

Facility: Indian Point 2	Scenario No.: NRC#1	Op-Test No.: 1	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: 3% Rated Thermal Power, MOL			
<p>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 though step 4.23. Operations 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.</p>			
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- RCP007C	C SRO/BOP	23 RCP High Vibration
5	MAL- ATS007A	C SRO/RO	21 Main Boiler Feed Pump Trip (Manual reactor trip required)
6	MAL- RCS014B MAL- EPS001	M ALL	SGTR with subsequent Loss of Offsite Power
7	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-RCP007C RCP 23 HIGH VIBRATION
IMF MAL-RCP007C (3 0) 10.000000 7200 4.000000
^ MAL-ATS007A MBFP 21 THRUST BEARING FAILURE (NR)
IMF MAL-ATS007A (4 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) 5.000000 0 0.050000"
  
```

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

Instructor Station Summary

Malfunction

Delete

Clear All

Description	Delay	Ramp	Event	Value	Final	Insert Time
MOC-SIS001 SI1 SAFETY INJECTION PU	00:00:00	00:00:00	None	n/a	aut cls	00:00:00
XMT-RCS020A FIXED OUTPUT: LT-460 PZ	00:00:00	00:00:00	1	47.6803	0	00:00:00
MAL-RCS014B STEAM GENERATOR 22 TUBE LEAK	00:00:00	00:00:00	2	0	0.05	00:00:00
MAL-RCP007C RCP 23 HIGH VIBRATION	00:00:00	02:00:00	3	0	10	00:00:00
MAL-ATS007A MBFP 21 THRUST BEARING FAILUR	00:00:00	00:00:00	4	FALSE	FALSE	00:00:00

Remotes

Delete

Clear All

Overrides

Delete

Clear All

Triggers

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

OK

Simulator Setup

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

Event Triggers
[-] [] [X]

Event#
Event Action

29

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
[-] [] [X]

Event#
Event Action

30

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

3 of 19

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.

Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Page 1 of 1		
Event Description: Raise Reactor Power from 3% reactor power		
Time	Position	Applicant's Actions or Behavior
	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	Directs activities associated with shifting Feedwater from Auxiliary Feedwater Pumps to Main Feedwater Pumps
	BOP	Shifts Feedwater from Auxiliary Feedwater Pumps to Main Feedwater Pumps per 2-SOP-21.1 "Main Feedwater System." <ul style="list-style-type: none"> - Checks operation of main feed and bypass feed flow control valves - Shifts Feedwater control from AFW pumps to Main Feedwater System - Control SG levels on main Feedwater bypass flow control valves - Align AFW pumps and flow control valves for automatic operation per 2-SOP-21.3 "Auxiliary Feedwater Operation"
	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.

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

Time	Position	Applicant's Actions or Behavior
	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

Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 2 of 3
 Event Description: 22 SG Tube Leak (5 GPM)

Time	Position	Applicant's Actions or Behavior
	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 the Lead Evaluator to proceed to the next event (23 RCP High Vibration)

Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Page 1 of 1		
Event Description: 23 RCP High Vibration		
Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledge alarm and perform ARP: - SF 4-6 23 RCP HI Vibration
	SRO	Enter 2-AOP-RCP-1, Reactor Coolant Pump Malfunction
	TEAM	Determine immediate reactor trip and RCP trip NOT required: - Checks Stator winding temp $\geq 250^{\circ}\text{F}$ AND Tave $\geq 547^{\circ}\text{F}$ - Stator winding temp $\geq 270^{\circ}\text{F}$ AND Tave $< 547^{\circ}\text{F}$. - RCS seal 1 $\Delta P < 200$ psig. - Sustained RCP vibration > 20 mils - RCP motor bearing temp $\geq 200^{\circ}\text{F}$ - #1 Seal inlet temp $\geq 225^{\circ}\text{F}$
	BOP	Initiate data collection per Attachment 1, RCP Data Sheet
	SRO	Notify Plant Engineering
	BOP	Check vibration < 13 mils (no)
	BOP	Check vibration spiking (no)
	BOP	Check vibration trend increasing < 1 mil/hr (no) Note: Vibration trend is increasing at a rate of 3 mils/hr
	SRO	Continue plant shutdown per POP-3.1

SIMULATOR OPERATOR:

Activate trigger 4 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)

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		
Time	Position	Applicant's Actions or Behavior
	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

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				
Time	Position	Applicant's Actions or Behavior		
	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		

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		
Time	Position	Applicant's Actions or Behavior
	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

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
	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 before water relief from the ruptured SG atmospheric or safety relief valves occurs
	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 dumps 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 µCi/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.

