

Facility: Indian Point 2		Scenario No.: NRC#1		Op-Test No.: 1	
Examiners: _____		Operators: _____		_____	
_____		_____		_____	
Initial Conditions: 3% Rated Thermal Power, MOL					
Turnover: Unit 2 is at 3% power, recovering from a 7 day forced outage to repair body to bonnet leak on PRZR Spray Loop 23 Bypass Valve 524. Shift orders are to continue the startup in accordance with Pop 1.3 Plant Startup, Mode 2 to Mode 1. The previous shift completed POP 1.3 through step 4.23. Shift Manager has directed you to baseload the HP Steam Dumps to approximately 8% prior to placing the unit on line per POP-2.1. The Operations Manager, Reactor Engineering and Power Marketing have authorized a rate of power increase of 200 MWe per hour to 100% RTP.					
Event No.	Malf. No.	Event Type*	Event Description		
1		N SRO/BOP R RO	Raise reactor power		
2	XMT- RCS020A	I ALL	Pressurizer Level Channel 2 (LT-460) Fails Low (TS SRO)		
3	MAL- RCS014B	C ALL	22 SG Tube Leak (5 gpm) (TS SRO)		
4	MAL- ATS007A	C SRO/RO	21 Main Boiler Feed Pump Trip (Manual reactor trip required)		
5	MAL- RCS014B MAL- EPS001	M ALL	SGTR with subsequent Loss of Offsite Power		
6	MOC- SIS001	C SRO/BOP	21 SI Pump Fails to Auto Start		

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

Simulator Setup

Reset to IC-124 Validation time = 105 minutes.

Execute batch file Bat "NRC#1.bat" from Ph.D Expert window:

```

^ MOC-SIS001 SI1      SAFETY INJECTION PUMP 21 MOTOR
IMF MOC-SIS001 (-1 0) 4
^ XMT-RCS020A FIXED OUTPUT: LT-460    PZR LEVEL CH.2
IMF XMT-RCS020A (1 0) 0.000000 0 40.412601
^ MAL-RCS014B  STEAM GENERATOR 22 TUBE LEAK  (NR)
IMF MAL-RCS014B (2 0) 0.050000 0 0.000000
^ MAL-ATS007A  MBFP 21 THRUST BEARING FAILURE (NR)
IMF MAL-ATS007A (3 0) TRUE
^ Loss of Offsite Power when manual SI pushed
TRGSET 29 "xaoi610a.eq.1"
TRG 29 "IMF MAL-EPS001 (-1 0) TRUE"
^ SGTR 22 SG gets big when reactor trips
TRGSET 30 "JBKRTA.EQ.0"
TRG 30 "IMF MAL-RCS014B (-1 0) 5.00000 0 0.050000"

```

Verify that the following commands appear in the Instructor Station Summary:

Instructor Station Summary		Description	Delay	Ramp	Event	Value	Final	Insert Time
Malfunction	MOC-SIS001 SI1 SAFETY INJECTION PU	00:00:00	00:00:00	None	n/a	aut clis	00:00:00	
Delete	XMT-RCS020A FIXED OUTPUT: LT-460 PZ	00:00:00	00:00:00	1	47.5803	0	00:00:00	
Clear All	MAL-RCS014B STEAM GENERATOR 22 TUBE LEAK	00:00:00	00:00:00	2	0	0.05	00:00:00	
	MAL-ATS007A MBFP 21 THRUST BEARING FAILUR	00:00:00	00:00:00	3	FALSE	FALSE	00:00:00	
Remotes								
Delete								
Clear All								
Overrides								
Delete								
Clear All								
Triggers								
						TRUE		
						FALSE		
OK								

Simulator Setup

Verify that Conditional Trigger 29 & 30 appears on Event Trigger 29 and 30 as follows:

Event Triggers

Event# 29 Event Action xaoi610a.eq.1

Command IMF MAL-EPS001 (-1 0) TRUE

Accept New Event Finish

#	Action
16	Available
17	Available
18	Available
19	Available
20	Available
21	Available
22	Available
23	Available
24	Available
25	Available
26	Available
27	Available
28	Available
29	xaoi610a.eq.1
30	JBKRTA.EQ.0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

TRUE
FALSE

Event Triggers

Event# 30 Event Action JBKRTA.EQ.0

Command IMF MAL-RCS014B (-1 0) 5.00000 0 0.050000

Accept New Event Finish

#	Action
16	Available
17	Available
18	Available
19	Available
20	Available
21	Available
22	Available
23	Available
24	Available
25	Available
26	Available
27	Available
28	Available
29	xaoi610a.eq.1
30	JBKRTA.EQ.0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

TRUE
FALSE

Prior to start of scenario, brief team on power escalation orders. Allow them to formulate a reactivity plan and do their brief outside the simulator. Provide them required graphs and NUPOP, and turnover sheet.

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Page 1 of 1 Event Description: Raise Reactor Power from 3% reactor power		
	SRO	Directs activities associated with power increase per 2-POP-1.3, "Plant Startup, Mode 2 to Mode 1": <ul style="list-style-type: none"> - Rod Motion - Dilution
	RO	Adds Positive reactivity <ul style="list-style-type: none"> - Rod Motion - Dilution
	SRO	Initiates Turbine Generator startup operations per 2-SOP-26.4, "Turbine Generator Startup, Synchronizing, Voltage Control and Shutdown"

SIMULATOR OPERATOR:

Activate trigger 1 to start the next event Pressurizer Level Channel 2 (LT-460) Fails Low (TS SRO) when directed by the Lead Evaluator.

