JAMES A. FITZPATRICK NUCLEAR POWER PLANT
NRC INITIAL LICENSE EXAMINATION SCENARIO
27 MAY 2003

TITLE: LOI-03-01 SCENARIO 1, STUCK ROD/RWCU LEAK EOP-5

SCENARIO NUMBER: NEW

PATH:

	SIGNATURE
VALIDATION	
TRAINING	
OPERATIONS	for Torbitt

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
7/1/03	NRC Validation	Eliminate RMS to startup, Event 1 Add detail for required operator actions Make stuck rod malfunction earlier in pull sequence.	DeVercelly	Torbitt
7/9/03	Operations Validation	Modify Attachment 1, Turnover Page Add turnover info on EPIC Thermal Limit Alarms expected. Change RWCU pump trip event to "B". Steam leak is modeled with elevated temperature in "B" pump room. Incorporate NRC approval of validation changes	DeVercelly	Torbitt

C. **SCENARIO SUMMARY:**

Commitment Document:
The scenario begins with the plant at ~8% CTP with a reactor startup in progress and the Reactor Mode Switch in RUN. The crew will continue the startup per OP-65 by starting a second condensate pump and continuing rod withdrawal with guidance to proceed to 25% CTP with rods. After several rods, an in-sequence rod will be found stuck requiring entry to AOP-24. All procedural actions will fail resulting in a Technical Specification review for an inoperable rod. The "B" RWCU pump will trip resulting in diagnostic actions. Shortly after, a steam leak will be detected in the Reactor Building vicinity of the Reactor Water Cleanup pumps. Automatic or manual isolation of RWCU will result in a loss of MCC-152 as 12 MOV-15 begins to stroke. This renders the leak unisolable. The leak severity will slowly grow requiring entry into EOP-5. EOP-5 actions to manually scram the reactor will find a control rod that failed to scram. This coupled with the previously stuck control rod will require entry into EOP-3 until operator action to insert the second rod with RMCS. Leak severity will eventually force an Emergency Depressurization when reactor building temperatures exceed 2 maximum safe values. Timely action to insert the above control rod and thus exit EOP-3 to EOP-2 will provide the opportunity for the crew to anticipate an Emergency Depressurization and open all Bypass Valves. Upon opening, the Bypass Valves will subsequently fail closed forcing the Emergency Depressurization. Upon Emergency Depressurization, 2 ADS SRV's will fail to open forcing additional SRV's to be operated. The scenario will terminate upon Emergency Depressurization.

Shift Turnover ATTACHMENT 1
A reactor startup is in progress. The plant is at approximately 8% CTP. The Reactor Mode Switch is in RUN. OP-65 is complete through Step D.22.3. ST-5D has just been completed and is satisfactory. Chemistry has reported that all chemistry parameters are well within specification for Power Operation. I-131 Dose Equivalent is <.2uci/gm. EPIC is indicating thermal limit alarms that are evaluated by Reactor Engineering to be expected values. IT is looking into the EPIC issue. Reactor Engineer guidance is to continue reactor startup with rods until 25%CTP. You are currently in RWM Step 26.

A. **TITLE:** LOI-03-01 SCENARIO 1, STUCK ROD/RWCU LEAK/EOP-5

B. **SCENARIO SETUP:**

1. Initial Protected IC-137.

2. Special Instructions:
   a. Reactor Startup in progress at approximately 8% CTP, RMS in RUN.
   b. OP-65 complete through step D.22.3. Ready to start a second condensate pump.
   c. FWLC in automatic master control on either reactor feed pump.
   d. Confirm Reactor Analyst pull sequence agrees with simulator modeling.
   e. * denotes critical task(s)

3. Preset Conditions:
   a. RD10:34-19. Forth rod in RWM Group 26 stuck
   b. ED24:B on Trigger E-6. Loss of MCC-153 triggered on 12MOV-15 green lamp on.
   c. RD13:22:27. Control rod 22-27 fails to scram. RMCS insertion still available.
   d. TC04:A-D. On event trigger 9. All BPV's fail closed after opening
   e. AD07:C and E. Two ADS SRV's fail to open.
   f. CU02:B on event trigger 5. RWCU Pump "B" trip.
   g. CU07 on event trigger 5 at 50%, 10 minute ramp.

4. Consumable Forms and Procedures:

   - AOP-24, STUCK CONTROL ROD, Rev. 7
   - AOP-1 Reactor Scram, Rev. 39

5. Modified Shift Turnover Sheet

   See Attachment 1

EVENT NO.	EVENT SEQUENCE
1.	Event Deleted
2.	Start of second Condensate Pump (Normal)
3.	Continue startup with Rod Withdrawal (Reactivity Manipulation)
4.	Stuck Control Rod (AOP-24) (Component and Tech Specs)
5.	RWCU pump trip and steam leak into Rx Bldg. (Component)
6.	Loss of MCC-152 upon 12MOV-15 closure
7.	Non-isolable RB steam leak/EOP-5/Manual Scram/Emergency Depressurization (Major)
8.	One rod fails to scram (Component)
9.	BPV's fail closed after opening (Component)
10	2 ADS SRV's fail to open (Component)