Operations 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#2	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	RLY-DSG009	N BOP/SRO R RO	23 EDG inoperable due to 86 Lockout Relay tripped Begin TS required plant shutdown
2	MAL-EP007D	C ALL	Loss of Bus 6A (Lose 23 CHG Pump, Starts 21 CHG Pump)
3	MOT-CVC003A	C ALL	21 Charging Pump Trips Manual Reactor Trip
4	MAL-EP001 MAL-DSG003B	M ALL	Loss of all AC Station Aux Xfmr fails 22 EDG fails to start
5	MOC-SWS010 MOC-SWS-011	C SRO/BOP	25 SW Pump Fails to auto start following start of 22 EDG and energizing associated 480V buses

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

Simulator Setup

1. Execute batch file Bat "NRC2.bat from Ph.D Expert window:

```
^ 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-EPS010 52-C1 C 21 480V BKR RACK OUT/ RACK IN
IRF LOA-EPS010 (-1 0) OUT
^ MOC-SWS010 SW5-2A SW PUMP MOTOR 25 480V BUS 2A
IMF MOC-SWS010 (-1 0) 4
^ MOC-SWS011 SW5-3A SW PUMP MOTOR 25 480V BUS NO. 3A
IMF MOC-SWS011 (-1 0) 4
^ MAL-DSG003B DG 22 AIR START FAILURE
IMF MAL-DSG003B (-1 0) TRUE
^ RLY-DSG009 RELAY FAILURES: 86-DG23 DG23 LOCKOUT RELAY
IMF RLY-DSG009 (1 0) 3
^ MAL-EPS007D 480V BUS 6A FAULT
IMF MAL-EPS007D (2 0) TRUE
^ MOT-CVC003A C1 CHARGING PMP 21 MOTOR
IMF MOT-CVC003A (3 0) 3
^ MOV 625 fails closed after 204 closed
TRGSET 30 "xcoi213o.eq.0"
TRG 30 "IMF MOV-CCW008 (-1 0) 2 "
^ Loss of Statin Aux Transforem 60 seconds after RX Trip
TRGSET 29 "jbkrta.eq.0"
TRG 29 "IMF MAL-EPS001 (-1 60) TRUE"
```

2. Place CS for 21 EDG in Pullout
3. Place 23 Charging pump in auto operation.
4. Place CS for 22 Charging Pump in Pullout
5. Verify that standard PICs screens are displayed (no screens that could cue the team to upcoming events)

Simulator Setup

Validation time 105 minutes

Verify the following commands appear in the instructor station summary:

Instructor Station Summary																																						
	Description	Delay	Ramp	Event	Value	Final	Insert Time																															
Malfunction	MOC-SWS010 SW5-2A SW PUMP MOTOR 25 48	00:00:00	00:00:00	None	n/a	aut cls	00:00:00																															
Delete	MOC-SWS011 SW5-3A SW PUMP MOTOR 25 48	00:00:00	00:00:00	None	n/a	aut cls	00:00:00																															
	MAL-DSG003B DG 22 AIR START FAILURE	00:00:00	00:00:00	None	FALSE	FALSE	00:00:00																															
Clear All	RLY-DSG009 RELAY FAILURES 86-DG23 DG	00:00:00	00:00:00	1	n/a	energize	00:00:00																															
	MAL-EPS007D 480V BUS 6A FAULT	00:00:00	00:00:00	2	FALSE	FALSE	00:00:00																															
	MOT-CVC003A C1 CHARGING FMP 21 MO	00:00:00	00:00:00	3	n/a	winding short	00:00:00																															
Remotes	LOA-DSG055 DSG-NT-89 DG-21 MANUAL-OFF-	00:00:00	00:00:00	None	auto	off	00:00:00																															
Delete	LOA-DSG032 DSG-NT-110 BKR 52/EG1 PACK-O	00:00:00	00:00:00	None	in	out	00:00:00																															
Clear All	LOA-EPS011 52-C2 C22 480V BKR RAC	00:00:00	00:00:00	None	in	out	00:00:00																															
Overrides																																						
Delete																																						
Clear All																																						
Triggers																																						
<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr><tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr></table>									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
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<table><tr><td><input type="checkbox"/></td><td>TRUE</td></tr><tr><td><input type="checkbox"/></td><td>FALSE</td></tr></table>									<input type="checkbox"/>	TRUE	<input type="checkbox"/>	FALSE																										
<input type="checkbox"/>	TRUE																																					
<input type="checkbox"/>	FALSE																																					
<input type="button" value="OK"/>																																						