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 1 of 3 Event Description: Pressurizer Level Channel 2 (LT-460) Fails Low		
	RO	Diagnose Pressurizer Level Channel 2 failed low
	BOP	Refers to Alarm response Procedure <ul style="list-style-type: none"> - SAF 3-3 Pressurizer Low Level 18% 5% - SAF 4-3 Pressurizer Lo Lo Level Channel Trip 5% - SGF 2-9 RCS Reduced Inventory - SFF 1-7 PRZR Heater Group Tripped
	SRO	Directs RO to perform immediate operator actions (from memory) of 2-AOP-INST-1, "Instrument/Controller Malfunctions"
	RO	Places 22 Charging Pump speed controller in manual and adjusts charging flow as necessary to maintain Pressurizer Level on program (per Graph RCS-2, "Pressurizer Level vs. Tave")
	SRO	Directs actions to select operable channels for control and alarm
	BOP	Defeats controlling PRZR Level Channel by placing L/460A (Pressurizer Level Defeat Transfer Switch) in DEFEAT CH2 (located in Foxboro rack B-6)
	SRO	Directs initiation of actions to restore letdown using SOP-3.1, "Charging Seal Water and Letdown Control"
	RO	Restores letdown: <ul style="list-style-type: none"> - Verifies a charging pump is in service - Verifies HCV-142, Charging Line Flow Controller is throttled open - Verifies Charging flow established with 204A 22 Hot Leg Alternate Charging Stop is OPEN - Verifies letdown orifice stops CLOSED (200 A, B, C) - Verifies that switch Letdown Flow Control Valves ABC in REMOTE - Verifies Letdown Line Isolation Stops 200A and 200B are OPEN

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 2 of 3
 Event Description: Pressurizer Level Channel 2 (LT-460) Fails Low

Time	Position	Applicant's Actions or Behavior
	RO	Restores letdown (continued): <ul style="list-style-type: none"> - OPENS LCV 459 Letdown Stop and places control switch to AUTO - Places PCV-135, Low Pressure Letdown Line Controller to manual and adjusts to 50% - OPENS desired letdown orifice stop to obtain desired letdown flow (200A or 200C excepted to obtain 75 gpm letdown flow) - ADJUSTs PCV-135 to maintain 225-275 psig Letdown Pressure - Return PCV-135 to AUTO
	SRO	Direct actions to restore backup heaters to pre-failure configuration (21 AUTO, 22 and 23 ON) (or as desired by SRO)
	RO	Reset PRZR Backup heaters by taking control switches for each group (21, 22, and 23) to OFF and then returning to AUTO or ON as directed by SRO
	SRO	Direct actions to reset modulating heaters
	RO	Resets Modulating Heaters: <ul style="list-style-type: none"> - Place Modulating Heaters control switch in TRIP and then back to neutral. - Place control switch in CLOSE and then back to neutral
	SRO	Direct actions to place 22 Charging Pump in AUTO (if desired)

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 3 of 3		
Event Description: Pressurizer Level Channel 2 (LT-460) Fails Low		
Time	Position	Applicant's Actions or Behavior
	RO	Places 22 Charging Pump to AUTO: <ul style="list-style-type: none"> - Place speed control to MAN-BAL - Adjust bias knob until deviation meter indicates zero - Place speed controller to AUTO - Slowly return bias knob to zero - Verify RCP Seal Injection Flow 6-12 GPM - Monitor automatic Przr level control per Graph RCS-2, "Pressurizer Level vs Tave"
	SRO	Refer to Technical Specification 3.3 "Instrumentation" and Table 3.3.1-1 "Reactor Protection System Instrumentation" for required actions: <ul style="list-style-type: none"> - Determine that TS 3.3.1 Condition A applies - Determine from table 3.3.1-1 function 8 directs that Condition K applies - Determine from TS 3.3.1 Condition K that the bistable must be placed in trip within 72
	SRO	Direct actions to trip bistable LC-460A (LOOP 2) Hi Level Trip in the White Foxboro Rack A-12 CUE: IF the SM is asked if Bistables should be tripped, direct the team to trip the appropriate bistables.
	BOP	Place bistable LC-460A (LOOP 2) Hi Level Trip in the White Foxboro Rack A-12 to TRIP

SIMULATOR OPERATOR:

Activate Trigger 2 to start the next event (22 SG Tube Leak) when directed by the lead evaluator. (Wait until PRZR level is stable from previous event, else team will have to wait in AOP-SG-1 to determine leak rate)

Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 1 of 3		
Event Description: 22 SG Tube Leak (5 GPM)		
Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledge alarms and perform ARPs <ul style="list-style-type: none"> - SA-1 (3-7) R49 Steam Generator Blowdown Hi Rad/Trouble (WARN SETPOINT(after about 1 minute)) - SA-1 (3-9) R-45 Air Ejector Radiogas Hi Rad/Trouble (after about 6 minutes)
	TEAM	Diagnose steam generator tube leak
	SRO	Enter 2-AOP-SG-1, "Steam Generator Tube Leak"
	SRO/RO	Verify that Pressurizer level is being maintained by charging flow: <ul style="list-style-type: none"> - Checks PRZR level able to be maintained with two charging pumps - Checks PRZR level > 11% - Checks RCS Pressure and Subcooling
	SRO	Directs RO to evaluate plant conditions for indication of Gross Tube Leakage EVALUATOR NOTE: The team will not have clear indication of Gross Tube Leakage at this point.
	TEAM	Initiate determination of affected SG. Checks: <ul style="list-style-type: none"> - N-16 Monitor - Steam Line surveys - Chemistry results BOOTH OPERATOR/COMMUNICATOR: When chemistry or the NPO are contacted, report back that 22 SG is affected.
	RO/BOP	Check R-45 operable

