

**JAMES A. FITZPATRICK NUCLEAR POWER PLANT
NRC INITIAL LICENSE EXAMINATION SCENARIO 1
17 MAY 2005**

TITLE: LOI-05-01 NRC EXAMINATION SCENARIO 1, TORUS RUPTURE/ATWS, EOP-3/4/5

SCENARIO NUMBER: NEW

PATH:

SCENARIO NEEDS TO BE RESNAPPED WITH STABLE INITIAL CONDITIONS.

INVESTIGATE FAILURE OF RB-TORUS VACUUM BREAKER ANNUNCIATOR

NEED TO REVALIDATE THE REVISIONS FROM THE OPS VALIDATION.

	CANDIDATES
CRS	
SRO With Command	
SNO Primary At The Controls Operator	
SNO1 Primary 09-5 Operator	

RECORD OF CHANGES

[illegible]

A. **TITLE:** LOI-05-01 NRC EXAMINATION SCENARIO 1, TORUS RUPTURE/ATWS, EOP-3/4/5

B. **SCENARIO SETUP:**

1. Initial Protected IC 132

2. Special Instructions:

- a. Plant operating normally at 100% CTP
- b. "A" RHR in Torus Cooling Mode with "A" RHR and "A" RHR/SW pumps in service.
- c. "A" EHC pump in service

3. Preset Conditions:

- a. TRIGGER 2, SW04:A, RHR/SW Pump A Trip
- b. TRIGGER 4, NM14:C, APRM C Failure as is at 100%
- c. TRIGGER 7, RH10:A, RHR Pump Suction Line Break, 50% over 600 seconds
- d. Preset, RD22:A and B, E and W SDV Hydraulic Block, 60%
- e. Preset, SL03:A and B, SLC pump A and B Relief Valve Lift.
- f. TRIGGER 9, SL01:A and B, SLC pump A and B Breaker Trip
- g. TRIGGER 10, TC02:B, B EHC Pump Trip
- h. TRIGGER 12, TCO2:A, "ALPHA" EHC PUMP

4. Consumable Forms and Procedures:

- ◆ ST-20B, Control Rod Operability For Partially Withdrawn Control Rods, Pre-Marked up for performance
- ◆ AOP-9, Loss of Primary Containment
- ◆ AOP-1, Reactor Scram

C. **SCENARIO SUMMARY:**

The scenario will begin with the plant operating normally at 100% Core Thermal Power. HPCI surveillance testing has just been completed and the Torus Cooling Mode of RHR is to be secured. During the shutdown of the Torus Cooling Mode, the "A" RHR/SW pump will trip. Dispatch of the NPO will produce a local report of "A" RHR/SW pump breaker charring. The CRS will declare the RHR/SW Subsystem inoperable. Per Reactor Engineer's guidance, a power reduction to 95% will then be commenced for performance of ST-20B. During the power reduction, "C" APRM will not respond as expected. The APRM will be declared inoperable and bypassed. A NPO performing rounds will report a sizable EHC leak in the running "A" EHC pump discharge filter. The crew will swap the running EHC pumps isolating the leak. A rupture in the Torus shell will then start a slow reduction in Torus Water Level. AOP-9 may be entered momentarily resulting in immediate direction to enter EOP-4/EOP-5. EOP-4 will be entered on low Torus water level and EOP-5 will be entered on High Sump/Floor Water Level in the Crescent Area. Local investigation will reveal that the leak is isolable and isolation actions will commence. Before Torus Water Level reaches 10.75 feet, HPCI will be tripped and a manual scram inserted. Shortly after the manual scram occurs, the leak will be reported isolated. The manual scram will result in a power reduction to 40-50% due to a blockage in the SDIV(s). EOP-2 will be entered then exited to EOP-3 resulting in a start of either SLC pump. SLC injection will fail resulting in a manual start of the other SLC pump which will also fail. The Level/Power Control contingency will be exercised by first terminating and preventing injection sources followed by re-injection at a reduced RPV water level. A loss of the remaining EHC pump will result in a turbine trip and a loss of the bypass valves shortly thereafter. This will force transitioning pressure control to the SRV's and trending the approach to the Boron Injection Initiation Temperature (BIIT). If BIIT is reached, another Terminate and Prevent will result in RPV water level control at an even lower level. Timely action to complete rod insertion may avoid exceeding BIIT. The control rod insertion success path will require resetting the scram signal, draining the SDIV(s) and re-inserting a manual scram. Control rod insertion while the SDIV's are draining will occur. Upon inserting the second manual scram, all control rods will be reported full-in and the scenario will be terminated.

Shift Turnover

Operating normally at 100% CTP; RHR Loop "Alpha" in Torus Cooling Mode; HPCI Surveillance Testing recently completed successfully; Torus Cooling needs to be secured; Then, reduce power to 95% using recirculation flow per Reactor Engineer's guidance and perform ST-20B.

Critical Tasks/Standards

Critical Task #1: Isolate the torus leak prior to torus level dropping to 9.58 feet.

Critical Task #2: Terminate / Prevent RPV injection sources per EP-5. Reinject to maintain RPV water level 0-100 inches.

Critical Task #3: Control rod insertion per EP-3 until all rods are in

Critical Task #4: (Potential if Critical Task #3 not timely) Terminate / Prevent RPV injection sources when BIIT is exceeded per EP-5. Reinject to maintain RPV water level -19 to the level at which reinjection is cued.

EVENT NO.	EVENT SEQUENCE
1.	Secure Torus Cooling Lineup. (Normal evolution)
2.	Running RHR/SW Pump Trip. (Technical Specification)
3.	Power reduction to 95%. (Reactivity Manipulation)
4.	"C" APRM fails to respond to power change (Instrument Failure)
5.	"C" APRM Inoperable (Technical Specification)
6.	"A" EHC Pump Discharge Leak (Component Failure)
7.	Lowering Torus Water Level. (Component Failure)
8.	ATWS on SDIV Blockage (Major Transient)
9.	SLC Pump Start Failure. (Component Failure)
10.	EHC Pump Trip (Component Failure)
11.	Level/Power Control (Major Transient)

