a
	sw12b
	
	Role Play if called as the SOC and inform the crew that 10,000 MWE of generators in Illinois tripped.
	
	This will cause the grid voltage to drop to 80 % over 3 min.
	
	About 3 min after the grid disturbance, modify ed03 as follows
	
	ed03 Final Severity of **0.45**
	Ramped in over 60 sec.
	
	This will raise the grid voltage to about 90 %
	
	ROLE PLAY if called to look at the ESW breaker, inform the control room that the breaker door is blackened and the area smells strongly of burnt wires.
		The crew will diagnose the LOOP. (SRO 5.38)
		
		SRO will direct the following:
		• IPOI 5 be completed and that the follow-up actions for natural circulation be carried out. (SRO 4.21 &4.22)
		• AOP 301 for the loss of essential power. (SRO 5.38)
		
		RO will perform the following:
		• Carry out IPOI-5 immediate actions. (RO 93.22)
		• Carry out the actions of AOP 301
		• Carry out the actions of AOP 304
		  • Ask the SS if he should do AOP 358 when finished.
		  • Verify SBDGs carrying essential busses. (RO 19.01)
		  • Determine that the B EDG is running, but there is no B ESW pump running
		  • Crew should secure the B EDG when the A EDG is restored to bus 1A3.
		  • Determine that the A EDG is running and up to speed, however it did not auto transfer.
		  • Crew will manually load the A EDG to bus 1A3.
		
		(Critical)
		With electric power available but not supplying EOP required equipment, take manual actions to restore power to systems required to perform EOP actions.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 9 Continued	**Role play** as the SOC and inform the control room that there has been a severe grid transient, you currently have the grid voltage back up to about 90% and that's where it's going to stay for about an hour.	
As directed by the Lead Examiner. EOP 2 **Event 11** **Event 10**	When 1A3 is being supplied by the "A" SBDG. AND The crew has tripped the "B" SBDG OR Restored Off Site power to 1A4 **ET3** Activate event trigger # 3: Verify the following become active **rr15a .02 120** This will start a leak in the PC. Increase as required to ensure Drywell Sprays are initiated.	**Crew** will determines that the DW pressure and temperature are going up, and at 2 psig enter EOP 2. The SRO will direct and the ROs will perform the following actions: (RO 95.63, 95.64, SRO 6.63, 6.64) • Restore MCC 1B33 and 1B35 after the load shed • DW/T • Attempt to control temp < 150 by bypassing the main plant intake coils. • Place Defeat 4 in service. • RO reports that Defeat 4 did not work to increase the speed of the DW fans. • **While in the safe region of the drywell spray initiation limit, and before drywell temperature reaches 280 °F, initiate drywell sprays. (Critical).** • PC/P • Before the Torus reaches 11 psig, spray the Torus.

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
EOP 1		Crew recognize EOP-1 entry on 2 psig D/W. The **SRO** will direct and the RO's will perform the following actions of EOP 1 • Verify Group 1 isolation. (RO 95.44) • Verify Group 3A isolation. (RO 95.44) • Restore RPV level 170-211 inches. (RO 95.44) (SRO 6.44) • Override CV-4371A. (RO 95.46) (SRO 6.21.01) • Verify LLS stabilizes RPV pressure. (RO 95.46) (SRO 6.46)
AOP 358	Role-play as the Aux who is sent to restore RPS. When sent to the Essential Switchgear, report back the following: • The RPS MG sets are running satisfactorily. • The EPA breakers were tripped on under voltage. When directed to close the EPA s Perform the following: **Call up the RPS screen RP1, and reset EPAs.**	**OSS** will direct the AOP 358 be performed to reset the scram. (SRO 5.11). **RO** will perform the following actions to restore RPS. (RO 94.11) • Verify auto actions and manually initiate those that did not occur. • Verify reactor scram and perform IPOI 5 • Verify group 1 and control RPV pressure using these systems, (RCIC. HPCI, LLS, or ADS) • Verify Gr. 3 and place CV4371A in override at 1C35. • Direct the Aux to 1A3 & 4 Switchgear room to assist in trouble shooting RPS. • Suspend all electrical switching evolutions. • Break condenser vacuum • If RPS is de-energized and it's power sources are available, then restore RPS per OI 358, section 6.0. **RO** will reset the scram and perform applicable portions of OI 358 Attachment 4 to verify the scram is reset properly