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 2 of 3 Event Description: 22 SG Tube Leak (5 GPM)		
	BOP	Initiate attachment 1, "R-45 Estimated Leak Rate" NOTE: If chemistry is requested, provide the following information: <ul style="list-style-type: none"> - Condenser air in leakage = 6 SCFM - RCS total gaseous activity = 2.5 e-3 uCi/cc
	BOP	Calculates leak rate of approximately 5 gpm
	SRO	Directs Chemistry to perform Primary to Secondary Leak Rate determination BOOTH OPERATOR/COMMUNICATOR: After about 10 minutes, report that Pri to Sec leakrate is 4.3 GPM
	SRO	Notify Health Physics of SGTL
	BOP	Initiate Attachment 2, SG Leak Rate Data Sheet
	TEAM	Determine primary to secondary leak rate using <ul style="list-style-type: none"> - N-16 - Chemistry grab sample results - Attachment 1 EVALUATOR NOTE: N-16 data is not valid below 30% power. Team should use Chemistry results and Attachment 1 calculation to determine that leak rate is 3-5 gpm
	SRO	Determine that leak rate is >100 gpd
	SRO	Direct chemistry to draw backup samples and re-perform Primary to Secondary Leak Rate calculation. BOOTH OPERATOR/COMMUNICATOR: When Chemistry is contacted, report that additional samples have been obtained and that the leak rate has been verified at 4.3 gpm

Op-Test No.: 1		Scenario No.: 1	Event No.: 3	Page 3 of 3
Event Description: 22 SG Tube Leak (5 GPM)				
Time	Position	Applicant's Actions or Behavior		
	SRO	Initiate notifications per SAO-124, Oral Reporting of Non-Emergency Events and Items of Interest and Significant Occurrence Reporting		
	SRO	Direct Chemistry to calculate leak rate every 2 hours while shutting down		
	SRO	Evaluate attachment 3 and Technical Specification 3.4.13 to determine Shutdown Requirements: <ul style="list-style-type: none"> - TS 3.4.13 Condition A – reduce leak rate to allowable in 4 hours (cannot be met) - Be in mode 3 in additional 6 hours - Be in mode 5 in additional 36 hours 		
	SRO	Initiate plant shutdown IAW POP-3.1, "Plant Shutdown Mode 1 to Mode 3."		

SIMULATOR OPERATOR:

Activate trigger 3 when directed by Lead Evaluator to proceed to the next event (21 MBFP trips)

Op-Test No.: 1		Scenario No.: 1	Event No.: 5	Page 1 of 1
Event Description: 21 Main Boiler Feed Pump Trips				
Time	Position	Applicant's Actions or Behavior		
	RO	Diagnose trip of 21 Main Boiler Feed Pump		
	SRO	Diagnose Loss of Feedwater: <ul style="list-style-type: none"> - Direct RO to perform immediate operator actions of 2-AOP-FW-1 Loss of Main Feedwater 		
	RO	Performed from memory: <ul style="list-style-type: none"> - Checks any Main Boiler Feed Pump operating (no) - Checks Reactor power greater than 4% (yes) - Manually trip the reactor 		
	SRO	Directs team to perform immediate operator actions of EOP E-0, Reactor Trip or Safety Injection		

NOTE:

1. The SGTL will increase in size to a SG Tube Rupture (600 gpm) when the reactor is tripped (from conditional trigger 30 which actuates from condition of reactor trip breakers open)
2. A loss of offsite power will occur when SI is manually actuated (from conditional trigger 29 which actuates from condition of manual SI buttons pushed)

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 1 of 5 Event Description: Steam Generator Tube Rupture with subsequent Loss of Offsite Power		
	SRO	Direct Operators to perform immediate operator actions of EOP-E-0, Reactor Trip or Safety Injection
	RO	Verifies Reactor Trip (from memory)
	RO	Verifies Turbine Trip (from memory)
	BOP	Checks status of 480V ac buses (from memory) NOTE: Following SI actuation, offsite power will be lost and all 480V buses will be powered from the EDGs
	RO	Checks status of SI: (from memory) <ul style="list-style-type: none"> - Determines pressurizer pressure and level are lowering - Manually actuates SI - Checks both trains of SI actuated EVALUATOR NOTE: The team may go to ES-0.1 and then manually actuate SI from the foldout. Also, the team may use AOP-SG-1 IAAT step 4.1 to actuate SI.
	TEAM	Perform immediate actions steps again (using the procedure)
	SRO	Directs BOP to perform E-O Attachment 1, Automatic Action Verification EVALUATOR NOTE: See required operator actions for event 7 for BOP E-O Attachment 1, Automatic Action Verification
	RO	Verify AFW Pumps Running
	RO	Verify total AFW flow > 400 GPM