Simulator Setup

Verify that conditional trigger 29 and 30 appear as follows:

Event Triggers
[-] [] [X]

Event#
Event Action

29

jbrkta.eq.0

Command IMF MAL-EPS001 (-1 60) 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	jbrkta.eq.0
30	xcoi213o.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
[-] [] [X]

Event#
Event Action

30

xcoi213o.eq.0

Command IMF MOV-CCW008 (-1 0) 2

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	jbrkta.eq.0
30	xcoi213o.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

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Page 5 of 2
 Event Description: 23 EDG becomes Inoperable due to 86 Lockout Tripped. Begin TS required plant shutdown

SIMULATOR OPERATOR:

Activate Trigger 1 to insert the 23 EDG 86 Relay Trip when directed by the lead evaluator

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Acknowledge alarm and perform Alarm Response Procedure:</p> <ul style="list-style-type: none"> - SG 4-9 23 Diesel Generator Trouble - Dispatch NPO to 23 EDG - Refer to SOP 27.3.1.3 23 Emergency Diesel Generator Manual Operation <p>SIMULATOR OPERATOR/COMMUNICATOR:</p> <p>After dispatched, NPO reports back to CCR that 23 EDG 86 lockout has tripped.</p>
	SRO/BOP	<p>Direct NPO to attempt to clear trouble and VERIFY that lockout relay is RESET</p> <p>SIMULATOR OPERATOR/COMMUNICATOR:</p> <p>NPO reports back to CCR that 23 EDG 86 Lockout relay will NOT reset.</p>
	SRO	<p>Refers to Technical Specification 3.8.1 Condition E</p> <ul style="list-style-type: none"> - Two or more EDGs inoperable - Action Statement E.1 Restore at least two EDGs to operable status within 2 hours - Determines that plant shutdown must be commenced per action statement F.1, be in mode 3 in 6 hours <p>SIMULATOR OPERATOR/COMMUNICATOR:</p> <p>Maintenance reports that 21 and 23 EDG cannot be returned to service within 2 hours. The 86 tripped and will not reset. It appears that the relay itself must be replaced.</p> <p>Note: If the team does not begin the SD right away, then the Operations Manger directs the team to commence shutdown immediately.</p>
	SRO	<p>Directs plant shutdown per POP-3.1, Plant Shutdown, Mode 1 to Mode 3</p>

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Page 2 of 2		
Event Description: 23 EDG becomes Inoperable due to 86 Lockout Tripped. Begin TS required plant shutdown		
Time	Position	Applicant's Actions or Behavior
	RO	Adds negative reactivity: <ul style="list-style-type: none">- Boration- Control rod insertion- Maintains Delta-flux within the target band
	BOP	Lowers turbine load using Turbine Governor (or LL1/LL2 if directed)

SIMULATOR OPERATOR:

Activate Trigger 2 to insert the Loss of Bus 6A when directed by the lead evaluator

Op-Test No.: 1 Scenario No.: 2 Event No.: 2 Page 7 of 2
 Event Description: Loss of Bus 6A (Lose 23 Charging Pump)

Time	Position	Applicant's Actions or Behavior
	BOP	Diagnose loss of Bus 6A. Acknowledge multiple alarms: <ul style="list-style-type: none"> - SH 3-10 480V Swgr Motor Trip (Common) - SH 4-10 480V Bus Main Tie or Emerg Gen Breaker Trip - SG 4-6 Switch Gear 21 or 22 Undervoltage - Additional alarms associated with loss of 26 SWP, 23 Charging Pump, 22 Rod Drive MG, 25 FCU, Process Radiation Monitors, 22 PW Pump, 22 BA Xfer Pump
	SRO	Enters 2-AOP-480V-1, Loss of Normal Power to Any 480V Bus and directs team actions
	RO	Starts 21 Charging Pump
	BOP	Checks one CCW pump running (yes) Checks OPEN MOV-625 RCP Thermal Barrier Discharge Isol Vlv (yes) Checks SW pumps running on essential and non-essential headers (yes)
	RO	Starts 21 PW Pump
	SRO	Dispatches NPO to monitor all running EDGs NOTE: 22 EDG fails to start. NPO is unable to start it if directed to. 21 and 23 EDGs are inoperable. TS 3.8.1 Condition E still applies for two or more EDGs inoperable. NPO report 22 EDG OVERCRANK Alarm is annunciated.