D. **TERMINATION CUES:**

1. Emergency Depressurization in progress with 7 SRV's

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Brief crew on plant conditions and OP-65 status. Provide Modified Turnover			
After the shift turnover, allow no more than five minutes for panel walkdown	All	Walkdown the control panels	SAT / UNSAT / NA
	CRS	Conduct turnover brief. Order continuation of OP-65 startup	SAT / UNSAT / NA
	SNO/BOP	Start second condensate pump per OP-3 D.7 • Check 33P-8A motor amps • Place 33P-8B control switch in start and release. • Check 33P-8A and B motor amps for load sharing. • Verify RPS A and B power source white lamps are lit. Ensure 34MOV-100A(B) is open and 34FCV-137 is closed	SAT / UNSAT / NA
	CRS	Order in-sequence rod withdrawal	SAT / UNSAT / NA
	SNO/RO	Selects and withdraws control rods in sequence.	SAT / UNSAT / NA
	SNO/RO	Reports that control rod 34-19 will not move at normal drive pressures. May adjust up to 400 psid per OP-25 Section E. • Adjust 03MOV-20 closed to raise drive water D/P in ~50 psid increments.	SAT / UNSAT / NA
	ANY/ALL	Recognize symptom of AOP-24	SAT / UNSAT / NA
	CRS	Order performance of AOP-24	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: After several minutes report lineup as expected.	SNO/BOP	Confirm 09-5 panel indications and HCU lineup are normal per OP-25 • Adjust 03MOV-20 open to restore drive water D/P to ~260 psid. • Dispatch NPO to perform HCU-34-19 valve lineup per Attachment 2.	SAT / UNSAT / NA
	SNO	Incrementally raise drive D/P at ~50 psig increments and attempt rod movement after each adjustment until drive D/P can no longer be raised. • Adjust 03MOV-20 closed to raise drive D/P by ~50 psid. • Ensure stuck rod is selected in rod select matrix. • Select OUT NOTCH on rod movement control switch.	SAT / UNSAT / NA
	SNO	Report to CRS that rod will not move with maximum D/P applied.	SAT / UNSAT / NA
	SNO	Restore CRD hydraulic parameters to normal values • Adjust 03MOV-20 open to restore drive water D/P to ~260 psid.	SAT / UNSAT / NA
	CRS	Consult Technical Specification 3.1.3	SAT / UNSAT / NA
	CRS	Declare control rod 34-19 inoperable and enter condition A.	SAT / UNSAT / NA
	CRS	Brief crew on inoperability and required actions • Immediately verify stuck rod separation criteria • 2 hours to disarm the drive • 72 hours to perform SR demonstrating adequate shutdown margin.	SAT / UNSAT / NA
TRG! E5	ANY/ALL	Recognize and report RWCU pump "B" trip.	SAT / UNSAT / NA
	SNO	Dispatch NPO to RWCU pump area.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: After several minutes report a steam leak in overhead area of RWCU pumps on RB 300 foot elevation.	SNO	Relay report to CRS	SAT / UNSAT / NA
	CRS	Order actions to trip and isolate RWCU (OP-28, Section G.2)	SAT / UNSAT / NA
	SNO/BOP	• Turn off RWCU pumps • Close 12 MOV-15, 18, and 69	SAT / UNSAT / NA
	ANY/ALL	Recognize bus loss coincident with valve closures	SAT / UNSAT / NA
	CRS	Order investigation of bus loss.	
	SNO/BOP	Determine/report loss of MCC-152 Determine/report failure of 12MOV-15 to close	SAT / UNSAT / NA
CU07 severity may need to be slowly adjusted to drive the rest of the scenario actions by tracking temperatures on SCT	CRS	Recognize RWCU steam leak is un-isolable.	SAT / UNSAT / NA
	ANY/ALL	Recognize EOP-5 entry condition on RB Area Temperature/Radiation	SAT / UNSAT / NA
	CRS	Enter EOP-5	SAT / UNSAT / NA
	CRS	Order local area evacuation of reactor building	SAT / UNSAT / NA
	SNO	Sound station alarm and announce steam leak local area evacuation of reactor building	SAT / UNSAT / NA
	CRS	Execute EOP-5 RB/T, RB/R and RB/L concurrently prioritizing RB/T	SAT / UNSAT / NA
	CRS	Order maximizing Reactor Building area cooling	SAT / UNSAT / NA
	SNO/BOP	Start all remaining Crescent Area Unit Coolers.	SAT / UNSAT / NA
	CRS	Before any RB area Temperature exceeds Max Safe, Order Manual Scram and enter EOP-2	SAT / UNSAT / NA *** CRITICAL TASK**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO/RO	Insert Manual Scram and perform AOP-1 Immediate Actions • * Depress Manual Scram pushbuttons • Reactor Mode Switch to Shutdown • Fully Insert all SRM's and IRM's • Verify all rods in (2 will be not full in) • Verify SDIV Vent and Drain valves closed • Verify APRM's downscale • Verify/Trip Main Turbine • Verify electrical distribution fast transfer • Verify at least 1 Circ Water pump running	SAT / UNSAT / NA *** CRITICAL TASK**
	CRS	Order SNO/BOP to level control with Feed/Condensate at 177-222.5 inches.	SAT / UNSAT / NA
	SNO/BOP	Trend level performance and manipulate GEMAC Master/Individual controllers, RFP discharge valves and RFP trip as necessary to control level.	SAT / UNSAT / NA
	SNO/RO	Recognize and report that 1 rod failed to scram (22-27) and that another (34-19) was previously stuck and also did not insert	SAT / UNSAT / NA
	CRS	Enter EOP-3 based on 2 rods not inserted to or beyond 02	SAT / UNSAT / NA
	CRS	Order SNO to Pressure Control with EHC in automatic.	SAT / UNSAT / NA
	SNO	Confirm EHC controlling pressure in automatic	SAT / UNSAT / NA
	CRS	Order SNO/RO to initiate ARI	SAT / UNSAT / NA
	SNO/BOP	Initiate ARI and confirm all 5 valves energized.	SAT / UNSAT / NA
	CRS	Order SNO/RO to insert control rods per EP-3	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
If rod 22-27 is attempted, it will insert. If rod 34-19 is attempted, it will not To reset ARI: RFI-RP20 to test	SNO/RO	Determine EP-3 success path is RMCS • Reset ARI by dispatching NPO to Relay Room • Bypass RWM • SDIV Hi Level Trip Switch to BYPASS • Scram Reset Switch to Group 2&3 then 1& 4. • Verify scram group lights lit • Establish drive D/P by placing 03FIC-301 in manual and opening 03FCV-19A(B). • May start second CRD pump to support D/P. • May select control rod 34-19 on rod select matrix • May attempt to drive in with Rod Movement or Emergency In Control Switch. • Rod will not move • Select control rod 22-27 on rod select matrix • Attempt to drive in with Rod Movement or Emergency In Control Switch. • Rod will fully insert	SAT / UNSAT / NA **EVALUATOR NOTE:** **Candidate may recognize that 34-19 was previously demonstrated stuck and declared inoperable. The candidate may NOT attempt to insert.**
	CRS	May order O/R ADS and T/P Core Spray per EOP-3	SAT / UNSAT / NA
	SNO/BOP	If ordered: • Both ADS O/R switches to O/R • Both 14MOV-11 valve keylocks to bypass • Close 14MOV-11 A and B (14MOV-11A is de-energized and will not close.	SAT / UNSAT / NA
	SNO/RO	Report all rods in except 1	SAT / UNSAT / NA
	CRS	Exit EOP-3 and enter EOP-2	SAT / UNSAT / NA
If ED is anticipated, TRG! E9 As BPV's are opening	CRS	Recognize that 2 RB area temperatures above max safe requires Emergency Depressurization.	SAT / UNSAT / NA
If BPV's failed closed:	CRS	Order pressure control on SRV's at a 200 psig band.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO	Sequentially open and close SRV's as necessary to maintain pressure band	SAT / UNSAT / NA
	CRS	If 2 max safe RB area temperatures are exceeded, announce that an emergency depressurization is required.	SAT / UNSAT / NA
	CRS	Enter EOP-2 ED leg and order opening of 7 ADS valves.	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO	Open ADS valves A-H (excluding F)	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO	Report that ADS valves C and E failed to open	SAT / UNSAT / NA *** CRITICAL TASK**
	CRS	Order additional SRV's opened to a total of 7 valves	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO	Opens 2 additional SRV's and reports 7 valves open	SAT / UNSAT / NA *** CRITICAL TASK**
		TERMINATE THE SCENARIO	