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 2 of 5 Event Description: Steam Generator Tube Rupture with subsequent Loss of Offsite Power		
	RO	Verify SI System Flow <ul style="list-style-type: none"> - Checks RCS Pressure < 1160 psig (no) - Places one RHR pump in pullout
	RO	Check RCP Seal Cooling <ul style="list-style-type: none"> - Dispatch an NPO to align backup cooling to the Charging Pumps, RHR pumps, and SI pumps - Dispatch an NPO to locally close SWN-4 and SWN-5 in the zurn strainer pit
	RO	Check cold leg temperatures stable at or trending to 547°F
	RO	Check PRZR Porvs and Spray Valves Closed
	RO	Check RCPS stopped (yes- loss of offsite power)
	RO	Check if any SG is faulted (no)
	RO	Check if SG tubes are intact (no, 22 SG is Ruptured) <ul style="list-style-type: none"> - Main Steam Line radiation recorder - Condenser air ejector radiation recorder - SG Blow down radiation recorder - No SG Level increasing in an uncontrolled manner
	SRO	Transitions to EOP E-3, Steam Generator Tube Rupture

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 3 of 5 Event Description: Steam Generator Tube Rupture with subsequent Loss of Offsite Power		
	Critical Task E-3 -- A	Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs
	RO	Isolate flow from rupture SG <ul style="list-style-type: none"> - Adjust 22 SG Atmospheric Steam Dump controller to 74% - Check atmospheric Steam Dump closed - Trip 22 AFW Pump - Dispatch NPO to locally close MS-41 Steam Supply from 22 SG to 22 AFW Pump Turbine - Verify SG Blowdown Isolation Valves closed - Dispatch NPO to close steam traps upstream of 22 MSIV and verify that MS-55B, 22 MSIV Bypass is closed - Close MS-1-22, SS SG MSIV - When 22 SG NR Level >10%, STOP Feed flow to 22 SG
	RO	Check 22 SG pressure > 440 PSIG
	SRO	Determine required core exit temperature: NOTE: 510°F expected with 22 SG pressure > 1025 PSIG
	Critical Task E-3 -- B	Establish and maintain RCS temperature so that transition from E-3 does not occur due to either of the following: <ul style="list-style-type: none"> • RCS temperature TOO HIGH to maintain required subcooling in E-3 step 16 table. OR • RCS temperature TOO LOW results in a severe challenge to the Subcriticality or Integrity CSF.
	RO	Dump steam at maximum rate from intact (21, 23, 24) SGs using atmospheric steam dumps <ul style="list-style-type: none"> - When core exit TCs < required value (510°F), stops dumping steam - Maintains core exit thermocouples less than required temperature

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 4 of 5 Event Description: Steam Generator Tube Rupture with subsequent Loss of Offsite Power		
	BOP	Check Intact SG Levels <ul style="list-style-type: none"> - Maintain total feed flow > 400 gpm until narrow range level >10% in at least one SG
	RO	Check PORVs and Block Valves
	BOP	Reset SI and CI Phase A
	BOP	Check RCS pressure greater than 320 PSIG and then stop RHR pumps and place in AUTO
	RO	Establish maximum charging flow
	RO	Check 22 SG pressure stable or increasing
	RO	Check RCS subcooling > value from table (>39°F expected)
	RO	Depressurize RCS using PORV <ul style="list-style-type: none"> - Opens one PORV - Monitors RCS Pressure, 22 SG Pressure, PRZR Level, and RCS subcooling - Closes PORV when RCS pressure < 22 SG Pressure, or PRZR Level > 71%, or subcooling < value from table
	RO	Checks RCS pressure increasing
	TEAM	Checks if SI flow can be terminated <ul style="list-style-type: none"> - Checks subcooling greater than value from table - AFW flow > 400 GPM - RCS Pressure stable or increasing - PRZR Level > 14%

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 4 of 5		
Event Description: Steam Generator Tube Rupture with subsequent Loss of Offsite Power		
Time	Position	Applicant's Actions or Behavior
	Critical Task E-3 -- D	Stop all SI pumps within 45 minutes of SI actuation.
	TEAM	STOP SI Pumps and Place in AUTO
	TEAM	Verify SI system flow not required <ul style="list-style-type: none"> - Checks Subcooling greater than value from table - PRZR Level > 14%

EVALUATOR NOTE:

Terminate scenario after SI pumps stopped, or at the discretion of the lead evaluator.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 1 of 1		
Event Description: 21 SI Pump Fails to Auto Start (E-0, Attachment 1 Automatic Action Verification)		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify charging system operation <ul style="list-style-type: none"> - Starts one charging pump in manual at maximum speed - Align charging system to the RWST (opens LCV-112B, Closes LC-112C, place Makeup Control Switch to STOP)
	BOP	Check 345 KV MO Disc Switch F7-9 Open <ul style="list-style-type: none"> - verifies BKR 7 and 9 open
	BOP	Check status of 480 V buses <ul style="list-style-type: none"> - Determines all are powered from EDGs - Direct personnel to align lighting to TSC bus
	BOP	Verify FW Isolation
	BOP	Check if MSIVs should be isolated
	BOP	Check SW system operation
	BOP	Check Three SI Pumps running <ul style="list-style-type: none"> - Manually starts 21 SI pump - OPEN 851B - Check RHR pumps running
	BOP	Check SI system valve alignment
	BOP	Verify Containment Fan Coolers in service
	BOP	Verify AFW Flow to all SGs NOTE: The team may use prudent operator action to isolate AFW flow to 22 SG when NR Level is > 10%
	BOP	Verify Containment Ventilation Isolation
	BOP	Verify Containment Isolation Phase A
	BOP	Check if CS should be actuated
	BOP	Verify CCR Air Conditioner status
	BOP	Notify SRO Attachment 1 complete