SCENARIO TIME-LINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
END	Place the simulator in FREEZE when the following are complete: • RPS power has been restored • RPV pressure and level are stable. • DW sprays have been initiated • Operators have determined the need for thermal stratification actions. Have the OSS classify the event.	**OSS** will determine the proper classification is an FA1 due to DW pressure above 2 psig and not caused by a loss of DW cooling. (SRO 1.03)

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

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

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Decrease generator load by 60 MWe. **Event 1**	**SRO** Provide the 1C05 operator with a pre-evolution brief prior to reducing reactor power. **SRO** will direct the RO to reduce generator load by 60 MWe using the Reactor Recirculation System. **RO** will reduce generator load by 60 MWe using the Recirc System. • Reduce Recirc MG Set speed in small increments • Maintain balanced Recirc loop flows • Monitor APRMs, Main Steam Line flow, and Reactor Feedwater flow	**IPOI 3 Rev 55** Section 2.0 "Precautions and Limitations. Step 5 Section 3.0 " Power Change Guidelines" Step 1 Step 2 Step 3 Step 5 Step 6 Step 7 Step 9 Section 5.0 "Lowering Power to 35%." Step 1 Step 2 Step 3 Step 5	Power reduced with Recirc. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Startup of "A" RHRSW/ESW pumps.
 	
Event 2
	SRO Directs the BOP operator to startup "A" RHRSW and ESW pumps.
	BOP Startup the ESW System per OI-454.
	• Start "A" ESW Pump.
	  • Verify Red running light on
	  • Verify amps correct
	  • Verify flow >300 gpm
	  • Control ESW/RHRSW pit level.
	• **Verify flow greater than 300 gpm.**
	BOP Startup the "A" RHRSW pump in accordance with OI-416.
	• Place PDIC-2046(1947), RHRSW TO RHR ΔP controller in MANUAL and CLOSED.
	• Start "A" RHRSW pumps.
	• Adjust flow to attain between 2000 and 2600 gpm.
		OI-454 Rev 37
		Section 5.0
		Step
		1(a)
		2 N/A
		3(a)
		(b)
		4
		5(a)
		(b)
		6
		
		OI-416 Rev 26
		DFC 18780 in effect.
		Section 4.0
		Step
		1
		2
		3(a)
		4 N/A
		5
		6(a)
		(b)
		7(a)
		(b)
		8 N/A
		9
		10
			"A" ESW and "A" RHRSW pumps are running.
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS

Control Rod 18-35 losses position indication resulting in a rod drift annunciator.
 	
Event 3
	SRO Direct the RO to carry out the ARP actions for Rod Drift
	
	SRO possibly reviews AOP 255.1 for Abnormal Rod Control And Position Indications.
	
	SRO may direct the STP for RWM inop to be used.
	
	RO perform action IAW ARP 1C05A D-6 for Rod Drift.
	
	• Select the effected rod
	
	• Verify rod is not drifting
	
	• Verify rod position is lost at one notch
	
	  • Consult with OSS to substitute rod position
	
	  • Insert rod to check for position
	
	The crew may leave the rod at position 18 or return it to position 20 and again substitute the rod position.
	