Shift Turnover
A reactor startup is in progress. The plant is at approximately 8% CTP. The Reactor Mode Switch is in RUN. OP-65 is complete through Step D.22.3. ST-5D has just been completed and is satisfactory. Chemistry has reported that all chemistry parameters are well within specification for Power Operation. I-131 Dose Equivalent is <.2uci/gm. EPIC is indicating thermal limit alarms that are evaluated by Reactor Engineering to be expected values. IT is looking into the EPIC issue. Reactor Engineer guidance is to continue reactor startup with rods until 25%CTP. You are currently in RWM Step 26.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
NRC INITIAL LICENSE EXAMINATION SCENARIO
27 MAY 2003

TITLE: LOI-03-01 SCENARIO 2, TURBINE VIBRATION/LOSS OF VACUUM/ATWS

SCENARIO NUMBER: NEW

PATH:

	SIGNATURE
VALIDATION	
TRAINING	
OPERATIONS	for Tarbitt

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
7/1/03	NRC Validation	Add Cooper OE refernce Add detail to required operator actions	DeVercelly	Torbitt
7/9/03	Operations Validation	Modify Attachment 1, Shift turnover Add Technical Specification Call related to Event 1 Added missing operator actions related to the onset of event 7 Added recognition that SLC initiation earlier than required is acceptable and may affect the scenario predicted sequence of events.	DeVercelly	Torbitt

A. **TITLE:** LOI-03-01 SCENARIO 1, STUCK ROD/RWCU LEAK/EOP-5

B. **SCENARIO SETUP:**

1. Initial Protected IC-138

2. Special Instructions:
   a. Plant operating normally at ~95% CTP
   b. Rod Pattern exchange just completed. Returning to 100% CTP.
   c. Confirm Reactor Analyst pull sequence agrees with simulator modeling.
   d. Confirm RAP-7.3.16 guidance is at the 09-5 panel

3. Preset Conditions:
   a. On Trigger 1, RR19:B fail as is.
   b. On Trigger 3, TU04:E at 21% and D at 22% no ramp. (7-9 mils)
   c. On Trigger 3, MC01 at 42% severity over 20 minutes.
   d. Preset RD22:A at 70%
   e. Preset RD01A:A

4. Consumable Forms and Procedures:

   - AOP-66, MAIN TURBINE HIGH VIBRATION, REV. 3
   - AOP-31, LOSS OF CONDENSER VACUUM, REV. 15
   - AOP-41/42, FEEDWATER MALFUNCTION, Rev. 6/10
   - AOP-1 Reactor Scram, Rev. 39

5. Modified Shift Turnover Sheet

   See Attachment 1

C. **SCENARIO SUMMARY:**

Commitment Document:
The crew will take the shift with the plant operating normally at ~95% CTP following a rod pattern exchange. Following Reactor Analyst guidance, the crew will continue a power ascent to 100% CTP using recirculation flow. Shortly into the power ascent, the operators will notice that the non-controlling FWLC level instruments are trending down while the controlling is steady. The crew will diagnose that the FWLC controlling instrument has failed as is causing actual level to trend down slowly. The crew will take manual control, of FWLC, enter AOP-42 and determine the cause to be a failed instrument. The crew will then swap FWLC to the alternate instrument input and return to automatic level control. The Control Room Supervisor will consult technical specifications for the failed instrument. The Main Turbine will then lose part of a low pressure blade that will penetrate the low pressure turbine exhaust boot. This will be indicated by a step change in turbine vibration followed by a slow loss of condenser vacuum that will eventually worsen. Turbine vibration will result in entry to AOP-66 but will not be severe enough to require a turbine trip. The condenser vacuum loss will eventually result in AOP-31 entry which will require a power reduction. The vacuum loss will worsen such that power reductions with both recirculation flow and rods will occur. Eventually the AOP-31 manual scram milestone will be met. The manual scram will not be completely successful due to hydraulic blockage in one of the scram discharge volumes. Power will be above 2.5% requiring significant EOP-3 action. As a nuisance, one SDIV vent valve will fail to close. The EP-3 success path will be inserting rods with RMCS and repeated manual scrams. As vacuum continues to trend away, level control will need to transition to HPCI and pressure control augmented with SRV's. The resulting challenge to containment may result in SLC injection if not already started.