Op-Test No.: 1 Scenario No.: 2 Event No.: 2 Page 2 of 2

Event Description: Loss of Bus 6A (Lose 23 Charging Pump)

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Performs Attachment 3 Restoring Normal Power to 480V Bus 6A:</p> <ul style="list-style-type: none"> - Dispatch NPO to start 23 EDG - Notifies SRO that 23 EDG cannot be started - Diagnoses fault on bus 6A (observes 6A fault lamp extinguished) - Dispatch NPO to open bus 6A MCC breakers and perform visual inspection of Bus 6A - Places Control Switches for Bus 6A loads to pullout: <p>SIMULATOR OPERATOR/COMMUNICATOR:</p> <p>Report that the back of Bus 6A switchgear appears damaged and smells burned.</p>
	SRO	<p>Refer to attachment 5 "480V Bus Equipment" for loads lost and perform a review of Technical Specifications for required actions</p> <ul style="list-style-type: none"> - Refers to TS 3.8.9 Condition A

SIMULATOR OPERATOR:

Activate Trigger 3 to insert Trip of 21 Charging Pump when directed by the lead evaluator

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Page 9 of 4		
Event Description: 21 Charging Pump Trips (Loss of all charging)		
Time	Position	Applicant's Actions or Behavior
	RO	Diagnose trip of 21 Charging Pump
	SRO	Enter 2-AOP-CVCS-1, Chemical and Volume Control System Malfunction and Directs operator actions
	RO	Closes the following valves <ul style="list-style-type: none"> - 200A Letdown Orifice 75 GPM - 200B Letdown Orifice 45 GPM - 200C Letdown Orifice 75 GPM - LCV-459 Letdown Stop
	BOP	Closes 204A Alternate Charging 22 Hot Leg NOTE: MOV-625 should close at this time
	BOP	Observe MOV-625 RCP Thermal Barrier Disc CLOSED <ul style="list-style-type: none"> - Place control switch for MOV-625 in OPEN position - Determine MOV 625 does not open
	SRO	Directs team to <ul style="list-style-type: none"> - Trip Reactor - Stop all RCPs - Go to E-0
	RO	Actuates manual reactor trip
	BOP	Stops all RCPs
	SRO	Directs team to perform immediate actions of E-0

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 2 of 4

Event Description: Loss of All AC Power

NOTE: Loss of all AC occurs 60 seconds after reactor is tripped

Time	Position	Applicant's Actions or Behavior
	SRO	Directs team actions in EOPs
	RO	Verifies Reactor Trip Verifies Turbine Trip
	BOP	Checks status of AC Buses - Determines that no AC bus is energized
	SRO	Enters EOP ECA-0.0 Loss of All AC Power - Directs team to perform ECA-0.0 immediate actions
	RO	Verifies Reactor Trip Verifies Turbine Trip
	RO	Verifies RCS isolated. Observes the following valves CLOSED: - PRZR PORVS, - LCV-459, Letdown Stop - 200A, B, C, Letdown Isolation valves - 213, Excess letdown isolation
	Critical Task ECA-0.0--B	Establish at least 400 gpm AFW flow to the SGs before SG dry-out occurs (WR level less than 14%)
	BOP	Align AFW to SGs using 22 Turbine Drive AFW Pump - Checks Open PCV-1139, steam supply regulator - Manually aligns TD AFW Flow Control Valves - Adjust HCV-1118, steam supply - Observes > 400 GPM flow

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 3 of 4		
Event Description: Loss of All AC Power		
Time	Position	Applicant's Actions or Behavior
	TEAM	<p>Attempt to restore Power to any 480V Bus</p> <p>Dispatch NPO to emergency start EDGs</p> <p>SIMULATOR OPERATOR:</p> <p>NPO is initially unsuccessful at starting an EDG.</p>
	BOP	<p>Performs 2-AOP-138KV-1, Loss of Power to 6.9KV Bus 5 AND/OR 6</p> <p>SIMULATOR OPERATOR:</p> <p>CONED DO provides permission use Feeder 13W92. However, 22EDG will be started by NPO BEFORE bus 5A is restored.</p>
	RO	<p>Places Control Switches- in Pull-Out:</p> <ul style="list-style-type: none"> - CS Pumps - SI Pumps - FCUs - MD AFW Pumps - Turning Gear Oil Pump - Bearing Oil Pump - Turb Aux Oil Pump - CCW Pumps - RHR Pumps
	SRO	<p>Dispatch personnel to locally restore AC power</p> <p>SIMULATOR OPERATOR/COMMUNICATOR:</p> <p>After this step is performed, report back to CCR that 22 EDG is ready to start. When permission is given to start 22 EDG, then delete the air start malfunction MAL-DSG003B and execute batch file bat EDG22-1.bat to reset and start 22 EDG</p> <p>Report back immediately after 22 EDG starts.</p>

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 4 of 4		
Event Description: Loss of All AC Power		
Time	Position	Applicant's Actions or Behavior
	Critical Task ECA-0.0--F	Manually start the ESW pump such that the EDG does not fail because of damage caused by engine overheating
	BOP	Observe 22 EDG has started and bus 2A/3A energized <ul style="list-style-type: none"> - Starts 25 Service Water Pump - Checks 1276 and 1276 A Diesel Generator Cooling Water valves open
	TEAM	Verify equipment loaded onto energized bus: <ul style="list-style-type: none"> - MCC 24 - MCC 24A - 22 Battery Charger - 22 Static Inverter on alternate power - PA system inverter - MCC 26C - MCC 211 - 23 Battery Charger
	SRO	Selects Recovery Procedure based upon conditions <ul style="list-style-type: none"> - ECA-0.1, Loss of All AC Power Recovery Without SI Required (expected) - ECA-0.2, Loss of All AC Power Recovery With SI Required (if RCP seals degrade)

NOTE:

Terminate the scenario when the transition from ECA-0.0 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 µCi/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 (2ptw19) requirement last performed 3 hours ago.
2. 21 and 22 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.

Facility: Indian Point 2	Scenario No.: NRC#3	Op-Test No.: 1
Examiners: _____ Operators: _____ _____ _____		
Initial Conditions: 40% Rated Thermal Power, MOL		
Turnover: Unit 2 is at 38% Power with power ascension to 100% in progress following a forced outage. No equipment OOS.		