	BOP possibly be assigned review of AOP 255.1 for abnormal rod control and position indications.
		ARP 1C05A D-6
		
		Step 3.1
		3.2
		3.3.a
		3.3.b
		3.3.c
		
		AOP 255.1
			Rod correctly identified and determined not to be moving.
			Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Substitute a Rod Position in RWM **Event 4**	**RO** Substitute the rod position per OI 878.8 Section 8.2 • Check Mode switch on RWM-CC in operate • Verify RWM OD is in operate • At RWM-OD press ETC key until SUBSTITUTE OPTION appears • Verify NEW POSITION TO SUBSTITUTE appears • Press INCREMENT POSITION or decrement position to select desired position • Press ENTER SUBSTITUTE key • Press EXIT.	**OI 878.8 Rev 15** Step 8.2 "Rod Position Substitution" 8.2 (1) (2) (3) (4) (5) (6) (7)	Rod position correctly substituted in the RWM-OD. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
XFV isolation and LPCI loop select inop **Event 5**	**BOP** Acknowledges annunciator 1C03C D-2, EXCESS FLOW CHECK VALVES SYSTEM "B" HI FLOW and responds as directed. At Panel 1C29, monitor excess flow lights to determine the effected instrument line. Notify the HP office and send an operator locally to determine the extent of the leak and isolate if possible. Refer to EFCV Surveillance to determine the effects of a closed XFV. If the System "B" instrument excess flow condition renders a system/component inoperative, notify Shift Supervisor and comply with the requirements of DAEC Tech. Specs. for the effected instrumentation. **SRO** will determine that the XFV is inoperable. *Using Technical Specifications, determine that with LPCI loop select and HPCI both inoperable, HPCI or LPCI must be restored to operable status within 72 hrs. This is the most conservative call and it is expected the OSS would request further clarification for 3.3.5.1 to allow 24 hours before calling LPCI Subsystem Inop.* The **SRO** will determine that an ESF actuation has occurred and a 4 hour notification will need to be performed. Exact portions of 10 CFR 50.72 and 10 CFR 50.73 need not be identified and the report does not need to be made.	**ARP 1C03C D-2** Step 3.1 Step 3.2 Step 3.3 Step 3.4 Step 4.2 Tech Spec. 3.3.5.1 Table 1 Function J 3.3.5.1 Condition C 3.5.1 Condition H is a possible T.S. call but not required for this condition and would not be required for 24 hours.	Determination of XFV 4642A and what it supplies. Sat_____ Unsat_____ Tech Spec determination. Sat_____ Unsat_____ 4 hour reportable determination. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Gr. 3 isolation **Event 6**	**BOP** Perform actions of ARP 1C05B, C-8 • Check amber lights on the PCIS Status board and determine that only a Group 3B Isolation has occurred. • Verify completion of the Group 3B Isolation. • Reopen CV-4371A • Determine the cause of the isolation. (Fuel Pool Rad Monitor failure) • The other Fuel Pool Rad monitor and other area rad monitors can be checked to verify the instrument has failed. There would also be several other alarms indicating an actual rad condition.	**ARP 1C05B (C-8)** Rev 16 Steps 3.1 3.2 3.3 3.4.a b c d 3.5 3.6 N/A 3.7. a b c d N/A 3.8 4.1	Recognition of failure Fuel Pool Rad Monitor. Sat_____ Unsat_____

Determine 1C05B has lost alarm power
 	
Event 7
	RO Determine that 1C05 B (C-8) did not alarm.
	• Perform an alarm test on 1C05 and determine 1C05 B has lost alarm power
	• Inform the OSS
	• Determine the cause
	  • Locate the alarm panel diagram in the AOP
	  • Use the diagram to determine likely cause
	  • Inspect components is the power path
	  • Replace fuse F2.
	• When power restored perform annunciator panel check.
		AOP 302.2 Rev 12
		Immediate Actions
		Step
		1
		Follow-up Actions
		Step
		1
		a
		b
		c
		d
		2
			Determine fuses F-1 or F-2 could be the possible cause.
			Sat_____ Unsat_____

	SRO should also determine that the group 3 isolation is a 4-hour reportable event in accordance with ACP 1402.3.		