NOTE:

The main turbine blade loss and resulting vibration are similar to an event that occurred at Cooper in May 2003. Reference OE-16340

Shift Turnover ATTACHMENT 1
The plant is operating normally at ~95% CTP. A rod pattern exchange has just been completed and the reactor analyst guidance is to return to 100% CTP using recirculation flow.

EVENT NO.	EVENT SEQUENCE
1.	**FWLC Controlling Instrument as is failure (Instrument and Tech Specs)**
2.	**Swap to alternate FWLC Instrument input and return FWLC to automatic.**
3.	**Step change in Turbine Vibration (Component)**
4.	**Slow loss of condenser vacuum (Component)**
5.	**Power reduction with recirculation flow (Reactivity)**
6.	**Power reduction with rod insertion (Reactivity)**
7.	**ATWS/EOP-3 (Major)**
8.	**SDIV Vent and Drain valve fails to close (Component)**

D. **TERMINATION CUES:**

1. Control rods being/inserted using EP-3
2. Level control stable at 0-222.5 inches
3. Pressure control stable

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Modified Turnover			
After the shift turnover, allow no more than five minutes for panel walkdown	All	Walkdown the control panels	SAT / UNSAT / NA
	CRS	Conduct turnover brief. Order continuation of power ascent to 100% using recirculation flow per OP-27 Section E.	SAT / UNSAT / NA
TRG! E1	SNO/BOP	• Alternatively adjust recirculation MG set speeds in 1-3% increments. • Monitor reactor power and core flow between adjustments.	SAT / UNSAT / NA
	SNO/RO	Monitor power pressure and level at 09-5 during ascent.	SAT / UNSAT / NA
	ANY/ALL	Recognize off normal RPV water level condition	SAT / UNSAT / NA
	SNO	Select FWLC to manual. Stabilize and restore RPV level to green band. • Select the Master Controller to Manual and adjust the manual control potentiometer. OR • Select both MGU's to manual and adjust the manual control potentiometers	SAT / UNSAT / NA
	CRS	Order entry into AOP-42	SAT / UNSAT / NA
	SNO/BOP	Perform actions of AOP-42. • Determine that controlling "B" instrument is failed which caused an actual low RPV level condition.	SAT / UNSAT / NA
	CRS	Order swap to "A" level transmitter and return FWLC to automatic per OP-2A	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO/BOP	Select OP-2A, section G.30 • Place column select switch to "A" • Ensure RPV water level stabilizes • Return to Automatic FWLC per G.7 • Verify 06-84A and B (MGU's) in manual • Select 06LC-83 (Master Controller) to MANUAL • Adjust 06LC-83 manual potentiometer to balance 06-84A. • Place 06-84A in BAL • Adjust 06LC-83 setpoint tape to balance 06LC-83 • Place 06LC-83 in BAL • Balance 06-84B by adjusting the manual potentiometer. **Note, this will result in a level change and response by 06LC-83 and 06-84A.** • Place 06-84B in BAL	SAT / UNSAT / NA
	CRS	Reference Technical Specification 3.3.2.A.1 and determine that the failed channel must be tripped within 7 days.	SAT / UNSAT / NA
TRGI E3 **Severities may need adjustment to ensure 7-9 mils.**	ANY/ALL	Recognize Main Turbine High Vibration condition.	SAT / UNSAT / NA
	CRS	Order entry into AOP-66	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
ROLE PLAY: If requested, report that there is abnormally high noise levels and vibrations on the Main Turbine elevation (300')	SNO	Determine if alarm is valid. • EPIC Alarm list • EPIC TGB Screen • 09-5 recorder 94VR • Dispatch operator(s) to turbine • Announce turbine bearings 4 and 5 are alarming at elevated vibration values (7-9 mils)	SAT / UNSAT / NA
ROLE PLAY as Mike Tallents and acknowledge report. State that you are coming in	CRS	Report abnormal vibration to Main Turbine Expert	SAT / UNSAT / NA
	CRS	May order power reduction using recirculation flow at normal rates to attempt to reduce vibration levels.	SAT / UNSAT / NA
	SNO/BOP	If ordered, commence power reduction using recirculation flow per OP-27 Section E. • Alternatively reduce each MG set speed in 1-3% increments. • Monitor reactor power and core flow between adjustments.	SAT / UNSAT / NA
	ANY/ALL	Recognize and announce worsening trend in condenser vacuum.	SAT / UNSAT / NA
	CRS	Order entry into AOP-31	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Monitor and adjust MC01 as necessary to ensure the remaining scenario actions	SNO/BOP	Commence actions of AOP-31 • Determine operation to be in Normal Operating Region of Attachment 2 • Trip Recombiner • Ensure Hydrogen Addition System trips • Dispatch NPO to verifiy valve lineup at Off Gas Recombiner Panel • Close TB Equip Sump Vacuum Drag Isolation valve • Dispatch NPO to place spare SJAE's in service • Determine source is air in-leakage • Ensure Steam Seal Pressure is 1-4 psig • Ensure Steam Packing Exhauster vacuum is 10-20 inches. • Dispatch operators to search for air leak	SAT / UNSAT / NA
	CRS	Set Manual Scram benchmark of 23-25 inches Hg	SAT / UNSAT / NA
	CRS	Order power reduction with recirculation flow to counter vacuum trend. Caution against reducing below 50% core flow. Based upon vacuum trend rate, may order rapid rates	SAT / UNSAT / NA
	SNO/BOP	Reduce recircualtion flow to ~50% Core Flow at normal rates per OP-27 Section E. • Alternatively reduce each MG set speed in 1-3% increments. • Monitor reactor power and core flow between adjustments.	SAT / UNSAT / NA
	SNO/BOP	Reduce recirculation flow to ~50% Core Flow at rapid rates per OP-27 Section G.1 • Simultaneously reduce both Recirc MG controllers to reduce speed continuously to a value near but greater than 50% core flow.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ANY/ALL	Recognize/report that condenser vacuum is still worsening	SAT / UNSAT / NA
	CRS	Order insertion of the first cram group.	SAT / UNSAT / NA
ROLE PLAY: As NPO, report that there is a visible tear in the exhaust boot of LP turbine B.	SNO/RO	Select and fully insert all rods in the first cram group • Reference RAP-7.3.16 Attachment to determine first rod and number of rods in the first cram group • Select first rod in cram group. • Fully and continuously insert the selected rod to 00 using Rod Movement or Emergency In switch. • Repeat selection and insertion until all backlit rods are inserted to 00	SAT / UNSAT / NA
Monitor and adjust MC01 as necessary to force manual scram	ANY/ALL	Recognize/report that condenser vacuum is still worsening	
Delete TU04: D and E	CRS	Order Manual Scram	SAT / UNSAT / NA