Shift Turnover

Watch Team Turnover Sheet:

Date/Time:	TODAY	Condition:	Power Ops
RCS Temp:	549 °F	% Power:	3%
RCS Press:	2235 psig	MW Gross:	0
PZR Level:	38 %	River Water:	63 °F
RCS Total Leakage:	0.1 gpm	Boron Conc:	1530 ppm
RCS Unidentified Leakage:	0.1 gpm	Control Rods	105 CBD
Xenon:	Increasing	Condenser Air leakage	6 SCFM
EFPD:	30	RCS Gas activity	2.5E-3 μ Ci/cc
PZR Press Control:	Channel 1		
PZR Level Control:	Channel 2		
Service Water:	3 Header Ops		
Risk Assessment:	Green	Daily Risk Factor:	0.78

Plant Equipment Status:

No equipment out of service

Instructions to the Shift:

Continue plant startup IAW POP-1.3. Unit 2 is at 3% power, recovering from a 7 day forced outage to repair body to bonnet leak on PRZR Spray Loop 23 Bypass Valve 524. Shift orders are to continue the startup in accordance with Pop 1.3 Plant Startup, Mode 2 to Mode 1. The previous shift completed POP 1.3 though step 4.23.

Shift Manager has directed you to baseload the HP Steam Dumps to approximately 8% prior to placing the unit on line per POP-2.1

The Operations Manager, Reactor Engineering and Power Marketing have authorized a rate of power increase of 200 MWe per hour to 100% RTP.

-Facility: Indian Point 2	Scenario No.: NRC#4	Op-Test No.: 1
Examiners: _____	Operators: _____	_____
_____	_____	_____
<p>Initial Conditions: 100% Rated Thermal Power, MOL. 21 EDG is out of Service. 22 Charging Pump is out of service.</p> <p>Turnover: Unit 2 is at 100% Power steady state conditions 340 EFPD. 21 EDG is out of service and has been inoperable for 42 hours. Maintenance is currently performing repairs.</p> <p>In addition, 22 Charging Pump was removed from service for corrective maintenance 18 hours ago. Expected return to service in 35 hours.</p>		

Event No.	Malf. No.	Event Type*	Event Description
1		N ALL	Raise main generator reactive load (MVARs) TS (SRO) due to surveillance failure.
2	XMT-CVC019A	I ALL	VCT Level Transmitter fails low
3	MOT-CFW003A	C BOP/SRO R RO	23 Condensate Pump trips Reduce steam flow < Feed Flow Reduce Tave using boration and rod insertion
4	MAL-SGN002B Bat FailRxTrips.bat	M ALL	Faulted Steam Generator Reactor auto and manual trips fail to actuate
5	SWI-AFW019G	C ALL	AFW Flow Control Valve will not close from CCR
6	AOV-RCS002A	C RO/SRO	PORV Fails Open. Block valve used to isolate it.

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

Simulator Setup

1. Reset to IC-2, 100% MOL
2. Execute batch file Bat "NRC4.bat from Ph.D Expert window:

```
^ SWI-AFW019G HC-406B MANUAL SWITCH MOTOR DRIVEN AUX FEEDWATER FLOW TO
IOR SWI-AFW019G (-1 0) 1
^ SWI-AFW019J HC-406B SET DOWN SWITCH MOTOR DRIVEN AUX FEEDWATER FLOW
IOR SWI-AFW019J (-1 0) 1
^ SWI-AFW001A PC-406A PC-406A AUX B.F.P. FOXBORO CONTROLLER (B5)
IOR SWI-AFW001A (-1 0) 5
^ SWI-AFW019L HC-406B D SWITCH MOTOR DRIVEN AUX FEEDWATER FLOW TO S/G
IOR SWI-AFW019L (-1 0) 1
^ SWI-AFW019M HC-406B C SWITCH MOTOR DRIVEN AUX FEEDWATER FLOW TO S/G
IOR SWI-AFW019M (-1 0) 1
^ SWI-AFW019K HC-406B I SWITCH MOTOR DRIVEN AUX FEEDWATER FLOW TO S/G
IOR SWI-AFW019K (-1 0) 1
^ BKR-PPL003 52/RTA REACTOR TRIP BKR
IMF BKR-PPL003 (-1 0) 5
^ BKR-PPL004 52/RTB REACTOR TRIP BKR
IMF BKR-PPL004 (-1 0) 5
^ BKR-EPS031 52/MG1 MG21 INPUT BREAKER (480)
IMF BKR-EPS031 (-1 0) 5
^ BKR-EPS032 52/MG2 MG22 INPUT BREAKER (480)
IMF BKR-EPS032 (-1 0) 5
^ LOA-DSG055 DSG-NT-89 DG-21 MANUAL-OFF-AUTO (ECS)
IRF LOA-DSG055 (-1 0) OFF
^ LOA-DSG032 DSG-NT-110 BKR 52/EG1 RACK-OUT/RACK-IN
IRF LOA-DSG032 (-1 0) OUT
^ LOA-EPS011 52-C2 C 22 480V BKR RACK OUT/RACK IN
IRF LOA-EPS011 (-1 0) OUT
^ XMT-CVC019A FIXED OUTPUT: LT-112 VCT LEVEL
IMF XMT-CVC019A (1 0) 0.000000 0 34.159801
^ MOT-CFW003A CP23 CONDENSATE PUMP 23 MTR
IMF MOT-CFW003A (2 0) 3
^ MAL-SGN002B STM HDR LK INSIDE CNTMT S/G 22 (NR)
IMF MAL-SGN002B (3 0) 25.000000 360 0.000000
^ set up conditional trigger 30 to actuate when PORV opens
TRGSET 30 "xeoo325r.eq.1"
^ Fails open PORV 455C four minutes after it auto opens
TRG 30 "IMF AOV-RCS002A (-1 240) 1 "
```

