Facility: __D C Cook_____ Scenario No.: ____1____ Op-Test No.: 2014301

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: 100% power

Turnover: A 200 MW power decrease has been requested by the System Dispatcher. Both units are at 100% power.

Event No.	Malf. No.	Event Type*	Event Description
1	U1_RCR16	C(ATC) TS	Pressurizer Safety Valve Leak (SV45B 2gpm)
2		R	Power Reduction
3		N	Turbine Power Reduction
4	U1_ECP Stator Short	C(ATC) TS	East CCP fails on overcurrent
5	U1_RX33B	I(BOP)	Feedwater flow controller fails
6	U1_QTC302 175 over 5 Minutes	I(ATC)	Charging Letdown Header Temperature QTC-302 fails high
7	U1_RC01A 60%	M(ALL)	Large break LOCA
8	U1_ED05E (Trg 1)	M(ALL)	Vital bus T11A Fails (On RX Trip)
9	U1_RP10A U1_RP11A U1_RP11C	C(ATC)	Auto/Manual SI Train A does not occur

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

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 1

Event Description: **Safety Valve Leakage SV45-B (2 gpm)**

Time	Position	Applicant's Actions or Behavior
	CREW	Identify RCS Leakage
	US	Direct entry into 1-OHP-4022-002-020, EXCESSIVE REACTOR COOLANT LEAKAGE
	ATC	Performs the following actions, if directed: 1. Manually raises charging flow to maintain pressurizer level. 2. Manually adjusts seal injection flow (6–12 gpm / each RCP). 3. Reduces/isolates letdown flow to maintain pressurizer level. 4. Attempts to determine RCS leak rate.
	BOP	Monitor Containment Pressure Determine RCS Leak Rate (~2gpm) Check no leak into CCW Check for Primary to Secondary leak
	Crew	Identify Source of Primary Leak and attempt to isolate source Identify that leak is from Safety to PRT and cannot be isolated
	Crew	1. Check PRZ PORV and Safety valves for Leakage 2. Check PRT Conditions 3. Check Safety Valve Tailpipe Temperatures
	Crew	May elect to Use 1-OHP-4021-002-006 PRT Operations Attachment 4, Feed and Bleed of PRT to Reduce Pressure Or Temperature, to reduce PRT pressure
	US	Check TS 3.4.13 Determine that the Unit has to be shutdown Contact Duty Operations Manager

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 2

Event Description: Power Reduction

Time	Position	Applicant's Actions or Behavior
	US	Directs RO to commence Rapid Power Reduction in accordance with 1-OHP 4022-001-006.
	RO	Performs (Att. D) **NORMAL BORATION**: • Verify charging is > 75 gpm • CLOSE 1-QMO-225, EAST CCP Mini-Flow (CCP ELO) • Place RC Makeup Blend control switch in STOP. • Place RC Makeup Blend Control Mode switch in BORATE. • Adjust BA Controller/Totalizer to the desired flow rate and amount. • Place RC Makeup Blend control switch in START. • May take QRV-303 to MANUAL/OPEN (as required) to maintain VCT level and pressure. 1-OHP 4022-001-006 Attachment D Table
	RO	Commences power reduction: • Verify all PRZ backup heaters ON. • Ensures control rods in AUTO.
	BOP	Acts as peer checker for RO and verifies appropriate reactivity feedback.
	RO	Energize Pressurizer Backup Heaters

Change in Power Level (%)	Amount of Boric Acid Required (gals)	Volume change expected in BAST (%)
10	**100**	**1.0**
20	200	2.0
30	**300**	**3.0**
40	400	4.0
50	**500**	**5.0**
60	600	6.0
70	**700**	**7.0**
80	800	8.0
90	**900**	**9.0**
100	1000	10.0

Desired Rate of Change in Reactor Power(%/min)	Boration Rate (gpm)
1	10
2	**20**
3	30

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 3

Event Description: **Turbine Load Reduction**

Time	Position	Applicant's Actions or Behavior
	US	Directs BOP to setup Turbine HMI for Load Reduction
	BOP	Commences Turbine Power reduction: · Places Main Turbine in MW IN · Enters MW Load Target Into HMI (~114 for 10%) · Enters Ramp Rate into HMI (11.5 MW/MIN) · Depress GO to lower turbine load (reactor power) using HMI.
	BOP	Monitors main electrical generator temperatures.