D. TERMINATION CUES:

1. All Rods In

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	Walkdown the control panels and assume the watch.	SAT / UNSAT / NA
	CRS	Provide crew brief. Order RHR Loop "A" Torus Cooling secured	SAT / UNSAT / NA
	SNO	Obtain OP-13B Section F.1:	SAT / UNSAT / NA
	SNO	♦ At 09-3, Close 10MOV-34A	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure 10MOV-16A opens when loop flow <1500 gpm	SAT / UNSAT / NA
	SNO	♦ Continue RHR Loop "A" Shutdown per F.7	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure RHR Loop "A" Keep-Full Pump Running	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure closed <ul style="list-style-type: none"> ○ 10MOV-34A ○ 10MOV-38A ○ 10MOV-31A 	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Instructor Note: Upon securing "A" RHR Pump, ACTIVATE TRIGGER 2 "A" RHR/SW Pump Trip	SNO	♦ At 09-3, Secure RHR Pump "A".	SAT / UNSAT / NA
	SNO	♦ Report to CRS that RHR/SW "A" tripped.	SAT / UNSAT / NA
	SNO	♦ Dispatch NPO(s) to investigate RHR/SW pump trip	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure Closed <ul style="list-style-type: none"> ○ 10MOV-39A ○ 10MOV-26A 	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure open 10MOV-16A	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure open 10MOV-66A	SAT / UNSAT / NA
	SNO	♦ At 09-3, Close 10MOV-89A	SAT / UNSAT / NA
Instructor Role Play: As NPO report to SNO that "A" RHR/SW pump breaker is charred and tripped	SNO	Report "A" RHR/SW status to CRS	SAT / UNSAT / NA
	CRS	Declare 'A' RHR/SW Pump inoperable ♦ TS 3.7.1 Condition A. 30 days to restore to operable	SAT / UNSAT / NA
	CRS	Order power reduction to 95% for performance of ST-20B	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Instructor Note: Just prior to the first recirc flow adjustment, verify "C" APRM as is failure value and ACTIVATE TRIGGER 4 "C" APRM Fails to respond	SNO	Obtain OP-27, Section E.2: ♦ Review RAP-7.3.16 for rate limitation of 200 MWth/min	SAT / UNSAT / NA
	SNO	♦ At 09-4, Alternately reduce each recirculation pump MG set speed in 1-3% increments	SAT / UNSAT / NA
	SNO/SNO1	♦ At 09-5, Monitor reactor power and core flow between adjustments	SAT / UNSAT / NA
	SNO/SNO1	Report that "C" APRM is not tracking with the others.	SAT / UNSAT / NA
	CRS	Order "C" APRM Bypassed	SAT / UNSAT / NA
	SNO	Obtain OP-16, Section E.16:	SAT / UNSAT / NA
	SNO	♦ At 09-5, place APRM Bypass Switch in "C" position	SAT / UNSAT / NA
	SNO	♦ At 09-5 and/or EPIC confirm "C" APRM bypass indications	SAT / UNSAT / NA
	SNO	♦ At 09-5 and/or EPIC confirm "A" and "E" APRM bypass indications are OFF	SAT / UNSAT / NA
	CRS	Declare "C" APRM Inoperable ♦ TS Table 3.3.1.1-1, No action required ♦ TRM Table T3.3.B-1, No action required.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Instructor Role Play: As NPO report to the SNO that there is a sizable EHC leak spraying from the "A" EHC pump discharge filter. The leak is not onto any equipment.	SNO	Relay report to CRS	SAT / UNSAT / NA
	CRS	Order swapping EHC to "B" pump in service	SAT / UNSAT / NA
	SNO	Obtain OP-8, Section G.1:	SAT / UNSAT / NA
	SNO	♦ At 09-7, Start "B" EHC pump	SAT / UNSAT / NA
	SNO	♦ At 09-7, Wait 30 seconds and verify red light above "B" EHC pump test pushbutton is on	SAT / UNSAT / NA
Instructor Note: ACTIVATE TRIGGER 12 "A" EHC Pump Breaker Trip Instructor Role Play: As NPO report to the SNO that the EHC leak has stopped	SNO	♦ At 09-7, Stop "A" EHC pump while monitoring "B" EHC pump amps and system pressure.	SAT / UNSAT / NA
Instructor Note: ACTIVATE TRIGGER 7 Torus Rupture	ANY/ALL	Report that Torus Water Level is lowering	SAT / UNSAT / NA
	CRS	Order NPO(s) dispatched to investigate.	SAT / UNSAT / NA
	SNO	Dispatch NPO(s) to investigate	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ANY/ALL	Recognize and report EOP-4 and 5 entry conditions <u>EVALUATOR NOTE:</u> AOP-9 may also be entered without substantive action required.	SAT / UNSAT / NA
	CRS	Announce entry into EOP-4 and 5	SAT / UNSAT / NA
Instructor Role Play: As NPO report a large packing leak in the Torus room coming from 10MOV-151A. You believe you can isolate the leak.	SNO	Relay report to CRS	SAT / UNSAT / NA
CRITICAL TASK #1: ISOLATE THE TORUS LEAK			
Instructor Note: DELAY CLOSURE UNTIL MANUAL SCRAM RFI-RH11 to 0%	CRS	Order 10MOV-151A closed	SAT / UNSAT / NA
	SNO	Dispatch NPO to close 10MOV-151A	SAT / UNSAT / NA
CRITICAL TASK #1 STANDARD: Torus Leak isolated prior to torus level dropping to 9.58 feet.			SAT / UNSAT / NA
	CRS	From EOP-5, order operation of all RBFDS pumps	SAT / UNSAT / NA
Instructor Role Play: Report that both RBFDS pumps are running	SNO/SNO1	Call Radwaste to confirm both RBFDS pumps running.	SAT / UNSAT / NA
	CRS	From EOP-5, order operation of all available Reactor Building Area Coolers	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	At 09-75, Start 4 more crescent area unit coolers in each crescent <u>EVALUATOR NOTE:</u> This action may be accomplished by dispatching a NPO to.	SAT / UNSAT / NA
	CRS	From EOP-4 order restoration of Torus level per OP-13B using the "B" Loop of RHR	SAT / UNSAT / NA
	SNO	Obtain OP-13B, Section G.4:	SAT / UNSAT / NA
Instructor Note/Role Play: RFI-RH47 or 46 to 100% Report 10RHR-260 Open	SNO	♦ Dispatch NPO to open 10RHR-274 ("A") or 260 ("B")	SAT / UNSAT / NA
	SNO	♦ At 09-3, Open 10MOV-166A or B and 10MOV-167A or B	SAT / UNSAT / NA
	CRS	Order SNO to reestablish drywell to torus d/p <u>EVALUATOR NOTE:</u> This action is not a priority and may not be performed.	SAT / UNSAT / NA
Instructor Note/Role Play: Using the containment vent and purge mimic, align the system as directed per OP-37 E.2 or E.3 Report complete:	SNO	If ordered, obtain OP-37 Section E.2 or E.3 and establish drywell makeup <u>EVALUATOR NOTE:</u> This action is not a simulator capability. It is accomplished by candidate communication with the simulator console operator.	SAT / UNSAT / NA
	CRS	Determine that torus water level cannot be maintained above 10.75 feet.	SAT / UNSAT / NA
	CRS	Order the HPCI Turbine Tripped	SAT / UNSAT / NA
	SNO	At 09-3, Depress HPCI Turbine Trip Pushbutton	SAT / UNSAT / NA
	CRS	Enter EOP-2 and order a Manual Scram	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Instructor Note: When manual scram is inserted: RFI-RH11 to 0%	SNO1	At 09-5, Commence AOP-1 Immediate Actions: <ul style="list-style-type: none"> • Depress Manual Scram pushbuttons • Reactor Mode Switch to Shutdown • Fully Insert all SRM's and IRM's • Verify all rods in (multiple rods out) • Initiate ARI • Verify SDIV Vent and Drain valves closed • Verify APRM's downscale (Will NOT be downscale) • (At 09-6) Verify at least 1 Circ Water pump running • (At 09-4) Verify at least 1 Recirc Pump is running. 	SAT / UNSAT / NA
	CRS	Order SNO/BOP to level control with Feed/Condensate at 177-222.5 inches.	SAT / UNSAT / NA
	SNO	At 09-5 and 09-4, Recognize ATWS conditions, trend level performance and manipulate GEMAC Master/Individual controllers, RFP discharge valves and RFP trip as necessary to control level.	SAT / UNSAT / NA
	SNO1	Report multiple rods out and post scram power level 50 - 60%	SAT / UNSAT / NA
	CRS	Exit EOP-2, Enter EOP-3	SAT / UNSAT / NA
	CRS	Confirm Reactor Mode Switch in SHUTDOWN	SAT / UNSAT / NA
	SNO1	Report Reactor Mode Switch in Shutdown	SAT / UNSAT / NA
	CRS	Confirm ARI initiated	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO1	Report ARI Initiated	SAT / UNSAT / NA
	CRS	Order Recirculation Flow reduced to minimum	SAT / UNSAT / NA
	SNO1	At 09-4, reduce both Recirculation Flow Controllers to minimum	SAT / UNSAT / NA
	CRS	Determine reactor power above 2.5% and order both Recirculation Pumps tripped	SAT / UNSAT / NA