	SNO/RO	Insert Manual Scram and perform AOP-1 Immediate Actions • Depress Manual Scram pushbuttons • Reactor Mode Switch to Shutdown • Fully Insert all SRM's and IRM's • Verify all rods in (Many will not be) • Verify SDIV Vent and Drain valves closed (One will not be) • Verify APRM's downscale (Will not be) • Verify at least 1 Circ Water pump running	SAT / UNSAT / NA
	CRS	Order SNO/BOP to level control with Feed and Condensate 177-222.5 inches	SAT / UNSAT / NA
	SNO/BOP	Manipulate RFP, GEMAC Controllers and RFP Discharge valves as necessary to control RPV level.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO/RO	May report one SDIV Vent valve failed to close. **EVALUATOR NOTE** Based upon priorities, this information may be withheld until a less challenging time in the scenario.	SAT / UNSAT / NA
	CRS	If reported, order select SDIV Isolation Valve Test to Test/Isol.	SAT / UNSAT / NA
	SNO/RO	Report multiple rods out, APRM's NOT downscale	SAT / UNSAT / NA *** CRITICAL TASK**
	CRS	Announce EOP-3 entry from EOP-2	SAT / UNSAT / NA *** CRITICAL TASK**
	CRS	Order SNO/RO to perform the following EOP-3 actions • Initiate ARI • * Reduce recirculation flow to minimum • * Trip both recirculation pumps • Override ADS • May order SLC Initiation • * Determine EP-3 success path and insert rods. **EVALUATOR NOTE** Initiation of SLC may affected the predicted scenario sequence from this point forward.	SAT / UNSAT / NA *** CRITICAL TASK**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO/RO	Perform the following EOP-3 actions: • Select ARI Switch to ACT • * Adjust both recirculation GEMAC manual controls to minimum speed demand while trending RPV level • * Select both drive motor breaker control switches to STOP • Select both ADS override switches to override • *Determine EP-3 success path is both RMCS and Manual Scrams	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO	If ordered to inject SLC, • Verify Squib Valve ready lights are on • Note SLC tank level • Select SLC control switch to ordered division. • Verify pump running light on • Verify pump discharge pressure is above RPV pressure. • Verify RWCU-18 and 69 close.	SAT / UNSAT / NA *** CRITICAL TASK**
	CRS	Order SNO/BOP to terminate and prevent all injection except SLC, CRD and RCIC per EP-5. New level band is –19 to 110. Injection source will be HPCI. Caution against rapid injection.	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO/BOP	Perform the following EOP-3/EP-5 level control actions: • * Reduce running RFP(s) M/A stations to manual minimum. • * Ensure running RFP min flow valve(s) open • Shut 34MOV-100A,B and 34 FCV-137. (Not required until RFP's are shutdown) • * Depress HPCI Turbine Trip pushbutton.	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO	• 10MOV-27A/B Auto Control to bypass and close 10MOV-27A/B (May be deferred) • 14MOV-11A/B Auto Actuation to Bypass and close 14MOV-11A/B (may be deferred)	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	CRS	Order SNO to pressure control with EHC in automatic. Band of 900-1000 psig.	SAT / UNSAT / NA
	SNO	Confirm EHC in automatic controlling RPV pressure in band.	SAT / UNSAT / NA
	CRS	Order reinjection with HPCI per EP-5. Level band of –19 to 110 inches	SAT / UNSAT / NA
Adjust MC01 to force loss of Bypass Valves	SNO/BOP	Reinject with HPCI by: • Ensure SGT running (will be) • Ensure 01-125MOV-13A / B is open • Ensure HPCI flow controller in Manual minimum • Depress turbine trip reset • Verify / align automatic initiation lineup • Control speed to control injection • Ensure speed maintained greater than 2100 RPM	SAT / UNSAT / NA
	CRS	Order control rod insertion with EP-3 success paths	SAT / UNSAT / NA
	SNO/RO	NOTE: SNO/RO should pursue both paths in that RMCS can complete partial insertions while SDIV's are draining to enable Manual scrams.	SAT / UNSAT / NA
To reset ARI, RFI-RP20 to Test	SNO/RO	EP-3 RMCS path actions: • Dispatch NPO to reset ARI and observe solenoids de-energized. (if not already done) • * RWM Keylock to Bypass • * Raise drive water D/P. Options include shut CRD-56, Start second CRD pump, manually adjust FIC-301 to open AOV-19A(B) • * Select and drive rods full in in EP-3 attachment sequence using rod movement or emergency in switch.	SAT / UNSAT / NA *** CRITICAL TASK** **EVALUATOR NOTE:** **Rod insertion by EITHER RMCS or Manual Scrams is considered a Critical Task. Both are not required.**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Monitor and adjust MC01 as necessary to force RFP trip and loss of bypass valves	ANY/ALL	Recognize that as condenser vacuum continues to worsen, Pressure control will need to transition to HPCI augmented with SRV's.	SAT / UNSAT / NA
	CRS	Trend BIIT and if not already done, order SLC injection before exceeding BIIT	SAT / UNSAT / NA *** CRITICAL TASK**
	SNO	If ordered to inject SLC, • Verify Squib Valve ready lights are on • Note SLC tank level • Select SLC control switch to ordered division. • Verify pump running light on • Verify pump discharge pressure is above RPV pressure. • Verify RWCU-18 and 69 close.	SAT / UNSAT / NA *** CRITICAL TASK**
	CRS	Order transition of RPV pressure control to HPCI and augment with SRV's. Modify band to 800-1000 psig.	SAT / UNSAT / NA
	SNO	To transition Pressure Control. • Augment HPCI operation with sequential opening of SRV's to maintain 800-1000 psig	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	CRS	Before condenser vacuum is less than 8 inches Hg, order closure of the MSIV's.	SAT / UNSAT / NA
	SNO	Select all 8 MSIV control switches to CLOSE.	SAT / UNSAT / NA
	SNO	Report downward trend in SLC tank level.	SAT / UNSAT / NA
RFI- RP21:A1, A2, B1, and B2 to hang RPS jumpers When the scram is reset, delete malfunction RD22A	SNO/RO	EP-3 Manual Scram path actions • Dispatch NPO to reset ARI and observe solenoids de-energized (if not already done) • Order/hang 09-15/17 auto scram jumpers. • Open CRD-56 if closed. • SDIV Hi Level Trip to Bypass • Rx Scram Reset to Group 2 and 3 then 1 and 4. • When SDIV's are drained insert Manual Scram	SAT / UNSAT / NA *** CRITICAL TASK** **EVALUATOR NOTE:** **Rod insertion by EITHER RMCS or Manual Scrams is considered a Critical Task. Both are not required.**
	CRS	When all rods in: • Order SLC secured • Exit EOP-3 and enter EOP-2	SAT / UNSAT / NA
		TERMINATE THE SCENARIO	