Event No.	Malf. No.	Event Type*	Event Description
1		N SRO/BOP R RO	Raise reactor power
2	MAL-CRF001AY	C ALL	Stuck Control Rod (P-10)
3	XMT-SGN026A	I RO/SRO	LT 447B 24 SG Controlling Level Channel fails low.
4	MAL-CCW001D	C BOP/SRO	RCP Upper Bearing Oil Cooler CCW leak
5	MAL-RCS001C	M ALL	LBLOCA
6	RLY-PPL487 RLY-PPL488	C RO	Safety Injection auto actuation failure, RO manually actuates
7	MOC-RHR001 MOC-RHR002	C ALL	Both Recirculation Pumps both fail to start

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

Simulator Setup

Reset to IC-125

Execute batch file Bat "NRC3.bat from Ph.D Expert window:

```

^ MAL-CRF001AY  ROD: P10 STUCK ROD
IMF MAL-CRF001AY (-1 0) 1
^ RLY-PPL487 RELAY FAILURES: SIA-1 (A)  SAFETY INJECTION AUTO MASTE
IMF RLY-PPL487 (-1 0) 2
^ RLY-PPL488 RELAY FAILURES: SIA-2 (B)  SAFETY INJECTION AUTO MASTE
IMF RLY-PPL488 (-1 0) 2
^ MOC-RHR001 R1      RECIRC PUMP NO. 21 MOTOR
IMF MOC-RHR001 (-1 0) 5
^ MOC-RHR002 R2      RECIRC PUMP NO. 22 MOTOR
IMF MOC-RHR002 (-1 0) 5
^ XMT-SGN026A FIXED OUTPUT: LT-447B   S/G 24 LEVEL
IMF XMT-SGN026A (1 0) 0.000000 0 48.796101
^ MAL-CCW001D  RCP 24 OIL COOLER TUBE LEAK   (NR)
IMF MAL-CCW001D (2 0) 1.000000 180 0.000000
^ MAL-RCS001C  RUPTURE LOOP C COLD LEG       (NR)
IMF MAL-RCS001C (30 0) TRUE
^ Set Up trigger to actuate LBLOCA when Rx Trips
TRGSET 30 "jbrta.eq.0"
  
```

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"/>	MAL-CRF001AY ROD: P10 STUCK ROD	00:00:00	00:00:00	None	n/a	untrip	00:00:00																														
	RLY-PPL487 RELAY FAILURES: SIA-1 (A) SA	00:00:00	00:00:00	None	n/a	stuck contacts	00:00:00																														
	RLY-PPL488 RELAY FAILURES: SIA-2 (B) SA	00:00:00	00:00:00	None	n/a	stuck contacts	00:00:00																														
Clear All	MOC-RHR001 R1 RECIRC PUMP NO. 21	00:00:00	00:00:00	None	n/a	asis	00:00:00																														
	MOC-RHR002 R2 RECIRC PUMP NO. 22	00:00:00	00:00:00	None	n/a	asis	00:00:00																														
	XMT-SGN026A FIXED OUTPUT: LT-447B S/	00:00:00	00:00:00	1	48.3509	0	00:00:00																														
	MAL-CCW001D RCP 24 OIL COOLER TUBE LEAK	00:00:00	00:03:00	2	0	1	00:00:00																														
	MAL-RCS001C RUPTURE LOOP C COLD LEG	00:00:00	00:00:00	30	FALSE	FALSE	00:00:00																														
Remotes																																					
<input type="button" value="Delete"/>																																					
<input type="button" value="Clear All"/>																																					
Overrides																																					
<input type="button" value="Delete"/>																																					
<input type="button" value="Clear All"/>																																					
<div style="display: flex; justify-content: space-between; align-items: center;"> <div> Triggers <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> </table> </div> <div> <input checked="" type="checkbox"/> TRUE <input type="checkbox"/> FALSE </div> <div> <input type="button" value="OK"/> </div> </div>								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
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																							

Simulator Setup

Verify that conditional trigger 30 appears as follows

The image shows a software window titled "Event Triggers". At the top, there are two dropdown menus: "Event#" with the value "30" and "Event Action" with the value "jbkrt.a.eq.0". Below these is a "Command" field which is empty. There are two buttons: "Accept New Event" and "Finish". A list of events is shown with columns "#", "Action", and a scroll bar. The events are numbered 16 to 30, with actions "Available" for 16-29 and "jbkrt.a.eq.0" for 30. At the bottom is a truth table with two rows of 15 cells each, numbered 1-15 and 16-30. A legend indicates that a solid black square represents "TRUE" and a shaded square represents "FALSE".

#	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	jbkrt.a.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

Op-Test No.: 1 Scenario No.: 3 Event No.: 1 Page 1 of 1		
Event Description: Raise reactor power		
Time	Position	Applicant's Actions or Behavior
	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- Turbine Load
	RO	Adds Positive reactivity <ul style="list-style-type: none">- Rod Motion- Dilution
	BOP	Raises turbine load using Turbine Governor (or LL1/LL2 if directed)
		CUE: Generator Flux surveys have been performed. Extraction steam Bypass valves are closed. Fuel conditioning 3% per hour limit on power increase is not required. If questioned about the MBFP seal water injection pump, I&C is investigating the low delta-P alarm setpoint.