	SNO1	At 09-4, place both Recirculation Drive Motor Breaker Control Switches in Pull-To-Lock.	SAT / UNSAT / NA
	CRS	Order override ADS	SAT / UNSAT / NA
	SNO1	At 09-4, select ADS override switches (2) to override. Verify annunciator and white lamp.	SAT / UNSAT / NA
	CRS	Order SLC Injection	SAT / UNSAT / NA
Instructor Note: Upon start of either SLC pump, delete that pump from TRIGGER 9	SNO1	At 09-3 select SLC Control Switch to "A" or "B" and confirm injection indications <u>EVALUATOR NOTE</u> The first SLC pump will successfully start yet will not inject due to the discharge relief valve lifting. The second SLC pump will fail to inject due to breaker trip.	SAT / UNSAT / NA
	SNO1	Report to CRS that the first SLC pump has failed to inject.	SAT / UNSAT / NA
	CRS	Order SLC injection on the alternate pump.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Instructor Note: Upon start of either SLC pump, ACTIVATE TRIGGER 9	SNO1	At 09-3 select SLC Control Switch to the other pump "A" or "B" and confirm injection indications	SAT / UNSAT / NA
	SNO1	Report to CRS that the SLC pump breaker has tripped.	SAT / UNSAT / NA
	CRS	Order SLC injected with CRD per EP-4	SAT / UNSAT / NA
Instructor Role Play: Acknowledge order to commence EP-4. No actions will be performed.	SNO1	Dispatch NPO to commence EP-4 field actions.	SAT / UNSAT / NA
	CRS	Assign either operator pressure control with EHC at 900 to 1000 psig	SAT / UNSAT / NA
	SNO/SNO1	At 09-5, Monitor RPV pressure and Bypass Valve operation.	SAT / UNSAT / NA
CRITICAL TASK #2: TERMINATE / PREVENT AND RE-INJECT TO MAINTAIN 0 -100 INCHES			
	CRS	Order T/P all injection except SLC, CRD and RCIC per EP-5. Terminate high pressure sources first. Identify reinjection source as feedwater with a level band of 80-100" and caution against rapid level changes during reinjection.	SAT / UNSAT / NA
	SNO	Obtain EP-5:	SAT / UNSAT / NA
	SNO	♦ At 09-3, Depress HPCI Turbine Trip Pushbutton	SAT / UNSAT / NA
	SNO	♦ At 09-5, Select both RFP GEMAC Controllers to Manual	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	♦ At 09-5, Reduce both RFP GEMAC Controllers to Minimum	SAT / UNSAT / NA
	SNO	♦ At 09-6, Ensure both RFP Min Flow Valves are Open	SAT / UNSAT / NA
	SNO	♦ At 09-6, As necessary, adjust RFP speed, Feedwater Startup Valve position and RFP Discharge Valve position to maintain level 80-100 inches. Exercise caution against rapid level rise.	SAT / UNSAT / NA
	SNO	As time allows:	SAT / UNSAT / NA
	SNO	♦ At 09-3, Place both 14MOV-11A and B Auto Actuation Bypass switches in Bypass.	SAT / UNSAT / NA
	SNO	♦ At 09-3, Verify both white Auto Actuation Bypass lamps are lit.	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure closed 14MOV-11A and B	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure both Core Spray pumps are stopped	SAT / UNSAT / NA
	SNO	♦ At 09-3, Place both 10MOV-27A and B Auto Control Bypass switches in Bypass.	SAT / UNSAT / NA
	SNO	♦ At 09-3, Verify both white Auto Control Bypass lamps are lit.	SAT / UNSAT / NA
	SNO	♦ At 09-3, Ensure closed 10MOV-27A and B	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	<ul style="list-style-type: none"> At 09-3, Ensure RHR pumps not required to be running are stopped <u>EVALUATOR NOTE</u> The CRS may determine that pumps are required for Torus Cooling.	SAT / UNSAT / NA
CRITICAL TASK #2 STANDARD: Terminate / Prevent RPV injection sources per EP-5. Reinject to maintain RPV water level -19 to 110 inches.			SAT / UNSAT / NA
	CRS	Assign either operator to hang MSIV Low Water Level Jumpers per EP-2	SAT / UNSAT / NA
Instructor Note: RP17A-D "IN" or CAE-MSIVLEVEL	SNO/SNO1	Dispatch NPO to hang MSIV Low Water Level Jumpers	SAT / UNSAT / NA
CRITICAL TASK #3: CONTROL ROD INSERTION (MANUAL SCRAMS and RMCS)			
	CRS	Order control rods inserted per EP-3	SAT / UNSAT / NA
	SNO1	Obtain copy of EP-3 and determine success path to be Manual Scrams or driving with RMCS:	SAT / UNSAT / NA
Instructor Note: RP20 "TEST"	SNO1	<ul style="list-style-type: none"> Dispatch NPO to place ARI in Div I Pressure 	SAT / UNSAT / NA
	SNO1	<ul style="list-style-type: none"> Confirm ARI valves are closed 	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Instructor Note/Role Play: Candidate will page himself: Upon calling, Access Remote Functions RP21:A1,A2,B1 and B2 "IN" or CAE-RPSJUMPERS Report jumpers installed	SNO1	<ul style="list-style-type: none"> At 09-15 and 09-17, install jumpers to override all automatic scram signals. <u>EVALUATOR NOTE</u> Not a simulator capability. Simulated by candidate phoning the instructor console to complete the action.	SAT / UNSAT / NA
	SNO1	<ul style="list-style-type: none"> At 09-5, place SDIV Hi Level Trip Bypass Switch in Bypass 	SAT / UNSAT / NA
Instructor Note: After Scram Reset, Delete preset malfunctions RD22A and B	SNO1	<ul style="list-style-type: none"> At 09-5, Place Scram Reset Switch in 2-3 then 1-4 and confirm all 8 group lights are lit. 	SAT / UNSAT / NA
Instructor Note: When the scram is reset ACTIVATE TRIGGER 10	SNO1	<ul style="list-style-type: none"> While the SDIV's are draining pursue RMCS rod insertion 	SAT / UNSAT / NA
	ANY/ALL	Recognize and report EHC pump trip	SAT / UNSAT / NA
	CRS	Order pressure control shifted to SRV's at 800-1000 psig	SAT / UNSAT / NA
	SNO	At 09-4, Operate SRV's open and closed as necessary to maintain pressure band	SAT / UNSAT / NA
	CRS	Recognize and trend approach to BIIT.	SAT / UNSAT / NA
	SNO1	Insert control rods with RMCS per EP-3:	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO1	♦ Place RWM keylock switch in Bypass	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Raise drive D/P by any of the following: <ul style="list-style-type: none"> ○ Start second CRD pump ○ Close Drive PCV ○ Raise CRD system flow ○ Dispatch NPO to close CRD pump min flow valves. 	SAT / UNSAT / NA
	SNO1	♦ Select control rods in sequence of Attachment 1/2	SAT / UNSAT / NA
	SNO1	♦ Insert rods with Rod Movement Control or Rod Emergency In Switch.	SAT / UNSAT / NA
	SNO1	When SDIV's are drained, Insert a manual scram	SAT / UNSAT / NA
CRITICAL TASK #3 STANDARD: Control rod insertion per EP-3 until all rods are in			SAT / UNSAT / NA
CRITICAL TASK #4: TERMINATE / PREVENT AND RE-INJECT TO MAINTAIN 0 -100 INCHES			
	CRS	<p>If BIIT exceeded while power is > 2.5%:</p> <p>Order T/P all injection except SLC, CRD and RCIC per EP-5. Terminate high pressure sources first. Identify reinjection source as feedwater with a level band of -19" to the level at which injection may recommence. Caution against rapid level changes during reinjection.</p> <p><u>EVALUATOR NOTE</u></p> <p>Timely earlier actions to insert control rods may avoid the need to perform this terminate and prevent activity.</p>	SAT / UNSAT / NA
	SNO	♦ At 09-5, Reduce both RFP GEMAC Controllers to Minimum	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION SNO	OPERATOR ACTIONS/STANDARD ♦ At 09-3, confirm all other terminate and prevent actions are complete	COMMENTS/EVALUATION SAT / UNSAT / NA
	CRS	When Rx Power <2.5%, or RPV level at TAF (0") or SRV's will remain closed order injection with feedwater at a level band of current RPV level to -19".	SAT / UNSAT / NA
	SNO	At 09-6, As necessary, adjust RFP speed, Feedwater Startup Valve position and RFP Discharge Valve position to maintain level 80-100 inches. Exercise caution against rapid level rise.	SAT / UNSAT / NA
CRITICAL TASK #4 STANDARD: Terminate / Prevent RPV injection sources when BIIT is exceeded per EP-5. Reinject to maintain RPV water level -19 to the level at which reinjection is cued			SAT / UNSAT / NA
	SNO1	Verify and report All Rods In	SAT / UNSAT / NA