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Grid disturbance/LOOP **Event 8(M)**	**SRO/BOP** • Suspend all evolutions in progress associated with electrical Switchgear and switching operations. • Restores power to 1A3 with the A SBDG **(SEE EVENT 9)** • Verify A SBDGs operations as follows: • Maintain SBDG volts adjusted to ≈4160. • Maintain SBDG frequency adjusted to 60 hertz. • Verify ESW pumps are running • Verify B SBDGs operations as follows: • Maintain SBDG volts adjusted to ≈4160. • Maintain SBDG frequency adjusted to 60 hertz. • Verify ESW pumps are running • BOP determines that the "B" ESW pump is not running. • Verify SBDG supply fans are running • The crew may try to restore power to 1A4 from off-site at this point and it is available.	**AOP 304, Rev 4** **AOP 301, Rev 34** Immediate Actions Step 1 2 a 3 4 N/A 5 Follow-up Actions Step 1 a N/A b c d e f g h i N/A j k l Local annunciator 1C94 (A-5) requires securing the SBDG if no cooling	Determine loss of 1A3 and perform actions to restore 1A3 with the "A" SBDG. Sat_____ Unsat_____ "B" SBDG is **not** allowed to trip on loss of ESW cooling water. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
Restoration of the A EDG **Event 9**	**BOP** • Determines that the EDG did not Automatically close on to 1A3, and proceeds to the Restoration section of the AOP. (**Critical**) • Determine that there is no lock out relay tripped. • Energize 1A3 as follows. • Transfer switch to Manual. • No EDG lock out trip. • No bus lock out. • Verify SBDG is running • Insert 'Sync Switch' for 1A311 and turn it on. • Re-energize the bus by closing in breaker HS for 1A3 to close. • Adjust speed to 60 Hz. • Adjust volts to 4160 volts. • Turn the 'Sync Switch' off • Verify ESW pump is running • Verify supply fan running • Complete operating checklist. • When the "A" SBDG is supplying 1A3, the crew should secure the "B" SBDG. • Restore bus 1A3 to normal including MCC 1B33 and 1B35 and RPS	**AOP 301 Rev 34** Step 1 2 a 1 2 3 4 N/A 5 6 7 8 9 10 11 12 13	Restore power to 1A3 with the "A" SBDG. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
LOOP (Reactor Scram) **Event 8(M)** **Continued**	**RO** • Insert a backup manual scram. • Place the mode switch in SHUTDOWN. • Verify neutron flux decreasing. • Control RPV level 170"- 211" • Verify Recirc runback to minimum. • Verify all rods Full-In. • Insert SRMs and IRMs	**IPOI-5, Rev.** Step 3.2.1 3.2.2 3.2.3 3.2.4 3.2.5 3.2.6 3.2.7	Perform IPOI 5 "SCRAM" Immediate Actions. Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
EOP 2 Event 11 is the LOCA **Event 11(M)** Event 10 is failure of Defeat 4. **Event 10**	**SRO** • Attempt to maintain D/W temperature < 150 • If the D/W cannot be maintained < 150, then install Defeat 4. • **BOP** – Determine defeat 4 failed. • **Before D/W air temperature reaches 280 deg. F, secure Recirc pumps, and spray the D/W with RHR pumps not required for adequate core cooling.** **(Critical)** • Before Torus Pressure reaches 11 psig, initiate Torus Spray with RHR pumps not required for adequate core cooling.	**EOP 2 Rev. 7** Step DW/T-1 DW/T-2, & 3. DW/T-4, & 5 **Defeat 4 Rev 6** Step 1 2 3 4 Failed PC/P-3 & 4.	Determine EOP 2 entry on Drywell temperature and EOP 1 and 2 entry on Drywell pressure Sat_____ Unsat_____ Determine Defeat 4 did not function properly. Sat_____ Unsat_____ Initiate Drywell sprays when it is determined drywell temperature can not be maintained below 280°F **(critical)** Sat_____ Unsat_____

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
LOOP and LOCA	**SRO** • Recognize EOP-1 entry on DW pressure. • Verify Group 1 isolation. • Verify Group 3 isolation. • Restore RPV level 170-211 inches. • Override CV-4371A • Verify LLS stabilizes RPV pressure.	**EOP-1, Rev.7** Step RC-3 Step RC-3 Step RC/L-1 Step RC/P-1 Step RC/P-2	