EVALUATOR NOTE:

Proceed to the next event after sufficient rod motion has resulted in positive indication of rod misalignment

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Page 1 of 1		
Event Description: Stuck Control Rod (P-10)		
Time	Position	Applicant's Actions or Behavior
	RO	Diagnoses Control Rod misalignment
	BOP	Acknowledges alarm and performs ARP: - SF 2-7 Control Rod or Power Distribution Trouble
	SRO	Enters 2-AOP-ROD-1, Rod Control and Indication Systems Malfunctions - Directs the actions of the ROs
	RO	Determines Control Rod P-10 is misaligned by evaluating the following indications: - Flight Panel DVM - PICs
	SRO	Notifies Reactor Engineering of control rod misalignment. NOTE: If reactor engineering is contacted to determine if P-10 is misaligned, then reactor engineering responds that P-10 is misaligned from its group.
	RO	Places rod control in MANUAL
	BOP	Adjusts turbine load as necessary to maintain Tave on program
	SRO	Evaluates the following Technical Specifications: - 3.1.4 Rod Group Alignment Limits
	RO	Determines actual position of rod P-10 EVALUATOR NOTE: If I&C assistance is requested to determine rod position using RPI drawer, give the following cue: RPI drawer 2.60 volts.

SIMULATOR OPERATOR:

Activate Trigger 2 to fail LT-447B when directed by the lead examiner

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Page 1 of 1
 Event Description: LT 447B, 24 SG Controlling Level Channel fails low.

Time	Position	Applicant's Actions or Behavior
	RO	Diagnoses 24 SG Level control deviation
	BOP	Performs ARP for associated alarms: <ul style="list-style-type: none"> - FB 1-1 Steam Generator Level Control Deviation - SB-2 4-3 24 SG Low Level Channel Trip
	SRO	Directs RO to perform immediate action of 2-AOP-INST-1, Instrument/Controller Failures
	RO	Diagnoses failure of LT-447B, 24 SG controlling level channel <ul style="list-style-type: none"> - Places 24 SG Feedwater Regulating Valve controller in Manual and adjusts FRV position as necessary to control 24 SG level at program.
*	SRO	Evaluates the following Technical Specifications: <ul style="list-style-type: none"> - 3.3.1 Table 1 Function 13 (condition E applies) - 3.3.2 Table 1 Functions 5.b and 6.b (condition D applies) - Determines that bistable must be tripped within 72 hours per 3.3.1 Condition E and 3.3.2 Condition D
	BOP	Places bistable trip switches in trip: <ul style="list-style-type: none"> - LC-447E, Loop 4B High Level, in Foxboro Blue Rack B-2 - LC-447F, Loop 4B Low Level, in Foxboro Blue Rack B-2

* EXAMINER NOTE: the next event takes ~6 minutes until the first alarm providing a cue to the operator. Therefore, the next malfunction should be activated accordingly.

SIMULATOR OPERATOR:

Insert the next malfunction by activating trigger 2 to cause RCP Upper Bearing Oil Cooler CCW leak when directed by the lead evaluator.

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Page 1 of 1
 Event Description: RCP Upper Bearing Oil Cooler CCW leak

Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledge alarm and perform ARP: <ul style="list-style-type: none"> - SA 3-1, Reactor Coolant Pump Motor Bearing Oil High Level 1.25" - Observes status light and identifies 24 RCP Upper bearing High lamp illuminated - Monitors motor bearing temperatures and vibration
	SRO	Enters 2-AOP-RCP-1 Reactor Coolant Pump Malfunctions and directs the actions of the team
	BOP	Monitors the following parameters: <ul style="list-style-type: none"> - Stator Winding Temperature - #1 Seal Delta-P - RCP Vibrations - RCP Motor Bearing Temperatures - #1 Seal Inlet Temperatures Notifies the SRO WHEN RCP Motor Bearing Temperatures exceed 200°F (or at a lower value provided by the SRO) NOTE: RCP BRG Temp High Alarm at 180F
	BOP	Monitors RCP motor bearing temperatures and notifies the SRO when 24 RCP motor bearing temperature is $\geq 185^{\circ}\text{F}$
	SRO	When 24 RCP motor bearing temperature $\geq 185^{\circ}\text{F}$, INITIATES plant shutdown using POP-3.1 (with goal of stopping 24 RCP prior to reaching 200°F)
	SRO	When 24 RCP temperatures reach 200°F (or earlier if a band is provided by the SRO) directs the team to trip the Reactor, Stop 24 RCP and INITIATE EOP E-0
	RO	Trips the reactor
	BOP	Stops 24 RCP
	SRO	Directs team to perform immediate actions of EOP E-0, Reactor Trip or Safety Injection

EXAMINER NOTE:

Proceed to the next event after the reactor is tripped. The LBLOCA will occur automatically from the reactor trip.