TERMINATE THE SCENARIO

ATTACHMENT 1

Shift Turnover

Operating normally at 100% CTP

HPCI Surveillance Testing recently completed successfully

RHR Loop "Alpha" in Torus Cooling Mode; Torus Cooling needs to be secured

Then, reduce power to 95% using recirculation flow per Reactor Engineer's guidance and perform ST-20B.

**JAMES A. FITZPATRICK NUCLEAR POWER PLANT
NRC INITIAL LICENSE EXAMINATION SCENARIO 2
18 MAY 2005**

TITLE: LOI-05-01 NRC EXAMINATION SCENARIO 2, SRV Tailpipe Leak In Torus/EOP-2/4/ED

SCENARIO NUMBER: NEW

PATH:

SCENARIO NEEDS TO BE RESNAPPED WITH MALFUNCTION REVISIONS.

RESNAP WITH RFP B 100 VALVE CLOSED AND FCV-137 FULL OPEN

NEED TO REVALIDATE THE REVISIONS FROM THE OPS VALIDATION.

	CANDIDATES
CRS	
SRO With Command	
SNO Primary At The Controls Operator	
SNO1 Primary 09-5 Operator	

RECORD OF CHANGES

[illegible]

- A. **TITLE:** LOI-05-01 NRC EXAMINATION SCENARIO 2, SRV Tailpipe Leak In Torus/EOP-2/4/ED
- B. **SCENARIO SETUP:**
1. Initial Protected IC 133 Base IC 006
 2. Special Instructions:
 - a. Plant operating at ~5% CTP. Plant startup in progress.
 - b. FWLC in Automatic on the Master Controller with the "B" RFP in service.
 - c. "B" CRD Pump in service.
 - d. "B" Circulating Water Pump in service. "A" secured and available.
 - e. The A-1 Waterbox is out of service per OP-4 Section E to support single CW pump operation.
 3. Preset Conditions:
 - a. PRESET, RFI-MC01, Close, (Condenser A-1 Inlet Isolation)
 - b. PRESET, RFI-MC05, Close, (Condenser A-1 Outlet Isolation)
 - c. TRIGGER 2, RR19:B, Controlling FWLC Transmitter Downscale Failure
Initially to 53%, then to 0% over 600 seconds
 - d. TRIGGER 4, RD12:42-39, Control Rod Scram.
 - e. TRIGGER 6, ED18:A, Loss of 10500 Bus
 - f. TRIGGER 7, AD08:C, "C" ADS SRV Stuck Open.
 - g. TRIGGER 7, AD05:C, "C" ADS SRV Seat Leakage (100% over 300 seconds)
 - h. TRIGGER 7, AD06:C, "C" ADS SRV inadvertent opening on 300 second TD
 - i. TRIGGER 7, Override "C" SRV Red Lamp off on 299 second TD
 - j. TRIGGER 9, MS16:C, "C" ADS SRV Discharge Line Rupture (100% over 600 seconds)
 - k. TRIGGER 10, RH01:D, "D" RHR Pump Trip
 - l. TRIGGER 12, TC04:A-D at 0%. All Bypass Valves failed closed.
 4. Consumable Forms and Procedures:
 - ◆ AOP-1, Reactor Scram
 - ◆ AOP-36, Stuck Open Relief Valve(s)
 - ◆ AOP-18, Loss of 10500 Bus

C. **SCENARIO SUMMARY:**

Commitment Document:

The scenario will begin with a reactor startup in progress at ~5% Core Thermal Power. Turnover information will indicate that repairs to the 'A' Circulating Water Pump have just been completed. The crew will be directed to place the 'A' CW pump in service and secure 'B'. The "selected" Reactor Water Level Transmitter will fail downscale resulting in a slow rise in RPV Water Level. The crew will take manual control of RPV water level, swap level columns and return to automatic level control. The CRS will declare the failed transmitter inoperable. An airline rupture will result in a single control rod scram. The CRS will declare the control rod inoperable. A 4160 VAC bus loss will remove / degrade the containment cooling function. Operator actions will protect the A and C EDG's and complete the reactor building isolation. An SRV will develop growing seat leakage that will eventually result in an inadvertent opening (industry OE) requiring the crew to manually scram the reactor. The SRV tailpipe will develop a leak into the torus air space resulting in EOP-2 and EOP-4 entry. Upon shifting the "B" loop of RHR to Torus Spray, the only RHR pump in that loop will trip unexpectedly. This will force the crew to conclude that an Emergency Depressurization (contingency) is or will soon be required. The scenario will terminate upon the opening of 7 ADS valves.

Shift Turnover

Reactor Startup In-Progress at ~5% CTP; Currently at OP-65, Step D.19; Reactor Mode Switch In "Startup". The "Alpha" Circulating Water Pump Has Just Been Repaired; Start Up "Alpha" CW Pump and Secure "Bravo" CW Pump for Inspection. The A-1 Waterbox is out of service per OP-4 Section E to support single CW pump operation. Continue Power Ascent to 25% CTP Using Control Rods; Reactor Engineer is present in Control Room.

Critical Tasks

Critical Task #1: Respond to 06LI-94B Failure by taking manual control of RPV level per AOP-41. Maintain RPV water level 196.5 to 206.5 inches.

Critical Task #2: Manual Scram on SRV Opening per AOP-36 before torus water temperature exceeds 110 °F.

Critical Task #3: Complete RPV depressurization as directed by EOP-2 and 4 to prevent torus pressure from exceeding the Pressure Suppression Pressure (PSP) limit.

EVENT NO.	EVENT SEQUENCE
1.	Swap Circulating Water Pumps. (Normal evolution)
2.	FWLC Controlling (B) Level Transmitter Fails Downscale. (Instrument Failure)
3.	FWLC Controlling (B) Level Transmitter Inoperable (Technical Specification)
4.	Single Control Rod Scram on airline rupture (Component Failure)
5.	Control Rod declared inoperable (Technical Specification)
6.	Loss of 10500 Bus (Component Failure)
7.	"C" ADS SRV Leakage followed by Mechanical Opening. (Component Failure)
8.	Manual Scram, EOP-2 (Major Transient)
9.	"C" ADS SRV Tailpipe Failure in Torus Air Space, EOP-4. (Component Failure)
10.	"D" RHR Pump Trip (shortly after starting). (Component Failure)
11.	Emergency Depressurization (Major Transient)