3. Place CS for 21 EDG in Pullout
4. Place 23 Charging pump in auto operation.
5. Place CS for 22 Charging Pump in Pullout
6. Put a copy of SOP 26.4 MVARs section on RO clipboard.

Simulator Setup

Verify the following commands appear in the instructor station summary

Instructor Station Summary								
	Description	Delay	Ramp	Event	Value	Final	Insert Time	
Malfunction <input type="button" value="Delete"/>	BKR-PPL003 52/RTA REACTOR TRIP BKR	00:00:00	00:00:00	None	n/a	fail esis	00:00:00	
	BKR-PPL004 52/RTB REACTOR TRIP BKR	00:00:00	00:00:00	None	n/a	fail esis	00:00:00	
	BKR-EPS031 52/MG1 MG21 INPUT BREAKER	00:00:00	00:00:00	None	n/a	fail esis	00:00:00	
Clear All	BKR-EPS032 52/MG2 MG22 INPUT BREAKER	00:00:00	00:00:00	None	n/a	fail esis	00:00:00	
	KMT-CVC019A FIXED OUTPUT: LT-112 VC	00:00:00	00:00:00	1	34.1587	0	00:00:00	
	MOT-CFW003A CP23 CONDENSATE PUMP 23	00:00:00	00:00:00	2	n/a	winding short	00:00:00	
	MAL-SGN002B STM HDR LK INSIDE CNTMT S/G 2	00:00:00	00:06:00	3	0	25	00:00:00	
<hr/>								
Remotes <input type="button" value="Delete"/>	LOA-DSG055 DSG-NT-89 DG-21 MANUAL-OFF-	00:00:00	00:00:00	None	auto	off	00:00:00	
	LOA-DSG032 DSG-NT-110 BKR 52/EG1 RACK-O	00:00:00	00:00:00	None	in	out	00:00:00	
	LOA-EFS011 52-C2 C 22 480V BKR RAC	00:00:00	00:00:00	None	in	out	00:00:00	
Overrides <input type="button" value="Delete"/>	SWI-AFW019G HC-406B MANUAL SWITCH MOTOR DRIVEN A	00:00:00	00:00:00	None	OFF	OFF	00:00:00	
	SWI-AFW019J HC-406B SET DOWN SWITCH MOTOR DRIVEN	00:00:00	00:00:00	None	OFF	OFF	00:00:00	
	SWI-AFW001A PC-406A PC-406A AUX B.F.F. FOXBORO C	00:00:00	00:00:00	None	AUTO SIGN	AUTO SIGN	00:00:00	
	SWI-AFW019L HC-406B D SWITCH MOTOR DRIVEN AUX FE	00:00:00	00:00:00	None	OFF	OFF	00:00:00	
	SWI-AFW019M HC-406B C SWITCH MOTOR DRIVEN AUX FE	00:00:00	00:00:00	None	OFF	OFF	00:00:00	
SWI-AFW019K HC-406B I SWITCH MOTOR DRIVEN AUX FE	00:00:00	00:00:00	None	OFF	OFF	00:00:00		

Triggers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	20	21	22	23	24	25	26	27	28	29	30	31

TRUE
 FALSE

Verify that conditional trigger 30 appears as follows:

Event Triggers

Event# 30 Event Action xeoo325r.eq.1

Command IMF AOV-RCS002A (-1 240) 1

#	Action
16	Available
17	Available
18	Available
19	Available
20	Available
21	Available
22	Available
23	Available
24	Available
25	Available
26	Available
27	Available
28	Available
29	Available
30	xeoo325r.eq.1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

TRUE
 FALSE

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 4 Event No.: 1 Page 4 of 3 Event Description: Raise Main Generator Reactive Load (MVARs), TS (SRO) Due to surveillance failure. SIMULATOR OPERATOR: Telephone the CCR from the System Operator. Request Indian Point Unit 2 raise VARs 100 MVARs OUT.		
	CRS	Receives VAR request from SO. (Jim Armstrong) Directs RO to increase lagging MVARs by 100 Directs BOP to monitor UAT voltage during main generator voltage adjustment.
	RO	Refers to 2-SOP-26.4
	BOP	Place Unit Aux Transformer tap changer in Manual and adjust UAT voltage to 7.0 to 7.1 KV while adjusting Main Generator Voltage.
	RO	Adjust Main Generator Voltage using the AC Raise switch to obtain desired VARS
	BOP	When VARS adjustment is complete, verify UAT voltage 7.0 to 7.2 KV
	BOP	Return the UAT Tap Changer to AUTO
		SIMULATOR OPERATOR: Telephone the CCR fro the Field Support Supervisor. Surveillance 2-PT-W020, Electrical Verification- Inverters and DC Distribution In Modes 1-4 step 4.5.2 is UNSAT. Static Inverter 24 Output Frequency is 60.6 Hz. Allowable band is 59.5 to 60.5 Hz. This surveillance references TS SR3.8.7.1
	CRS	References TS SR 3.8.7.1. Determines that 24 Static Inverter is inoperable per LCO 3.8.7.A with required action A.1 and A.2