SCENARIO SEGMENT	CREW PERFORMANCE CRITERIA	PERFORMANCE REFERENCE	COMMENTS
AOP 358 Complete loss of RPS	**BOP** • Direct the Aux to 1A3 & 4 Switchgear room to assist in trouble shooting RPS • Suspend all electrical switching evolutions. • Verify auto actions and manually initiate those that did not occur. • Verify reactor scram and perform IPOI 5 • Evaluate RPS status • IF alternate RPS available shift to alternate • If Alternate not available shift to most reliable source • When RPS bus re-energized perform OI- 358 Appendix 4 • Verify Gr. 3 and place CV4371A in override at 1C35. • Reset Fuel Pool Rad Monitor • Resert Carbon Bed Vault Rad monitor • ResetScram • Depress PCIS Div 1 and Div 2 reset push buttons **NOTE** that the BOP will get a report from the AUX that the A MG set is shutdown due to the power problems. The Alternate is lined up to 1A3. Therefore he may have the Aux start up the "A" MG and close in the EPA s IAW OI 358 section 3.2	**AOP 358** Rev 19. Immediate Action Step 1 Step 2 Step 4 Step 5 Follow-up Actions Step 6 Step 7 Step 8 Follow-up Step 1 **OI 358A Appendix 4** Rev 41 Step 1 Step 2 Step 3 Step 4 Step 5 Step 6	RPS resorted. Note: Restoration of RPS is not required for completion of this scenario but may be an action taken during the LOOP action. Sat_____ Unsat_____

CREW GRADING ATTACHMENT

ESG ___ILC 15_____ Rev. ___0____

Operator Name	Position	Evaluator
	Shift Manager	
	Shift Supervisor	
	STA	
	Reactor Operator	
	1st Assistant	
	B.O.P. 1st Assistant	

Management Representative/Lead Evaluator _____

Crew Critical Tasks

Task Statement	SAT	UNSAT
1. **With electric power available but not supplying EOP required equipment, take manual actions to restore power to systems required to perform EOP actions.**		
2. **While in the safe region of the drywell spray initiation limit, and before drywell temperature reaches 280 °F, initiate drywell sprays.**		
3.		
4.		
5.		
6.		

Individual Competency Identifiers

1.

2.

3.

Attach to crew grading worksheet, OTI-105, Attachment 12 when complete.

OSG VALIDATION CHECKLIST

Scenario # ESG ILC 15 Rev. 0

1 ____ Verify that if not run from a protected IC that setup information is provided to reproduce the stated initial conditions.

2 ____ Verify that all stated objectives are identified in the body of the OSG.

3 ____ Verify that turn over sheets are completed, and are in agreement with both the narrative summary and shift turnover information sheet. Turn over sheets are not required for initial license scenarios.

4 ____ Verify that if the scenario requires documents to be provided to the crew, that they are filled out as appropriate (i.e., if an STP is used, it is filled out).

5 ____ If this is the initial validation or the revision affects ramp times, event triggers, malfunctions, overrides, remote functions or procedure changes could affect the scenario, then validate the scenario for proper response using a crew. It is preferable to use a crew unfamiliar with the scenario whenever possible. Verify the following while running the scenario:

- The scenario runs as written and all tasks are performed.
- The stated time line agrees with actual times.
- Critical task statements clearly define the expected plant and student response. They should also be written so that they are achievable as written. If any question exists, it is preferable to have operations management participate in the validation.
- Anticipated instructor role play/cues are identified
- Management expectations are captured and re-enforced.
- Verify administrative documentation requirements (i.e., CMARs / ARs) are identified.
- Verify reportability requirements (i.e., ESF actuations) are identified.
- Verify Technical Specification items / LCO declarations are correct.
- If procedure steps may cause confusion or disagreement between higher-level procedures and OIs/ARPs that operations management is consulted.

6 ____ Shutdown scenarios include shutdown risk assessment, time to boil calculations, and shutdown status board information.

SME/Instructor	Date
SME/Instructor	Date
SME/Instructor	Date