D. TERMINATION CUES:

1. 7 ADS Valves Open

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	Walkdown the control panels and assume the watch.	SAT / UNSAT / NA
	CRS	Provide crew brief. Order "A" CW pump started and "B" secured	SAT / UNSAT / NA
	SNO	Obtain OP-4, Section G.5, Step G.5.3:	SAT / UNSAT / NA
	SNO	♦ At 09-6, Place 36P-1A Control Switch in START	SAT / UNSAT / NA
	SNO	♦ At 09-6, Observe 36MOV-100A opening followed by the start of 36P-1A.	SAT / UNSAT / NA
	SNO	♦ At 09-6, Verify stable pump amperage on 36P-1A.	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY Report pump discharge pressure at 12 psig	SNO	♦ Contact NPO to verify pump discharge pressure ~ 12 psig	SAT / UNSAT / NA
	SNO	♦ At 09-16, Verify 4 white lamps lit at the RPS A and B Power Source Selector Switches.	SAT / UNSAT / NA
	SNO	♦ At 09-6, Place 36P-1B Control Switch to STOP	SAT / UNSAT / NA
	SNO	♦ At 09-6, Verify 36MOV-100B Fully Closes.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	♦ At 09-6, Verify 36P-1B Amperage is zero	SAT / UNSAT / NA
INSTRUCTOR NOTE: Trigger 2, "B" FWLC Level Transmitter Failure Attempt to trigger such that SNO responds to initial level transient.	ANY/ALL	Recognize and report High RPV Water Level	SAT / UNSAT / NA
CRITICAL TASK #1: CONTROL RPV WATER LEVEL IN MANUAL			
	CRS	Announce entry into AOP-41 and order SNO to complete the actions of AOP-41 EVALUATOR NOTE May provide a direct order to place FWLC in Manual prior to ordering the actions of AOP-41. Reference AP-12.03, 8.9.3.C.	SAT / UNSAT / NA
	SNO/SNO1	At 09-5, select 06LC-83 or 06-84B to MANUAL. Stabilize/Control RPV Water Level in the Green Band using manual control potentiometer.	SAT / UNSAT / NA
CRITICAL TASK #1 STANDARD: Respond to 06LI-94B Failure by taking manual control of RPV level per AOP-41. Maintain RPV water level 177 to 222.5 inches (above scram and below turbine trips).			SAT / UNSAT / NA
	SNO	Obtain AOP-41:	SAT / UNSAT / NA
	SNO	♦ Determine and report that 06LI-94B is failing downscale	SAT / UNSAT / NA
	SNO	♦ Recommend transfer to 06LI-94A and return to automatic level control	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	CRS	Order transfer to 06LI-94A and return to automatic level control per OP-2A	SAT / UNSAT / NA
	CRS	Declare 06LT-52B inoperable per T/S 3.3.2.2. Determine that T/S is not applicable until 25% RTP. (Potential LCO)	SAT / UNSAT / NA
	SNO	Obtain OP-2A Section G.30:	SAT / UNSAT / NA
	SNO	♦ At 09-5, Place 06-S1 in A-LEVEL	SAT / UNSAT / NA
	SNO	♦ Place FWLC in Automatic per OP-2A Steps D.3.28 through D.3.29	SAT / UNSAT / NA
	SNO	♦ At 09-5, Verify 06LC-83 is in manual	SAT / UNSAT / NA
	SNO	♦ At 09-5, ensure 06LC-83 setpoint is 196.5 to 203 inches	SAT / UNSAT / NA
	SNO	♦ At 09-5, Slowly adjust 06LC-83 manual control potentiometer to balance 06-84B	SAT / UNSAT / NA
	SNO	♦ At 09-5, Place 06-84B in BAL	SAT / UNSAT / NA
	SNO	♦ At 09-5, Adjust 06LC-83 setpoint to balance then place 06LC-83 in BAL.	SAT / UNSAT / NA
INSTRUCTOR NOTE Trigger 4, Control Rod 42-39 scram.	ANY/ALL	Recognize and report control rod drift and accumulator trouble alarms	SAT / UNSAT / NA
	CRS	Order actions of AOP-27, Control Rod Drift	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ANY/ALL	Determine that the drift alarm resulted from a control rod scram	SAT / UNSAT / NA
	SNO	Dispatch an NPO to investigate the HCU for control rod 42-39.	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY Report to SNO that the airline on control rod 42-39 has ruptured downstream of the scram solenoids.	SNO	Relay report to CRS	SAT / UNSAT / NA
	CRS	Review TS 3.1.3.C declare control rod 42-39 inoperable	SAT / UNSAT / NA
INSTRUCTOR NOTE Trigger 6, Loss of 10500 Bus	ANY/ALL	Recognize and report the loss of the 10500 bus.	SAT / UNSAT / NA
INSTRUCTOR NOTE When requested, report that the 10514 breaker has tripped on ground overcurrent	CRS	Order SNO to perform actions of AOP-18	SAT / UNSAT / NA
	SNO	Obtain AOP-18:	SAT / UNSAT / NA
	SNO	◆ At 09-8, Place A and C EDG Load breaker (10502 and 10512) control switches in TRIP then PULL-TO-LOCK	SAT / UNSAT / NA
	SNO	● At 09-8, Ensure EDG A and C Tie Breaker (10504) is tripped.	SAT / UNSAT / NA
INSTRUCTOR NOTE RFI-DG23:A and C. Select MAINT	SNO	● Dispatch a NPO to place EDG A and C Local Control Switches in MAINT	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY Report to SNO the A and C EDG Local Control Switches	SNO	◆ At 09-8, Place EDG A and C Control Switches in STOP	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
are in Maintenance			
	SNO	♦ Startup SGT Train "B" per OP-20, Section D.2	SAT / UNSAT / NA
	SNO	♦ At 09-75, Place 01-125MOV-12 control switch to OPEN	SAT / UNSAT / NA
	SNO	♦ At 09-75, Place 01-125MOV-14B Control Switch to OPEN	SAT / UNSAT / NA
	SNO	♦ At 09-75, Depress RB VENT ISOL B pushbutton.	SAT / UNSAT / NA
	SNO	♦ At 09-75, Start all available Drywell Cooling Fans	SAT / UNSAT / NA
	ANY/ALL	♦ Refer to AOP-18 Attachment 1 for affected loads	SAT / UNSAT / NA
INSTRUCTOR NOTE Trigger 7, "C" SRV leakage followed by mechanical opening	ANY/ALL	Recognize and report "C" SRV leakage.	SAT / UNSAT / NA
	CRS	Order "B" Loop of RHR in Torus Cooling	SAT / UNSAT / NA
	SNO1	Place RHR "B" loop in Torus Cooling per OP-13B or Posted Attachment at the 09-3 panel.	SAT / UNSAT / NA
	SNO1	♦ At 09-3, Place RHR "D" control switch in START	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO1	♦ At 09-3, Insert key and select 10MOV-39B to OPEN	SAT / UNSAT / NA
	SNO1	♦ At 09-3, Throttle 10MOV-34B to establish ≥ 6500 gpm per operating pump.	SAT / UNSAT / NA
	SNO1	♦ At 09-3, ensure closure of 10MOV-16B when loop flow exceeds 1500 gpm.	SAT / UNSAT / NA
	SNO1	♦ Startup RHR/SW per OP-13C or 09-3 Posted Attachment.	SAT / UNSAT / NA
	SNO1	♦ At 09-4 or EPIC, Verify RHR/SW A/B keep full alarm status is clear.	SAT / UNSAT / NA
	SNO1	♦ At 09-3, Start RHR/SW pump B or D	SAT / UNSAT / NA
	SNO1	♦ At 09-3, Throttle 10MOV-89B to establish 2500-4000 gpm per loop.	SAT / UNSAT / NA
INSTRUCTOR NOTE: Upon Manual Scram OR RPV Pressure = 900 psig TRIGGER 9	ANY/ALL	Recognize and report the full opening of "C" SRV and dropping RPV pressure	SAT / UNSAT / NA
	CRS	Announce entry into AOP-36 and direct SNO to perform actions.	SAT / UNSAT / NA
		Obtain AOP-36:	SAT / UNSAT / NA
		♦ At 09-5, Attempt to close the "C" SRV by cycling the control switch between AUTO and OPEN. Several cycles may be performed.	SAT / UNSAT / NA
INSTRUCTOR NOTE: RFI-AD02:C "OUT"		♦ Dispatch a NPO to the relay room to remove the control power fuses for the "C" SRV	SAT / UNSAT / NA
		♦ At 09-3, verify either Torus Temperature Recorder (16-1TR-131A/B) is operating	SAT / UNSAT / NA
		♦ At 09-3 or EPIC monitor Torus Water Temperature at least every 5 minutes.	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY		♦ At 09-4, observe "C" SRV solenoid lamps extinguished and	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Report to SNO that "C" SRV fuses are removed.		tailpipe temperatures still elevated.	
CRITICAL TASK #2: MANUAL SCRAM ON TORUS TEMPERATURE			
	ANY/ALL	Recognize AOP-36 required Manual Scram based upon the inability to maintain Torus Bulk Temperature < 110 degrees. <u>EVALUATOR NOTE:</u> The crew may choose to manually scram earlier due to the dropping trend in RPV pressure.	SAT / UNSAT / NA
	CRS	Order SNO1 to insert a Manual Scram and perform AOP-1 Immediate Actions. Order SNO to maintain RPV Water Level at 177 to 222.5 inches using Feed and Condensate.	SAT / UNSAT / NA
	SNO1	At 09-5, Depress both Manual Scram Pushbuttons	SAT / UNSAT / NA
CRITICAL TASK #2 STANDARD: Scram on SRV Opening per AOP-36 before torus water temperature exceeds 110 °F.			SAT / UNSAT / NA
	SNO1	At 09-5, Place the Reactor Mode Switch in SHUTDOWN and report to CRS.	SAT / UNSAT / NA
	SNO1	At 09-5, Select and insert all IRM's and SRM's	SAT / UNSAT / NA
	SNO1	At 09-5, Verify APRM Downscale lights on and report to CRS	SAT / UNSAT / NA
	SNO1	At 09-5, Verify all rods fully inserted and report to CRS	SAT / UNSAT / NA
	SNO1	At 09-5, Verify SDIV Vent and Drain Valves closed.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION SNO	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	At 09-5 and 09-6, Trend level performance and manipulate GEMAC Master/Individual controller, RFP "A" discharge valve and RFP trip as necessary to control RPV Water Level.	SAT / UNSAT / NA
	CRS	Order SNO1 to trend RPV Pressure	SAT / UNSAT / NA
	SNO1	Make periodic RPV pressure reports	SAT / UNSAT / NA
	ANY/ALL	Recognize and report upward trend in Drywell Pressure and EOP-2 and 4 Entry Condition.	SAT / UNSAT / NA
	CRS	Announce entry into EOP-2 and 4 on High Drywell Pressure	SAT / UNSAT / NA
	CRS	Monitor conditions of all 5 EOP-4 legs and all 3 EOP-2 legs concurrently.	SAT / UNSAT / NA
	CRS	Order SNO to turn over RPV Level Control to SNO1	SAT / UNSAT / NA
	SNO	Turnover RPV Level Control to SNO1	SAT / UNSAT / NA
	CRS	Order SNO to Terminate and Prevent Core Spray and RHR per EP-5	SAT / UNSAT / NA
	SNO	Obtain EP-5:	SAT / UNSAT / NA
	SNO	♦ At 09-3, Place 10MOV-27A and B AUTO CONTROL BYPASS Switch in BYPASS	SAT / UNSAT / NA
	SNO	♦ At 09-3, Verify 10MOV-27A and B AUTO CONTROL BYPASS white lamp is lit	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	♦ At 09-3, Close 10MOV-27A and B.	SAT / UNSAT / NA
	SNO	♦ At 09-3, Place 14MOV-11A and B AUTO ACTUATION BYPASS Switch in BYPASS	SAT / UNSAT / NA
	SNO	♦ At 09-3, Verify 14MOV-11A and B AUTO ACTUATION BYPASS white lamp is lit. EVALUATOR NOTE 14MOV-11A lamp will be de-energized due to the bus loss	SAT / UNSAT / NA
	SNO	♦ At 09-3, Close 14MOV-11A and B EVALUATOR NOTE 14MOV-11A will be de-energized due to the bus loss	SAT / UNSAT / NA
	SNO	♦ Stop Core Spray Pumps A and B	SAT / UNSAT / NA
	CRS	Before Torus Pressure reaches 15 psig, order SNO to place the "B" RHR Loop in Torus Spray.	SAT / UNSAT / NA
	SNO	Startup "B" RHR in Torus Spray per OP-13B or 09-3 posted attachment:	SAT / UNSAT / NA
	SNO	♦ At 09-3, Place 10A-S17B in MANUAL	SAT / UNSAT / NA
	SNO	♦ At 09-3, Verify 10A-DS67B white lamp is lit	SAT / UNSAT / NA
	SNO	♦ At 09-3, Place 10MOV-39B control switch in OPEN	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
INSTRUCTOR NOTE Upon initial stroking of 10MOV-38B, Trigger 10, "D" RHR pump trip	SNO	♦ At 09-3, Throttle open 10MOV-38B and throttle closed 10MOV-34B to maximize Torus Spray Flow	SAT / UNSAT / NA
	SNO	Report that "D" RHR pump has tripped	SAT / UNSAT / NA
	ANY/ALL	Determine that all RHR Containment Cooling functions have been lost.	SAT / UNSAT / NA
	CRS	Determine that Torus Pressure cannot be maintained below the Pressure Suppression Pressure Limit.	SAT / UNSAT / NA
INSTRUCTOR NOTE: Trigger 11. All bypass valves fail closed.	CRS	Order SNO1 to Open all Bypass Valves in anticipation of Emergency Depressurization	SAT / UNSAT / NA
	SNO1	At 09-5, Select Bypass Opening Jack to open all 4 Bypass Valves. Report that Bypass Valves will not open.	SAT / UNSAT / NA
	SNO1	At 09-5 and 09-6, Adjust FWLC to maintain RPV Water Level 177 to 222.5 inches.	SAT / UNSAT / NA
CRITICAL TASK #3: DEPRESSURIZE THE RPV			
	CRS	Before Torus Pressure exceeds the Pressure Suppression Pressure limit, order the SNO to open 7 ADS Valves	SAT / UNSAT / NA
	SNO	At 09-4, Select all 7 ADS valve control switches to OPEN.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
CRITICAL TASK #3 STANDARD: Complete RPV depressurization as directed by EOP-2 and 4 to prevent torus pressure from exceeding the Pressure Suppression Pressure (PSP) limit.			SAT / UNSAT / NA