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 4

Event Description: **East CCP fails on overcurrent**

Time	Position	Applicant's Actions or Behavior
	ATC	Recognizes and reports multiple annunciators on Panel #107, #108 and #109 which are indicative of a loss of charging capability. • Loss of charging flow • Loss of letdown flow • Loss of RCP seal injection flow
	Crew	Identify Annunciator 109 Drop 11, EAST CCP MOTOR INSTANT TRIP in alarm
	US	Directs RO to start the E CCP per annunciator response procedure(s): • 1-OHP 4024-108 Drop 20, Charging Flow < Min Set Point • 1-OHP 4024-109 Drop 21, West CCP Motor Instant Trip
	ATC	Verify Breaker T11D7 trips. Check Status of Letdown Start 1-PP-50W-ALOP, West CCP Auxiliary Lube Oil Pump Verify the West CCP has a suction source available **AND** aligned
	ATC	Performs the following as directed: • Starts W CCP • Adjusts QRV-200 and QRV-251 flow to maintain RCP seal injection flow and pressurizer level. • Places normal letdown back in service in accordance with 1-OHP-4021-003-001, Attachment 13.
	ATC	Restores normal letdown per 1-OHP-4021-003-001 Attachment 13 as: 1. Places QRV-302 in divert position. 2. Verifies orifice isolations closed (QRV-160, 161 and 162). 3. Adjusts CRV-470 controller to 50%. 4. Verifies open letdown isolation valves: • QCR-300 • QCR-301 • QRV-111 • QRV-112 5. Adjusts QRV-301controller to 50%. 6. Checks/adjusts charging flow to > 75 gpm. 7. Opens QRV-161 or 162. 8. Adjusts QRV-301 to maintain 160 – 350 psig. 9. Places QRV-301 in AUTO. 10. Nulls and returns CRV-470 controller to AUTO.

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 4

Event Description: **East CCP fails on overcurrent**

		11. Adjusts charging flow as required to maintain PRZ level. 12. Places PRZ level control in automatic (if desired). 13. Places QRV-302 in normal (demineralizer) position when letdown temperature is stable.
	US	Refer to Technical Specifications and Technical Requirements Manual. a. 3.5.2, ECCS-Operating Refer to Technical Requirements Manual: a. 8.1.1, Boration System-Operating

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 5

Event Description: **Feedwater Flow Controller Fails Low**

Time	Position	Applicant's Actions or Behavior
	Crew	Recognize **ANNUNCIATOR #115 Drop 53 Feedwater Controller Trouble Alarm**
	BOP	Reports malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Verifies FRV-220, SG 2 Feedwater Regulating Valve, controls in MANUAL.
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	US	Direct crew response to alarm using 1-OHP-4024-115

	BOP	Recognize 1-RU-10, Level Control 1-FRV-220 as failed LOW
		• Note that RU-10 (1-XL-192, Steam Generator Ome-3-2) Level Control System Signal Controller (flow control) has failed
		• Note S/G level controller defaults to Manual
		• At the panel: Determine affected controller by observing controller faceplate alarm light and/or audible alarm.
		• Press the Alarm Scroll key to silence the audible alarm (upper right hand corner of controller)
		  • Press the "A" (Auto Function) key to acknowledge the alarm. The window display adjacent to the "A" key will change to [ACK] or [CLR].
		  • Press the R/L (Remote/Local) key or the Tag Key to return the faceplate to runtime to allow manual control if required.
		• Monitor Steam Generator levels and adjust as necessary.
		• Contact MTI to confirm failure mode and replace/repair controller.