Shift Turnover
The plant is operating normally at ~95% CTP. A rod pattern exchange has just been completed and the reactor analyst guidance is to return to 100% CTP using recirculation flow.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
NRC INITIAL LICENSE EXAMINATION SCENARIO
27 MAY 2003

TITLE: **LOI-03-01 SCENARIO 3, Combustion in After Condenser, Steam Leak in Drywell, EOP-4**

SCENARIO NUMBER: **NEW**

PATH:

	SIGNATURE
VALIDATION	
TRAINING	
OPERATIONS	for Tarbitt

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
7/3/03	NRC Validation	Add detail to required operator actions Delete ramp on Event 2	DeVercelly	Torbitt

A. **TITLE:** LOI-03-01 SCENARIO 3, Combustion in After Condenser, Steam Leak in Drywell, EOP-4

B. **SCENARIO SETUP:**

1. Initial Protected IC-139

2. Special Instructions:
   a. Plant operating normally at 100% CTP
   b. Confirm Reactor Analyst pull sequence agrees with simulator modeling.
   c. Confirm Reactor Analyst RAP-7.3.16 guidance is available at 09-5 panel.
   d. Ensure LPRM bypass postings are current to support scenario.
   e. Bypass additional LPRM's as necessary to support Event 2 Tech Spec exercise.
   f. Ensure A and B SW pumps in service. C in standby

3. Preset Conditions:
   a. NM11:6B3613 on Trigger E-2 at 100% severity and no ramp (must resnap IC), LPRM Upscale failure. (LPRM will be assigned to a B division APRM such that upon failure, APRM inop on 2 per level count).
   b. On a trigger, override LPRM 36-13-B downscale white lamp on.
   c. OG04 on Trigger E-3, Combustion in Off-Gas
   d. Annunciator 09-6-1-23 crywolf on Trigger E-3
   e. Recombiner trip on Trigger E-3
   f. RR15:A on Trigger E-6 at 50% severity and 10 minute ramp, Steam Leak in Drywell.
   g. Preset RD13:XX:YY, One rod fail to scram
   h. ED18:X on Fast transfer trigger assigned to Trigger E-7, Loss of 10500 Bus.

4. Consumable Forms and Procedures:

   - AOP-5, Combustion in SJAE After Condenser, Rev. 10
   - AOP-1 Reactor Scram, Rev. 39

5. Modified Shift Turnover Sheet

   See Attachment 1

C. **SCENARIO SUMMARY:**

Commitment Document:
The scenario begins with the plant operating normally at 100% CTP. A repair of the C SW strainer has just been completed and the tags are clear. The shift will swap to the C SW pump in service and B in Standby to facilitate a pressure leak test of the C SW pump strainer. An LPRM will fail upscale resulting in a single APRM upscale trip. A half scram on APRM upscale will result. The crew will determine a failed LPRM as the cause and bypass the LPRM. The bypass will result in an INOP APRM on the 2 per level count basis. A Tech Spec review will identify a Potential LCO with trip function maintained by the remaining divisional APRM's. A fire in the SJAE After Condenser will require entry to AOP-5. Actions to extinguish the fire will not be successful until Rx power has been reduced with both recirculation flow and control rods. After the fire is out, a steam leak in the drywell will force entry into EOP-2 and 4. On the Manual Scram, a single rod will fail to insert and will subsequently be driven in by normal RMCS. On the fast transfer, the 10500 bus will experience catastrophic failure resulting in a loss of containment cooling capability with the A RHR loop as well as a loss of both A and B RHR pumps. This reduces EOP-4 actions to a single (D) RHR pump in the B loop. A single drywell spray evolution will result in scenario termination.