TERMINATE THE SCENARIO

ATTACHMENT 1

Shift Turnover

Reactor Startup In-Progress at ~5% CTP; Currently at OP-65, Step D.19; Reactor Mode Switch in "Startup".

The "Alpha" Circulating Water Pump Has Just Been Repaired; Start Up "Alpha" CW Pump and Secure "Bravo" CW Pump for Inspection.

The A-1 Waterbox is out of service per OP-4 Section E to support single CW pump operation.

Continue Power Ascent to 25% CTP Using Control Rods; Reactor Engineer is present in Control Room.

**JAMES A. FITZPATRICK NUCLEAR POWER PLANT
NRC INITIAL LICENSE EXAMINATION SCENARIO 3
18 MAY 2005**

TITLE: LOI-05-01 NRC EXAMINATION SCENARIO 3, Seismic Event, AOP-31, MSL Break in TB

SCENARIO NUMBER: NEW

PATH:

RESNAP WITH CORRECT EVENT NUMBERS AND MALFUNCTION EDITS

SCENARIO NEEDS TO BE RESNAPPED WITH MALFUNCTION REVISIONS.

RESNAP WITH MSLCS ALARMS epic-989 AND 990 OUT OF SCAN

NEED TO REVALIDATE THE REVISIONS FROM THE OPS VALIDATION.