SIMULATOR OPERATOR: Activate trigger 1 when directed by the Lead Examiner to proceed to event 2: VCT Level Transmitter fails low

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 4 Event No.: 2 Page 1 of 1 Event Description: VCT Level Transmitter fails low		
	RO	Diagnoses VCT Level Transmitter failure
	SRO	Enters 2-AOP-CVCS-1, Chemical and Volume Control System Malfunctions, and directs the operator's actions
	BOP	Holds LCV-112C Control Switch in OPEN When LCV-112C indicates open, then CLOSES LCV-112B
	RO	Places Makeup Control Switch in STOP If necessary, reduces turbine load to keep Tave on program When necessary to raise VCT pressure, initiates manual VCT makeup per SOP-3.2, Reactor Coolant System Boron Concentration Control
	BOP	Monitors VCT Pressure. Controls VCT pressure 2-5 psig above pre-malfunction (19-20 psig) pressure as follows: <ul style="list-style-type: none"> - Coordinates with RO to raise VCT Pressure by manual makeup to VCT per SOP-3.2, Reactor Coolant System Boron Concentration Control - Lowers VCT Pressure by manually diverting letdown via LCV-112A

SIMULATOR OPERATOR:

When directed by the Lead Examiner, actuate trigger 2 to cause Condensate Pump Trip

Op-Test No.: 1 Scenario No.: 4 Event No.: 3 Page 1 of 1		
Event Description: 23 Condensate Pump trips, Reduce Steam flow < Feed Flow, Reduce Tave using boration and rod insertion		
SIMULATOR OPERATOR: Activate Trigger 1 when directed by Lead Examiner to start event.		
Time	Position	Applicant's Actions or Behavior
	BOP	Diagnoses trip of 23 Condensate Pump
	SRO	Directs RO to perform immediate actions of 2-AOP-FW-1, Loss of Main Feedwater
	RO	Verifies Main Feedwater Pumps running
	SRO	Directs team actions using 2-AOP-FW-1, Loss of Main Feedwater
	RO	Reduces turbine load as necessary to maintain Feed Flow \geq Steam Flow Adds negative reactivity using boration and/or control rods to maintain Tave on program Monitors delta-flux during reactivity addition and uses control rods when required to maintain delta-flux within the target band
	BOP	Monitors MBFP suction pressure and if suction pressure cutback actuates, then places MBFP Master Speed Controller in MANUAL and slowly lowers MBFP speed to maintain suction pressure > 310 psig EXAMINER NOTE: Suction pressure will not immediately respond after manual action is taken: Suction pressure will respond after Feed Flow is > Steam Flow AND the Main Feed Regulating Valves begin to throttle closed.
	RO	Places Main Feed Regulating Valve controllers to manual as necessary and controls feed flow when level in SG > 60% or when controller windup is to be removed. Places Main Boiler Feed Pump Master Controller back to automatic using SOP 21.1

SIMULATOR OPERATOR:

When directed by the Lead Examiner, actuate trigger 3 to cause Faulted Steam Generator, Reactor auto and manual trips fail to actuate

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No. 4: Event No.: 4 Page 1 of 2 Event Description: Faulted Steam Generator, Reactor auto and manual trips fail to actuate		
	RO	Diagnose steam leak Manually actuate Reactor Trip Diagnose failure of reactor to trip
	SRO	Direct team to perform immediate actions of EOP FR-S.1, Response to Nuclear Power Generation/ATWS
	Critical Task FR-S.1 -- C	Insert negative reactivity into the core by at least one of the following methods before completing FR-S.1 step 4: <ul style="list-style-type: none"> - De-energize the control rod drive MG sets - Place rod control in manual and insert RCCAs - Establish emergency boration flow to the RCS
	SRO	Dispatch NPO to locally trip the reactor
	RO	Place Rod Control Bank Selector switch in MANUAL Hold Rod Control In-Out Switch in the IN position and manually insert control rods
	BOP	Manually trip the turbine Verify AFW pumps running Start charging pumps Open MOV-333, Emergency Boration valve Place both Boric Acid Pumps in high speed Place running Charging Pump speed controllers in Manual Open LCV-112B, Suction from RWST Close LCV-112C, Suction from VCT Place RCS Makeup Control Switch to STOP Establish minimum charging flow of 75gpm Check PRZR Pressure < 2335
		SIMULATOR OPERATOR: Trip both Rod Drive MG set Output Breakers to insert control rods at this time.