Shift Turnover **ATTACHMENT 1**
The plant is operating normally at 100% CTP. Maintenance has just completed a repair to the C SW pump discharge strainer and the tags have been cleared. An NPO is standing by with maintenance to perform a pressure leak check of the strainer. Swap to the C SW pump in service and B in Standby.

EVENT NO.	EVENT SEQUENCE
1.	**Swap in service Service Water pumps (Normal)**
2.	**LPRM Upscale failure/APRM half scram (Instrument and Tech Specs)**
3.	**Combustion in SJAE After Condenser (AOP-5) (Component)**
4.	**AOP-5 directed power reduction with recirculation flow (Reactivity)**
5.	**AOP-5 directed power reduction with Control Rods (Reactivity)**
6.	**Steam leak in the Drywell (Major)**
7.	**Loss of 10500 bus (Component)**

D. **TERMINATION CUES:**

1. Completion of 1 Drywell Spray Evolution

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Modified Turnover			
After the shift turnover, allow no more than five minutes for panel walkdown	All	Walkdown the control panels	SAT / UNSAT / NA
	CRS	Conduct turnover brief. Order coordination with field to start C SW pump and place B in STBY per OP-42 G.1	SAT / UNSAT / NA
After short times, act as NPO and report: • Chlorine and chemical cleaning isolated to B pump • 46SWS-2C is open • C SW strainer has no leakage • Chlorine and chemical cleaning started on C pump	SNO/BOP	Swap SW pumps per OP-42 • Dispatch NPO to isolate chemical cleaning and chlorine to B SW pump. • Dispatch NPO to verify discharge valve (46SWS-2C) is open. • Place C SW pump control switch in START. • Verify motor amps less than 163 • Verify no strainer leakage with NPO • Place and hold SW pump B control switch in stop • When header pressure is normal release switch tgo NORMAL • Place SW pump B control switch in PTL • Verify A and C pump motors at less than 163 amps • Verify header pressure 85 to 100 psig • Start chemical cleaning and chlorine injection on C pump.	SAT / UNSAT / NA
TRG! E2	ANY/ALL	Recognize/Report APRM "B" upscale, half scram "B" and LPRM upscale alarm. Determine failed LPRM is 36-13-B	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO/RO	Report that all other APRM's are stable.	SAT / UNSAT / NA
	CRS	Order bypass of LPRM 36-13-B per OP-16	SAT / UNSAT / NA
When LPRM amplifier card is selected to BY, override LPRM downscale white lamp on: ORIXXXXXXXXXXXXXXX	SNO/BOP	Select OP-16 section E.11. • Bypass APRM per section E.16 by placing bypass switch to "B" and confirming bypass lamp/EPIC alarm. • Verify APRM "B" bypass lamp at 09-14 • Select APRM meter function switches to the LPRM 36-13-B • Place LPRM amplifier card in BY • Verify individual LPRM downscale and bypass lamps on. • Verify meter face LPRM bypass lamp is lit. • Verify APRM meter reads zero. • Place meter function switch in AVERAGE. • Ensure rod select power is on. • Select a neighboring control rod at 09-5 to check RBM inputs. • Turn off rod select power then turn on. • May contact RE to determine effect on RBM • Count APRM total and per level remaining inputs by counting LPRM card switches that remain in OP. • Report results to CRS	SAT / UNSAT / NA
	CRS	Recognize that APRM is inoperable on 2 per level criteria and consult Tech Specs 3.3.1.1 and TRM 3.3.B.1. Determine that no condition entry is required.	SAT / UNSAT / NA
TRG! E3 **Cause of recombiner trip is low outlet temperature**	ANY/ALL	Recognize/Report indications of combustion in SJAE after condenser.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	CRS	Announce entry to AOP-5. Direct SNO/BOP to perform actions of AOP-5. • May review E-plan for fire event applicability	SAT / UNSAT / NA
	SNO/BOP	Perform the following AOP-5 actions: • Ensure Hydrogen Injection trips. • Ensure tempering gate hoist is closed. • Dispatch NPO to place manipulate SJAE's lineup. • Report to CRS that power reduction is required until 40% or fire is extinguished. • Continue with SJAE alignment changes.	SAT / UNSAT / NA
	CRS	Brief crew and direct SNO/BOP to reduce power using recirculation flow to 50% core flow or the fire is out. NOTE: CRS judgment on desired power ramp rate.	SAT / UNSAT / NA
	SNO/BOP	Alternatively adjust Recirculation GEMAC controllers in 1-3% increments without going below 50% core flow. OR Concurrently reduce both GEMAC's at a rapid rate without going below 50% core flow	SAT / UNSAT / NA
	SNO/RO	Monitor power/pressure/level during downpower.	SAT / UNSAT / NA
DELETE OG04	SNO/BOP	Report Core Flow at ~ 50% and combustion still indicated.	SAT / UNSAT / NA
	CRS	Order SNO/RO to insert the first cram group	SAT / UNSAT / NA
	SNO/RO	Select the first rod in the cram group and fully insert all rods in the cram group using Rod Movement or Emergency In Control Switch.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ANY/ALL	Recognize that combustion has extinguished. • Off Gas Flow rate rises • Off Gas Radiation lowers • Stack Radiation rises.	SAT / UNSAT / NA