	CANDIDATES
CRS	
SRO With Command	
SNO Primary At The Controls Operator	
SNO1 Primary 09-5 Operator	

RECORD OF CHANGES

[illegible]

A. **TITLE:** LOI-05-01 NRC EXAMINATION SCENARIO 3, Seismic Event, AOP-31, MSL Break in TB

B. **SCENARIO SETUP:**

1. Initial Protected IC 134

2. Special Instructions:

a. Plant operating normally at 75% CTP

3. Preset Conditions:

- a. Preset, RP13, PCIS Group 1 Isolation Failure.
- b. Preset, RD13:30-15, Control Rod Fail To Scram
- c. Preset, AD07:J, G, C and B. Several ADS SRV's Fail To Open
- d. Trigger 2, RFI-EP09, Seismic Event Alarm
- e. Trigger 2, ANN-09-6-4-11, RFP "A" High Vibration, CRYWOLF
- f. Trigger 2, RFP 'A' DDR-10 Vibration Point with Step rise followed by slow rise.
- g. Trigger 3, RFI-HP15, HPCI AOP Breaker Trip.
- h. Trigger 5, MC01, Loss of Main Condenser Vacuum,(35% over 180 seconds)
- i. Trigger 7, MS05, Main Steam Line Break in the Turbine Building (25% over 300 seconds)

4. Consumable Forms and Procedures:

- ◆ AOP-1, Reactor Scram
- ◆ AOP-14, Earthquake
- ◆ AOP-31, Loss of Condenser Vacuum
- ◆ AOP-40, Main Steam Line Break

C. **SCENARIO SUMMARY:**

Commitment Document:

The scenario will begin with the reactor at ~75% Core Thermal Power. The crew will raise power using recirculation flow. A seismic event will result in several failures starting with a 'crywolf' RFP alarm on high vibration. Vibration will be slightly elevated and monitored by the crew. The following event will be a HPCI power supply loss that will disable HPCI. The CRS will declare HPCI inoperable. The crew will then notice a slow loss of condenser vacuum and perform the AOP actions including a power reduction using recirculation flow. The major event will be a Main Steam Line Break in the Turbine Building that will fail to automatically isolate. A manual scram will be inserted followed by manually isolating the steam lines. During the scram, one control rod will fail to scram but will be inserted using RMCS. RCIC will be operated for Level Control and the SRVs will be operated in Pressure Control. Several SRVs will fail to open forcing alternative SRV selection. The scenario will terminate upon stabilization of Pressure and Level Control.

Shift Turnover

Reactor Power is at 75% to support recent repairs to "Alpha" Circulating Water Pump. "A" CW pump has been returned to service. Return power to 92% using recirculation flow. Hold at 92% for Reactor Engineer's ramp guidance.

Critical Tasks

Critical Task #1: Power Reduction on Degrading Condenser Vacuum per AOP-31 to prevent turbine trip(s) on low condenser vacuum.

Critical Task #2: Manual Scram and Close MSIVs per AOP-40 prior to steam tunnel temperature exceeding 200 °F.

EVENT NO.	EVENT SEQUENCE
1.	Raise Power using Recirculation Flow (Reactivity)
2.	Seismic Event resulting in RFPT slight vibration and CRYWOLF alarm (Component)
3.	HPCI Aux Oil Pump Breaker Trip (Component)
4	HPCI Inoperable (Technical Specification)
5.	Loss of Condenser Vacuum (Component)
6.	AOP Required Power Reduction with Rods and Recirculation (Reactivity Manipulation)
7.	Main Steam Line Break in the Turbine Building with Failure To Automatically Isolate (Major)
8.	One Control Rod Fails to Scram (Component)
9.	RCIC Level Control and SRV's Pressure Control
10.	Several SRV's Fail to Open (Instrument/Component)