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No. 4: Event No.: 4 Page 2 of 2 Event Description: Faulted Steam Generator, Reactor auto and manual trips fail to actuate		
	BOP	Verify Containment Ventilation Isolation Verify Containment Pressure Relief Valves Closed
	RO	Check reactor trip and turbine trip have occurred
	BOP	Maintain total feed flow > 800 gpm until NR level in at least one SG > 10%
	RO	Verify all dilution paths isolated: <ul style="list-style-type: none"> - Check FCV-111A demin water flow control valve CLOSED - Check no flow indicated on FI-111 Primary Water Flow Check for Reactivity Insertion from Uncontrolled RCS Cooldown
	Critical Task E-2 - A	Isolate the Faulted SG before Transition out of FR-S.1
	BOP	Isolated Faulted SG <ul style="list-style-type: none"> - Close all MSIVs - Isolate AFW flow to 22 SG (FCV-406B does not close) <ul style="list-style-type: none"> o Dispatches NPO to locally close FCV-406B - Dispatch NPO to close MS-41, steam supply from 22 SG to 22 ABFP turbine
	RO	Isolate Faulted SG <ul style="list-style-type: none"> - Identify 22 SG Faulted - Isolate Main Feed to 22 SG - Verify 22 SG Atmospheric Steam Dump CLOSED
		BOOTH OPERATOR: When NPO is dispatched to close FCV-406B, use CVH-AFW006B set to 0 to close the valve.
	RO	Check CETs < 1200°F Verify Reactor Subcritical
	SRO	Return to EOP E-0, Reactor Trip or Safety Injection

Op-Test No.: 1 Scenario No.: 4 Event No.: 5 Page 1 of 2		
Event Description: PORV Fails Open. Block valve used to isolate it.		
Time	Position	Applicant's Actions or Behavior
	RO	Verify Reactor Trip Verify Turbine Trip
	BOP	Verify power to 480V Buses
	RO	Verify SI Status
	BOP	<p>Performs Attachment 1 while SRO and RO continue in E-0:</p> <p>Verify charging system operation</p> <ul style="list-style-type: none"> - Starts one charging pump in manual at maximum speed - Align charging system to the RWST (opens LCV-112B, Closes LC-112C, place Makeup Control Switch to STOP) <p>Check 345 KV MO Disc Switch F7-9 Open</p> <ul style="list-style-type: none"> - verifies BKR 7 and 9 open <p>Check status of 480 V buses</p> <ul style="list-style-type: none"> - Dispatches NPO to reset all lighting and MCCs 24A, 27A, and 29A - Stops all Condensate Pumps <p>Verify FW Isolation</p> <p>Check if MSIVs should be isolated</p> <p>Check SW system operation</p> <p>Check SI System Operation</p> <p>Check SI system valve alignment</p> <p>Verify Containment Fan Coolers in service</p> <p>Verify AFW Flow to all SGs</p> <p>Verify Containment Ventilation Isolation</p> <p>Verify Containment Isolation Phase A</p> <p>Check if CS status</p> <p>Verify CCR Air Conditioner status</p> <p>Notify SRO Attachment 1 complete</p>

Time	Position	Applicant's Actions or Behavior
Op-Test No.: 1 Scenario No.: 4 Event No.: 5 Page 2 of 2 Event Description: PORV Fails Open. Block valve used to isolate it.		
	RO	Verifies AFW Pumps running and supplying > 400 GPM AFW flow to the SGs Verifies SI Pump flow and RHR pump flow Checks RCP seal cooling Starts 22 SWP Controls RCS Cool-Down by verifying not dumping steam, reducing AFW flow to >400gpm and closing MSIVs
	Critical Task E-0 -- M	Close the block MOV upstream of the stuck-open PZR PORV before completion of the first step in the ERG network that directs the crew to close the block MOV
	RO	Check PORVs and Spray Valves: <ul style="list-style-type: none"> - PORVs – Closed - Determines PORV PCV-455C is open - Checks pressure < 2335 - Places Control Switch for PCV-455C to CLOSE - Determines if PCV-455C is not closed - Closes Block Valve 535
	RO	Check if RCPs should be stopped
	RO	Checks for any faulted SG
	SRO	Transitions to E-2, Faulted SG Isolation
	TEAM	Verify all actions to isolate 22 SG have been completed
	SRO	Transition to E-1, Loss of Reactor or Secondary Coolant
	TEAM	Verify that SI Termination Criteria are met
	CRS	Transition to ES-1.1, SI Termination

EXAMINER NOTE:

Terminate the scenario when transition to ES-1.1 is made, or at the discretion of the Lead Examiner

Shift Turnover

Watch Team Turnover Sheet:

Date/Time:	TODAY	Condition:	Power Ops
RCS Temp:	562 °F	% Power:	100%
RCS Press:	2235 psig	MW Gross:	1017
PZR Level:	48 %	River Water:	78 °F
RCS Total Leakage:	0.1 gpm	Boron Conc:	972 ppm
RCS Unidentified Leakage:	0.1 gpm	Control Rods	214 CBD
Xenon:	Equilibrium	Condenser Air leakage	6 SCFM
EFPD:	340	RCS Gas activity	2.54e-2 μ Ci/cc
PZR Press Control:	Channel 1		
PZR Level Control:	Channel 2		
Service Water:	3 Header Ops		
Risk Assessment:	Yellow	Daily Risk Factor:	3.45

Plant Equipment Status:

1. EDG 21 is out of service for bearing replacement. It was removed from service 42 hours ago and is due back in 12 hours. Maintenance is currently performing repairs. TS 3.8.1.B surveillance requirement last performed 3 hours ago.
2. 22 and 23 EDGs are protected equipment.
3. 22 Charging Pump was removed from service for corrective maintenance 18 hours ago. Expected return to service in 35 hours.

Instructions to the Shift:

Maintain current plant conditions.