	CRS	Order chemistry to complete a confirmatory hydrogen sample.	SAT / UNSAT / NA
TRG! E6	ANY/ALL	Recognize indications of steam leak in drywell.	SAT / UNSAT / NA
	CRS	Order establishment of a Torus Vent per OP-37 Set a benchmark for a manual scram of 2-2.3 psig drywell pressure.	SAT / UNSAT / NA
	SNO/BOP	Commence actions to establish Torus vent. NOTE: No actions will actually complete due to rate of rise in drywell pressure.	SAT / UNSAT / NA
	ANY/ALL	Recognize/Report manual scram benchmark	SAT / UNSAT / NA
	SNO/RO	Insert Manual Scram and perform AOP-1 Immediate Actions • Depress Manual Scram pushbuttons • Reactor Mode Switch to Shutdown • Fully Insert all SRM's and IRM's • Verify all rods in (One will not be) • Verify SDIV Vent and Drain valves closed • Verify APRM's downscale • Verify/trip Main Turbine • Verify electrical fast transfer NSS-RSS • Verify at least 1 Circ Water pump running	
	CRS	Order SNO/BOP to level control with Feed/Condensate at 177-222.5 inches.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SNO/BOP	Trend level performance and manipulate GEMAC Master/Individual controllers, RFP discharge valves and RFP trip as necessary to control level.	
	SNO/RO	Recognize and report that 1 rod failed to scram and that the 10500 is de-energized with A and C EDG's running	SAT / UNSAT / NA
Role Play: Report as NPO that 10500 bus has heavy damage at the 10514 breaker and heavy smell of burnt insulation.	SNO	Dispatch NPO to assess status of 10500 bus and EDG's	SAT / UNSAT / NA
	CRS	Order SNO to Pressure Control with EHC in automatic.	SAT / UNSAT / NA
	SNO	Confirm EHC controlling pressure in automatic	SAT / UNSAT / NA
	CRS	Order actions of AOP-18	SAT / UNSAT / NA
	SNO	Perform actions of AOP-18. Prioritize S/D of EDG A and C. NOTE: Scenario progress may result in further AOP-18 actions being a lower priority. • For Each EDG (A and C) • Place output breaker (10502/10512) in PTL • Ensure tie breaker (10504) is tripped • Dispatch NPO to place local control switch in MAINT. • Place EDG control switch in STOP.	SAT / UNSAT / NA
	ANY/ALL	Recognize/Report EOP2/4 entry condition on D/W pressure	SAT / UNSAT / NA
	CRS	Announce entry into EOP-2 and 4	SAT / UNSAT / NA
	ANY/ALL	Recognize/Report HPCI initiation	SAT / UNSAT / NA
	CRS	Determine HPCI injection not needed and order HPCI tripped	SAT / UNSAT / NA
	SNO	Trip HPCI	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
RR15:A severity may need to be adjusted to force scenario milestones	CRS	When torus pressure >2.7 psig order B loop of RHR in torus spray with excess flow to torus cooling.	SAT / UNSAT / NA
	SNO	Startup B loop RHR in Torus Spray. Excess flow to torus cooling while observing current limitation on RHR pump. • Place spray control switch in manual and verify white lamp lit. • Start D RHR pump • Open 10MOV-39B • Open 10MOV-38B • Verify 10MOV-16B closes • Throttle 10MOV-34B to greater than 6500 gpm pump flow. • Verify RHR/SW keep full alarm clear • Start B/D RHR/SW pump • Throttle 10MOV-89B to 4000 gpm per pump • Close 10MOV-66B	SAT / UNSAT / NA
	CRS	Set a torus pressure benchmark of 15 psig. Order terminate and prevent RHR and Core Spray per EP-5	SAT / UNSAT / NA
	SNO/RO	• Keylock override 10MOV-27A/B to bypass • Close 10MOV-27A/B • Keylock override 14MOV-11A/B • Close 14MOV-11A/B (11A de-energized) • Stop Core Spray pumps A/B	SAT / UNSAT / NA
	CRS	Order RPV cooldown at <100 degrees per hour with caution that drywell steam leak is contributing to cooldown	SAT / UNSAT / NA
	SNO	Trend cooldown and adjust bypass jack and auxiliary steam loads to commence a cooldown at < 100 degrees per hour.	SAT / UNSAT / NA
	SNO	Announce torus pressure 15 psig milestone	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	CRS	Order/confirm drywell cooling fans and recirculation pumps tripped	SAT / UNSAT / NA
	SNO	Trip both recircualtion pumps	SAT / UNSAT / NA
	CRS	Confirm operation in safe region of D/W spray initiation limit.	SAT / UNSAT / NA
	CRS	Order drywell sprays using B RHR. Caution SNO to terminate drywell sprays before drywell pressure drops below 0 psig.	*** CRITICAL TASK**
	SNO	Places B RHR in drywell spray observing caution for excessive pump amps. • Place spray control switch in manual and verify white lamp is lit • Open 10MOV-26B • Throttle 10MOV-31B to raise drywell spray flow • Throttle 10MOV-34B to lower torus cooling flow	SAT / UNSAT / NA *** CRITICAL TASK**
	ANY/ALL	Trend and report drop in drywell pressure	SAT / UNSAT / NA
		TERMINATE THE SCENARIO	

Shift Turnover
The plant is operating normally at 100% CTP. Maintenance has just completed a repair to the C SW pump discharge strainer and the tags have been cleared. An NPO is standing by with maintenance to perform a pressure leak check of the strainer. Swap to the C SW pump in service and B in Standby.