D. TERMINATION CUES:

1. Stable RPV Level and Pressure Control

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	Walkdown the control panels and assume the watch.	SAT / UNSAT / NA
	CRS	Provide crew brief. Order raising Reactor Power to 92% using Recirculation Flow.	SAT / UNSAT / NA
	SNO	Obtain OP-27, Section E ;	SAT / UNSAT / NA
	SNO	<ul style="list-style-type: none"> ◆ At 09-4, Alternately raise recirculation pump speeds in 1-3% increments while monitoring: <ul style="list-style-type: none"> ○ Core Flow maintained less than 77 Mlbm/hr ○ Jet Pump Loop Mismatch \leq 5% (3.85 Mlbm/hr) 	SAT / UNSAT / NA
INSTRUCTOR NOTE Trigger 2, Seismic Event/RFP Vibration	ANY/ALL	Recognize and report RPP High Vibration Alarm and EPIC Seismic Event alarm	SAT / UNSAT / NA
	CRS	Direct SNO to enter and perform AOP-14 Direct SNO to respond to annunciator 09-6-4-11	SAT / UNSAT / NA
	SNO	At 09-6, Monitor and trend RFP A Vibration on 31TR-100A	SAT / UNSAT / NA
	SNO	Obtain AOP-14:	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
INSTRUCTOR ROLE PLAY No observable damage	SNO	♦ Dispatch NPO's throughout plant to inspect for damage and unusual indications	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY Report 27SOV-129A is Open	SNO	♦ At 27CAD, confirm that 27SOV-129A or B is open. EVALUATOR NOTE This activity is simulated by candidate phoning the instructor console from the back panel area.	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY Report 0.10g (>OBE)	SNO/SNO1	♦ Contact NMP Unit 2 or National Center For Earthquake Engineering Research to determine the magnitude of the earthquake.	SAT / UNSAT / NA
INSTRUCTOR NOTE Trigger 3, HPCI AOP Breaker Trip	ANY/ALL	Recognize and report annunciator 09-3-3-38 and the loss of lamp indication for the HPCI Aux Oil Pump.	SAT / UNSAT / NA
	CRS	Order SNO to respond per the ARP	SAT / UNSAT / NA
	SNO	Obtain ARP-09-3-3-38:	SAT / UNSAT / NA
INSTRUCTOR NOTE Report that the pump is fine but the breaker is tripped with an acrid order from the breaker cubicle.	SNO	♦ Dispatch NPO to investigate pump and breaker	SAT / UNSAT / NA
	CRS	Declare HPCI Inoperable. Per T/S 3.5.1 Condition C, must immediately verify RCIC Operable and restore HPCI within 14 days	SAT / UNSAT / NA
INSTRUCTOR NOTE Trigger 5, Loss of Condenser Vacuum	ANY/ALL	Recognize and report the slow loss of condenser vacuum	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	CRS	Direct SNO to perform the actions of AOP-31	SAT / UNSAT / NA
	CRS	Set a manual scram benchmark for SNO1. (Typically ~23 inches)	SAT / UNSAT / NA
	SNO	Obtain AOP-31:	SAT / UNSAT / NA
	SNO	♦ At 09-6, Trip the Recombiner and verify The Hydrogen Addition System trips	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY All valve in correct positions per AOP-14, Step C.5.4		♦ Dispatch an NPO to verify valve positions at the Off Gas System Recombiner Panel (01-107OGR)	SAT / UNSAT / NA
INSTRUCTOR NOTE RFI-MC13-20 to ON for all off service SJAE's	SNO	♦ Dispatch NPO to place spare SJAE's in service	SAT / UNSAT / NA
	SNO	♦ At 09-6, Observe Off Gas Flow on 38FR-101 and determine that the source of condenser vacuum loss is air inleakage	SAT / UNSAT / NA
INSTRUCTOR ROLE PLAY Report a tear in the "A" RFPT Exhaust Boot	SNO	♦ Dispatch NPO(s) to inspect for source of air inleakage.	SAT / UNSAT / NA
	SNO	♦ At 09-7 monitor Turbine Steam Seal Pressure and SPE Vacuum	SAT / UNSAT / NA
CRITICAL TASK #1: POWER REDUCTION ON DEGRADING CONDENSER VACUUM			
INSTRUCTOR NOTE Adjust severity of MC01 to force power reduction	CRS	Trend Condenser Vacuum and direct SNO to perform a power reduction with recirculation flow to combat trend. Limit the SNO to maintain $\geq 50\%$ Core Flow. Rapid rates may apply.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	Obtain OP-27, Section E: (Normal Rates at ≤ 200 Mwth/min)	SAT / UNSAT / NA
INSTRUCTOR NOTE After several adjustments, adjust MC01 severity to force rapid rates.	SNO	<ul style="list-style-type: none"> ◆ At 09-4, Alternately lower recirculation pump speeds in 1-3% increments while monitoring: <ul style="list-style-type: none"> ○ Jet Pump Loop Mismatch $\leq 5\%$ (7.7 Mlbm/hr) ○ Core Flow $> 50\%$ 	SAT / UNSAT / NA
	SNO	Obtain OP-27, Section G.1 (Rapid Rates):	SAT / UNSAT / NA
	SNO	<ul style="list-style-type: none"> ◆ At 09-4, Simultaneously lower recirculation pump speeds while monitoring: <ul style="list-style-type: none"> ○ Jet Pump Loop Mismatch $\leq 5\%$ (7.7 Mlbm/hr) ○ Core Flow $> 50\%$ ○ RPV Water Level < 222.5 inches 	SAT / UNSAT / NA
INSTRUCTOR NOTE Adjust severity of MC01 to force power reduction	CRS	Trend condenser vacuum and direct SNO1 to insert Control Rod Cram Groups to combat trend	SAT / UNSAT / NA
	SNO1	Obtain RAP-7.3.16, Attachment 1 (Posted at 09-5):	SAT / UNSAT / NA
	SNO1	◆ At 09-5, Select control rods in the first cram group	SAT / UNSAT / NA
INSTRUCTOR NOTE Adjust MC01 severity to a slowly improving trend in condenser vacuum	SNO1	◆ At 09-5, Fully insert the selected control rods until all control rods in cram group 1 are inserted.	SAT / UNSAT / NA
CRITICAL TASK #1 STANDARD: Power Reduction on Degrading Condenser Vacuum per AOP-31 to prevent turbine trip(s) on low condenser vacuum.			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
INSTRUCTOR NOTE Trigger 7, MSL Break in TB	ANY/ALL	Recognize and report elevating temperatures in the Main Steam Tunnel.	SAT / UNSAT / NA
CRITICAL TASK #2: MANUAL SCRAM AND CLOSE MSIVs			
	CRS	Direct SNO to perform the actions of AOP-40	SAT / UNSAT / NA
	SNO	Obtain AOP-40 and inform CRS that MSIV closure is required. EVALUATOR NOTE The MSIV's will NOT automatically isolate on area temperature	SAT / UNSAT / NA
	CRS	Direct SNO1 to perform a manual scram and AOP-1 immediate actions	SAT / UNSAT / NA
	CRS	Direct SNO to maintain RPV Water Level at 177-222.5 inches using Feed and Condensate	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Depress Manual Scram Pushbuttons	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Place Reactor Mode Switch in SHUTDOWN and report to CRS	SAT / UNSAT / NA
	SNO1	♦ At 09-5, select and fully insert all SRM's and IRM's	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Observe APRM downscale indications and report to CRS	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Trip the Main Turbine	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Verify all rods Full In. Report to CRS that Control Rod 30-15 is not full in. Currently at position 48	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Ensure SDIV Vent and Drain Valves are closed	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO1	♦ At 09-8 Ensure 4KV Bus transfers to Reserve Station Service	SAT / UNSAT / NA
	SNO1	♦ At 09-6, Ensure at least 1 Circulating Water Pump is running.	SAT / UNSAT / NA
	SNO	Trend level performance and manipulate GEMAC Master/Individual controllers, RFP discharge valves and RFP trip as necessary to control level. Announce EOP-2 entry condition	SAT / UNSAT / NA
	CRS	Enter EOP-2	SAT / UNSAT / NA
		Obtain AOP-40:	SAT / UNSAT / NA
	SNO	♦ At 09-4, Close all 8 MSIV's	SAT / UNSAT / NA
CRITICAL TASK #2 STANDARD: Manual Scram and Close MSIVs per AOP-40 prior to steam tunnel temperature exceeding 200 °F.			SAT / UNSAT / NA
	SNO	♦ At 09-75, Isolate Control Room and Relay Room Ventilation per OP-55B (Section G.1)	SAT / UNSAT / NA
	SNO	♦ At 09-75, Place Control Room Vent Control Switch in ISOL	SAT / UNSAT / NA
	SNO	♦ At 09-75, Verify Supply and Exhaust Dampers Close	SAT / UNSAT / NA
	SNO	♦ At 09-75, Verify Recirculation Dampers Open	SAT / UNSAT / NA
	SNO	♦ At 09-75, Verify Start of 70FN-6A or B	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	♦ Dispatch NPO to Stop 70FN-1 and Close 70DMPR-105	SAT / UNSAT / NA
	SNO	♦ At 09-75, Place Relay Room Ventilation Control Switches in ISOL	SAT / UNSAT / NA
	SNO	♦ At 09-75, Verify closure of Relay Room Supply and Exhaust Dampers and the Vent Damper.	SAT / UNSAT / NA
	SNO	♦ Dispatch NPO to place TSC Filtered Ventilation in service per OP-59B	SAT / UNSAT / NA
	CRS	Direct SNO1 to insert Control Rod 30-15 per AOP-1	SAT / UNSAT / NA
	CRS	Direct SNO to Pressure Control at 800 to 1000 psig using the SRV's	SAT / UNSAT / NA
	SNO	At 09-4, Operate SRV's in sequence (Posted at 09-4) to maintain RPV Pressure.	SAT / UNSAT / NA
	SNO	Recognize and report the Failure of SRV's to operate and continue in sequence to maintain RPV pressure in band	SAT / UNSAT / NA
	SNO1	Obtain AOP-1, Section C.3:	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Place RWM keylock switch in BYPASS	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Place SDIV High Level Trip Keylock Switch in BYPASS	SAT / UNSAT / NA
	SNO1	♦ At 09-5, Place Scram Reset Switch in Group 2&3 then 1&4	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO1	♦ Select Control Rod 30-15	SAT / UNSAT / NA
	SNO1	♦ Fully insert Control Rod 30-15 using RMCS	SAT / UNSAT / NA
	CRS	Direct SNO to maintain RPV Level 177-222.5 inches using RCIC	SAT / UNSAT / NA
	SNO	Obtain OP-19 Section D or 09-4 Posted Attachment EVALUATOR NOTE The following actions assume the candidate starts RCIC directly in Level Control. Depending upon RPV Water Level and trend, other options may apply resulting in minor deviations	SAT / UNSAT / NA
	SNO	♦ Start the RCIC Vacuum Pump	SAT / UNSAT / NA
	SNO	♦ Open 13MOV-132	SAT / UNSAT / NA
	SNO	♦ Open 13MOV-131	SAT / UNSAT / NA
	SNO	♦ Open 13 MOV-21	SAT / UNSAT / NA
	SNO	♦ Ensure Closed 13MOV-27, 13AOV-34 and 13AOV-35	SAT / UNSAT / NA
	SNO	♦ Start RHR in Torus Cooling per OP-13B or Posted Attachment at 09-3	SAT / UNSAT / NA

TERMINATE THE SCENARIO

ATTACHMENT 1

Shift Turnover
Reactor Power is at 75% to support recent repairs to "Alpha" Circulating Water Pump. "A" CW pump has been returned to service. Return power to 92% using recirculation flow. Hold at 92% for Reactor Engineer's ramp guidance.