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 6

Event Description: **CVCS Letdown Temperature Controller (QTC-302) output fails HIGH.**

Time	Position	Applicant's Actions or Behavior
	RO	Recognize and reports annunciator Panel 109 alarms which indicates a malfunction of CCW cooling to the letdown heat exchanger: • Drop 8, Letdown HX Outlet Temp High
	RO/BOP	Reports instrument malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Places CRV-470, Letdown Temperature Control valve, controller to MANUAL. • Opens CRV-470 and restores letdown temperature to normal.
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
NOTE: Since Indicated letdown temperature exceeds 185°F, then crew may : • Isolate normal letdown • Minimize charging flow • Establish excess letdown		
	RO	• Verifies letdown flow diverted to RC Filter • Identifies that QTC-302 has failed high • Determines condition NOT due to actual temperature
	US	Initiates action to have MTI investigate problem with letdown temperature controller/indicator.
NOTE: QRV-302 Letdown Demineralizer Divert Valve will reposition based on QTS-301. Diverts past Demins at 143°F. This is a separate switch from the Controller & Instrument that has failed (QTC-302).		

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 7, 8, 9

Event Description: **Large break LOCA**
Vital bus T11A Fails
Auto SI Train A does not occur

Time	Position	Applicant's Actions or Behavior
	RO/US	Acknowledge Ann. 122, Drop 83 ICE CONDENSER DOORS OPEN. Determines that a loss of reactor coolant is occurring based on the following: • Pressurizer Pressure and level change. • Containment radiation monitoring trend. • Containment pressure rise. • Containment sump level rise.
	US	Directs RO/BOP to verify/trip the reactor and perform the immediate actions of E-0, Reactor Trip or Safety Injection.
	RO/BOP	Performs the immediate actions of E-0: • Checks reactor trip. • Checks turbine trip. • Checks power to AC emergency buses. **Notes : Vital Bus T11A De-energized** • Checks safety injection status.
	US	Ensures immediate actions of E-0 are completed
	US	Directs subsequent actions of E-0.
	RO/BOP	Reviews E-0 Foldout Page Criteria.
	CREW	Determines that Containment Pressure requires Steamline Isolation, Phase B Isolation, and CTS Actuation. • Verifies Steamlines Isolated. • Verifies CTS Actuation. • Aligns Lower Cont. Vent Fans.
	CREW	Manually stops all Reactor Coolant Pumps (RCPs) due to Phase B Isolation and/or RCS pressure lowering below 1300 psig.
	BOP	Manually controls AFW flow to maintain SG narrow range levels 14% - 50% once one SG narrow range level is > 14%.
	RO	Reports that the E CCP is not running due to a previous failure
	RO/BOP	Performs manual actions of E-0 Attachment A (for Containment Phase A).
	Crew	Manually Aligns Safety Injection - Train A.

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 7, 8, 9

Event Description: **Large break LOCA**
Vital bus T11A Fails
Auto SI Train A does not occur

	Critical Task #1	-AND- Manually align valves to establish at least one train of isolation
	CREW	Completes all actions of E-0 through step 19 (Check If RCS Is Intact).
	US	Announces transition to E-1, Loss Of Reactor Or Secondary Coolant (at step 19 of E-0).
Note: The Crew may transition to OHP-4023-ES-1.3, Transfer to COLD Leg Recirculation if the RWST is low enough prior to the E-1 transition point (See Page 11 For actions). **Note: The Crew may momentarily enter 1-OHP-4023-FR-P.1, Response To Imminent Pressurized Thermal Shock Condition, on a Red Path, then exit once RHR flow is verified.**		
	RO/BOP	Reviews E-1 Foldout Page Criteria.
	US	Directs actions of E-1, Loss Of Reactor Or Secondary Coolant.
	BOP	Maintains SG narrow range levels 20% - 50%.
	BOP	Performs the following: ▪ Resets Containment Isolation Phase A. ▪ Notifies Chemistry to sample SGs for activity.
	US	Checks if SI Termination Criteria is MET: ▪ RCS Subcooling >40°F. ▪ Secondary Heat Sink (AFW Flow >240x103 or SG >14% [28% ADVERSE]). ▪ RCS Pressure rising or stable. ▪ Pressurizer Level >21% [25%ADVERSE].
	US	Check for CTS termination Critieria RCS pressure is <300 psig – Wait for 24 Hours
	RO/BOP	Performs the following as directed: 1. Resets both trains of Safety Injection. 2. Stops running Emergency Diesel Generators (EDG). 3. Dispatches operator to secure EDG jacket water pumps.
Applicants actions or behavior associated with ES-1.3, Transfer To Cold Leg Recirculation.		
	US	Announces transition to ES-1.3, Transfer To Cold Leg Recirculation when RWST level < 30% per:

Op-Test No.: Crews XX Scenario No.: 01 Event No.: 7, 8, 9

Event Description: **Large break LOCA**
Vital bus T11A Fails
Auto SI Train A does not occur

		• E-0, Foldout Page, Criteria 3 • E-1, Foldout Page, Criteria 5 • E-1, Step 13
	US	Directs actions of ES-1.3, Transfer To Cold Leg Recirculation.
	RO/BOP	Resets both trains of Safety Injection.
	RO/BOP	Checks CCW return flow on each RHR Hx at 3000-3500 gpm. (may only perform for the East CCW HX)
	RO/BOP	Checks the following prior to switching over to cold leg recirc: • RWST level < 20% • Cntmt water level > MIN RECIRC LEVEL

	US/RO
	Critical Task #2
		Directs/Performs switchover as follows:
		NOTE: If RWST level < 9% then stop CCPs and SI pumps.
		• Stops and locks out East CTS pump
		• Stops and locks out East RHR pump
		• Checks East CTS and East RHR pumps stopped
		• Initiates valve closure:
		  • IMO-310, East RHR pump suction
		  • IMO-215, East CTS pump suction from RWST
		• Stops and locks out West CTS pump
		• Stops and locks out West RHR pump (OOS)
		• Checks West CTS and West RHR pumps stopped
		• Initiates valve closure:
		  • IMO-320, West RHR pump suction
		  • IMO-225, West CTS pump suction from RWST
		• Restore control power to I-ICM-305, recirc sump to East RHR/CTS pumps
		• Check 1-ICM-305 open
		  • 1-IMO-215 – Full Closed
		  • 1-IMO-310 – Full Closed
		• Open 1-ICM-305 and check full open
		• Start East RHR pump and East CST pump (if previously running)

Terminate Scenario when RHR/CTS pump is restarted.

Facility: __D C Cook_____ Scenario No.: ____3____ Op-Test No.: 2014301

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: ___ EDG CD has been run following mechanical maintenance. The run is complete and the EDG is ready to be shutdown and placed in standby.

Turnover: 1-OHP-4021-032-001CD Attachment 2 is complete to step 4.4.2 and the diesel generator is ready to be shut down. Perform Step 4.4.3 through preparation for Restoring for OPERABILITY. U1 is at 92% power following turbine valve testing.

Event No.	Malf. No.	Event Type*	Event Description
1		N	Secure the CD D/G
2	U1_NI10B 200 over 1 min	I(ATC) TS	Power range detector (NI-42) fails high
3		R	Power increase to restore power
4	U1_FW40A 100	C(BOP)	Condenser Level Control failure (100%)
5	U1_BLP131 0 over 30sec	I(ATC) TS	Steam generator #3 BLP131 controlling level channel fails low
6	U1_MS02C 50%	Major	Steam line #3 break inside containment
7	U1_RP01A U1_RP01B	C(ATC)	Reactor trip failure (ATWS), Rods Drop when MG sets de-energized
8	U1_RP09A U1_RP09B	C(BOP)	Feedwater isolation does not occur in automatic
9	U1_FW48C	C(BOP)	TDAFW pump does not start in auto

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

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 1

Event Description: **Secure the CD D/G and place in standby**

Time	Time	Time
	US	Directs actions of 1-OHP-4021-032-001CD Attachment 2, DG1CD Operation On Safeguards Buses.
	US	Directs the following actions to realign condensate system: • Secure EDG CD.
	BOP	Performs the following to EDG CD as directed: 1. Opens the following breakers: • T11D8 • T11C3 2. Adjusts diesel speed using DG1CD GOVENOR CONTROL to 60 Hz. 3. Verifies DG1CD Start Gen & 69/4KV Voltmeter Sel switch in - OFF. 4. Returns to Procedure Body Step 4.6: **CUE: Step 4.1.7 and 4.1.8 were not performed** 5. Verifies T11D8, T11C3, and DGTCD - OPEN 6. Verifies diesel UNLOADED for approximately 2 minutes 7. Stops DG1CD by placing DG1CD Stop-Run control switch to STOP 8. Verifies green target at DG1CD Stop-Run control switch