Op-Test No.: 1 Scenario No.: 3 Event No.: 5 Page 1 of 1
Event Description: LBLOCA

Time	Position	Applicant's Actions or Behavior
	SRO	Directs team to perform immediate operator actions of EOP-E-0, Reactor Trip or Safety Injection
	RO	Verifies Reactor Tripped
	RO	Verifies Turbine Tripped
	BOP	Verifies all 480V buses energized

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Page 1 of 3
 Event Description: Safety Injection auto actuation failure, RO manually actuates

Time	Position	Applicant's Actions or Behavior
	Critical Task E-0 -- D:	Manually actuate at least one train of SIS-actuated safeguards before any of the following: <ul style="list-style-type: none"> - Transition to any E-1 series, E-2 series, or E-3 series procedure or transition to any FRP - Completion of step 5.a of ES-0.1
	RO	Checks Status of Safety Injection <ul style="list-style-type: none"> - Determines that neither train of SI is actuated - Manually actuates both trains of Safety Injection
	BOP	Performs Attachment 1 while SRO and RO continue in E-0: <ul style="list-style-type: none"> 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) Check 345 KV MO Disc Switch F7-9 Open <ul style="list-style-type: none"> - verifies BKR 7 and 9 open Check status of 480 V buses <ul style="list-style-type: none"> - Dispatches NPO to reset all lighting and MCCs 24A, 27A, and 29A - Stops all Condensate Pumps Verify FW Isolation Check if MSIVs should be isolated Check SW system operation Check SI System Operation Check SI system valve alignment Verify Containment Fan Coolers in service Verify AFW Flow to all SGs Verify Containment Ventilation Isolation Verify Containment Isolation Phase A Check if CS status Verify CCR Air Conditioner status Notify SRO Attachment 1 complete

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Page 2 of 3
Event Description: Safety Injection auto actuation failure, RO manually actuates

Time	Position	Applicant's Actions or Behavior
	RO	Observes RCS Subcooling less than 30°F and at least one SI Pump Running Stops all RCPs
	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 check MSIVs closed Checks PORVS and Spray Valves closed
	SRO	Dispatches NPO to close SWN-4 and SWN-5 in the Zurn strainer pit
	RO	Checks for Faulted and ruptured SGs
	SRO/RO	Diagnose RCS is not intact
	SRO	Transition to EOP E-1, Loss of Reactor or Secondary Coolant

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Page 3 of 3
Event Description: Safety Injection auto actuation failure, RO manually actuates

Time	Position	Applicant's Actions or Behavior
	RO	Verifies RCPs stopped Check for any faulted SG Checks SG levels and maintains >400gpm until one SG level > 27% Opens one Block Valve
	BOP	Resets SI Resets Phase A and Phase B Opens PCV-1228 to supply IA to containment
	RO	Check for ruptured SG Check charging flow
	BOP	Notifies team when RWST level < 9.24 feet
	SRO	Transitions to ES-1.3, Transfer to Cold Leg Recirculation

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 1 of 2
 Event Description: Both Recirculation Pumps both fail to start

Time	Position	Applicant's Actions or Behavior
	Team	Verify SI reset (Resets SI if not previously performed)
	SRO	Dispatch NPO to fully open SWN-35 and SWN-35-1 CCW Heat Exchanger SW Outlet valves
	RO	Stop all Charging Pumps Turn off all PRZR Heaters Reset Containment Spray Place Recirc Switches 1 and 3 to ON
	SRO	Check SW aligned for three header Check SWN-4 and SWN-5 have been closed
	RO	Place SI Recirc Switch 2 to ON Check Containment Sump Level Greater than 47'10" Place SI Recirc Switch 4 to ON <ul style="list-style-type: none"> - Determines 21 Recirculation Pump will not start - Attempts to manually start 22 Recirculation Pump - Determines neither Recirculation Pump can be started
	Critical Task ES-1.3 -- A	Transfer to cold-leg recirculation and establish minimum required ECCS recirculation flow per ES-1.3 Step 10 Table prior to core uncover based upon RVLIS indication (41%).
	SRO	Performs Attachment 2 Cold Leg Recirculation Using RHR Pumps
	RO	Establish Cold Leg Recirculation Using RHR Pumps <ul style="list-style-type: none"> - Check 885A and 885B both energized

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 2 of 2
 Event Description: Both Recirculation Pumps both fail to start

Time	Position	Applicant's Actions or Behavior
	SRO	Dispatch NPO to energize MOV-882
	RO	Verify Recirc switches 3, 4, and 5 in OFF Verify both RHR pumps stopped Verify both Recirc pumps stopped Verify 1802A and 1802 B closed CLOSE MOV-882 Open MOV-885A and MOV-885B Start 22 RHR Pump
	SRO	Return to ES-1.3 step 10 Determine if adequate low head recirculation flow has been established
	RO	Checks flow indicators 946A-D and provides values to SRO Place SI Recirc Switch 7 to ON Place SI Recirc Switch 8 to ON

EXAMINER NOTE:

Terminate the scenario after adequate Recirc flow has been established and verified, or at the Lead Examiner's discretion.

Shift Turnover

Watch Team Turnover Sheet:

Date/Time:	TODAY	Condition:	Power Ops
RCS Temp:	552°F	% Power:	38%
RCS Press:	2235 psig	MW Gross:	325
PZR Level:	41 %	River Water:	63°F
RCS Total Leakage:	0.1 gpm	Boron Conc:	1138 ppm
RCS Unidentified Leakage:	0.1 gpm	Control Rods	178 CBD
Xenon:	Increasing	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:	Green	Daily Risk Factor:	0.79

Plant Equipment Status:

1. The unit was forced offline four days ago. Repairs have been completed and restart is in progress.

Instructions to the Shift:

1. Continue startup per POP-1.3. Step 4.66 is currently in progress.
2. OM and Reactor Engineering have approved rate of power increase to 100% at 200 MWe per hour.

-Facility: Indian Point 2

Scenario No.: NRC#4

Op-Test No.: 1

Examiners: _____

Operators: _____

Initial Conditions: 100% Rated Thermal Power, MOL. 21 EDG is out of Service. 21 Charging Pump is out of service.

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.

In addition, 22 Charging Pump was removed from service for corrective maintenance 18 hours ago. Expected return to service in 35 hours.

Event No.	Malf. No.	Event Type*	Event Description
1		N ALL	Raise main generator reactive load (MVARs)
2	MOT- CFW003A	C BOP/SRO R RO	23 Condensate Pump trips Reduce steam flow < Feed Flow Reduce Tave using boration and rod insertion
3	XMT- CVC019A	I ALL	VCT Level Transmitter fails low
4	MAL- SGN002B Bat FailRxTrips.bat	M ALL	Faulted Steam Generator Reactor auto and manual trips fail to actuate
5	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:

^ 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
^ MOT-CFW003A CP23 CONDENSATE PUMP 23 MTR
IMF MOT-CFW003A (1 0) 3
^ XMT-CVC019A FIXED OUTPUT: LT-112 VCT LEVEL
IMF XMT-CVC019A (2 0) 0.000000 0 34.159801
^ 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	BKR-PPL003 52/RTA REACTOR TRIP BKR	00:00:00	00:00:00	None	n/a	fail asis	00:00:00	
	BKR-PPL004 52/RTB REACTOR TRIP BKR	00:00:00	00:00:00	None	n/a	fail asis	00:00:00	
Delete	BKR-EPS031 52/MG1 MG21 INPUT BREAKER	00:00:00	00:00:00	None	n/a	fail asis	00:00:00	
	BKR-EPS032 52/MG2 MG22 INPUT BREAKER	00:00:00	00:00:00	None	n/a	fail asis	00:00:00	
Clear All	MOT-CFW003A CP23 CONDENSATE PUMP 23	00:00:00	00:00:00	1	n/a	winding short	00:00:00	
	XMT-CVC019A FIXED OUTPUT LT-112 VC	00:00:00	00:00:00	2	34.1587	0	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	
Remotes	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	
Delete	LOA-EPS011 52-C2 C-22 480V BKR RAC	00:00:00	00:00:00	None	in	out	00:00:00	
Clear All								
Overrides								
Delete								
Clear All								

Triggers

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

Verify that conditional trigger 30 appears as follows:

Event Triggers	
Event#	Event Action
30	xeoo325r.eq.1
Command	IMF AOV-RCS002A (-1 240) 1
<input type="button" value="Accept New Event"/> <input type="button" value="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	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

Op-Test No.: 1 Scenario No.: 4 Event No.: 1 Page 4 of 2

Event Description: Raise Main Generator Reactive Load (MVARs)

Simulator Operator: Telephone the CCR from the System Operator. Request Indian Point Unit 2 raise VARs 100 MVARs OUT.

Time	Position	Applicant's Actions or Behavior
	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	If necessary, 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: When directed by the lead examiner, activate Trigger 1

Op-Test No.: 1 Scenario No.: 4 Event No.: 2 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:

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

Op-Test No.: 1 Scenario No.: 4 Event No.: 3 Page 1 of 1
 Event Description: VCT Level Transmitter fails low

Time	Position	Applicant's Actions or Behavior
	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 3 to cause Faulted Steam Generator, Reactor auto and manual trips fail to actuate

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		
Time	Position	Applicant's Actions or Behavior
	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.

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		
Time	Position	Applicant's Actions or Behavior
	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	Isolate Faulted SG <ul style="list-style-type: none"> - Close all MSIVs - Isolate AFW flow to 22 SG - 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
	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>

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.

Time	Position	Applicant's Actions or Behavior
	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 fPCV-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 µCi/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. 21 and 22 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.