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 2&3

Event Description: **Power range detector (NI-42) fails high**

Time	Position	Applicant's Actions or Behavior
	ATC	Recognizes and reports annunciators on Panel 110 which are indicative of a NI instrument failure (Drops 11, 13, 18, & 19).
	ATC	Reports malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Checks for no turbine runback • Ensures control rods are in manual with no rod motion
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	US	Enters and directs actions of 1-OHP-4022-012-003, Continuous Control Bank Movement procedure.
	RO	Performs the following as directed: • Checks for no turbine runback • Ensures control rods are in manual with no rod motion • Checks rod position above low-low rod insertion limit • Checks axial flux difference (AFD) within target band Initiates restoration of equilibrium conditions using either: • Control rod movement • Turbine load adjustment • Identifies failed power range channel
	US	Enters and directs actions of 1-OHP-4022-013-004, Power Range Malfunction procedure.

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 2&3

Event Description: **Power range detector (NI-42) fails high**

Time	Position	Applicant's Actions or Behavior

	ATC/BOP	Performs the following as directed:
		• Verify Control Rods – MANUAL
		• Place Rod Stop Bypass Selector In Failed Channel Position
		• Remove Affected Channel From Service By Placing Selector Switches To Failed Channel Position:
		• Comparator Channel Defeat Selector
		  • Upper Section Detector Current Comparator Defeat Selector
		  • Lower Section Detector Current Comparator Defeat Selector
		  • Power Mismatch Bypass Selector
		• Check The Following Interlocks Are In The Required State For Existing Conditions:
		  • P-7
		  • P-8
		  • P-10
		• Check AFD - WITHIN TARGET BAND
		• Verify Recorder Inputs - SELECTED TO AN UNAFFECTED CHANNEL POSITION:
		  • Delta-T
		  • Overtemperature Delta-T
		Caution - Control Rods should not be placed in automatic until at least 5 minutes have elapsed after placing Power Mismatch Bypass Selector to failed channel.
		Return Power to Normal
		• Place Control Rods In AUTOMATIC If Applicable

	US	Directs actions to trip bistables associated with NI-42 Power Range Malfunction per Attachment D of 1-OHP-4022-013-004.
	US	Refers to Tech Specs: 3.3.1 RTS Instrumentation (Table 3.3.1-1, Functions 2a,2b, 3, 6 18c&d Conditions C, D, & L) P-8 & P-10 must be verified in Correct Condition within 1 hour of channel failure.

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 4

Event Description: **Condenser Level Control failure (100%)**

Time	Position	Applicant's Actions or Behavior
	Crew	Respond to ANNUNCIATOR #116 RESPONSE: CONDENSATE: Drop 2, Condenser A Hotwell Level Low Drop 12, Condenser B Hotwell Level Low Drop 22, Condenser C Hotwell Level Low
	US	Direct BOP to Take Actions per 1-OHP-4024-116 Drop 2, 12, 22
	BOP	• IF Hotwell Level Controller not operating properly, THEN control level manually. • Verify 1-CRV-155, Condensate Excess Letdown Valve and 1-CMO-155 Bypass Valve - CLOSED. • Throttle open 1-CMO-55, Cndst Makeup Valve Bypass, as required to maintain low level clear.

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 5

Event Description: **Steam generator #3 controlling level channel fails low**

Time	Position	Applicant's Actions or Behavior
	Crew	Respond to ANNUNCIATOR #114 RESPONSE: STEAM GENERATOR 3 AND 4: Drop 3: STEAM GEN 3 WATER LVL LOW DEVIATION Drop 4: STEAM GEN 3 WATER LEVEL LOW Drop 13: STEAM GEN 3 SF > FWF FLOW MISMATCH
	BOP	Reports malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Verifies FRV-230, SG 3 Feedwater Regulating Valve, controls in MANUAL.
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	BOP	• Restore Steam Generator Narrow Range Level using Manual Control of Feedwater Regulating Valve 1-FRV-230 • Check Steam Generator Narrow Range Level – Stable OR Trending to 44% :
	US	Enters and directs actions of 1-OHP-4022-013-013, Steam Generator Level Instrument Malfunction
	US	Refers to the following TS: · TS 3.3.1 RTS Instrumentation (Table 3.3.1-1, Function 14 – Cond D). · TS 3.3.2 ESFAS Instrumentation (Table 3.3.2-1, Function 5b & 6c – Cond D). Enters action statement that requires bistables to be tripped within 6 hours.
	US	Direct actions to trip bistables per Attachment C-2 of 1-OHP-4022-013-013.

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 6, 7, 8, 9

Event Description: **Steam line #3 break inside containment, Reactor trip failure (ATWS), Feedwater isolation does not occur in automatic, TDAFW pump does not start in auto**

Time	Position	Applicant's Actions or Behavior
	Crew	Recognize containment pressure increase, and reactor trip requirements.
	US	Directs RO to Perform Reactor trip Enter 1-OHP-4023-E-0: Reactor Trip
	ATC	Recognizes and reports failure of reactor to manually trip
	US	Directs actions of FR-S.1, Response to Nuclear Power Generation/ATWS:
	ATC **Critical Task #1**	Performs the immediate actions of FR.S-1: 1. Checks reactor trip **Automatically/Manually insert control rods(must Insert Negative Reactivity through Inserting Control Rods or Emergency Boration)**
	BOP	Performs the immediate actions of FR.S-1: 1. Manually actuate AMSAC 2. Checks check Turbine Trip 3. Check AFW pumps running • MDAFPs – Both Running • TDAFP – did not start in automatic – manually starts the TDAFP
	US	Ensures immediate actions of FR.S-1 are completed
	ATC Critical Task #1	**Initiate Emergency Boration of RCS(must Insert Negative Reactivity through Inserting Control Rods or Emergency Boration)** • CCPs – at least one running • Initiate emergency boration o Start both boric acid transfer pumps in FAST speed o Open 1-QMO-41-. Emergency boration to CCP suction valve o Check emergency boration flow – GREATER THAN 44 GPM Check PRZ pressure LESS THAN 2335 PSIG Check Containment Isolation Valves Closed:

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 6, 7, 8, 9

Event Description: **Steam line #3 break inside containment, Reactor trip failure (ATWS), Feedwater isolation does not occur in automatic, TDAFW pump does not start in auto**

Time	Position	Applicant's Actions or Behavior
	Crew	Check Containment Isolation valves VCR-101-107, VCR-201-207 Closed Check SI Status – Actuation status light – NOT LIT • As time permits, perform Steps 5 through 13 of E-0 •
	US	Check if the following trips have occurred: • Reactor Trip – Reactor Trip Breakers, Bypass breakers, Rod drive MG set output breakers • Turbine Trip Dispatch Operator to Locally Trip Reactor
	CREW	Check if Reactor is Subcritical – Go to step 20 Continue Boration To Maintain Adequate Shutdown Margin During Subsequent Recovery Actions: • Determine shutdown margin using 1-OHP-4021-001-012, Determination Of Reactor Shutdown Margin Return To Procedure And Step In Effect E-0
	US	Transition to OHP-4023-E-0 and direct actions
		Check Reactor Trip Check Turbine Trip Check Power to AC Busses – At least ONE Energized AC Emergency Busses – ALL Energized Check SI Status – Status Light LIT BOTH CCP Leakoff valve “Safety Injection Signal” white lights – LIT
	BOP	Check Main Steamline Isolation NOT Required – Verify all SG stop valves are closed
	ATC	Check CTS actuated Check containment isolation Phase B is actuated Stop all RCPs Place lower containment vent Unit fans in OFF 1-HV-CLV-lA and 1-HV-CLV-3A 1-HV-CLV-2A and 1-HV-CLV-4A 1-HV-CLV-1B and 1-HV-CLV-3B 1-HV-CLV-2B and 1-HV-CLV-4B 5) Place control rod drive mech fans in STOP: 1-HV-CRD-3A 1-HV-CRD-3B 1-HV-CRD-4A 1-HV-CRD-4B

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 6, 7, 8, 9

Event Description: **Steam line #3 break inside containment, Reactor trip failure (ATWS), Feedwater isolation does not occur in automatic, TDAFW pump does not start in auto**

Time	Position	Applicant's Actions or Behavior

	Crew	Implement Attachment A (Page 27) While Continuing With This Procedure
		• Check If Ruptured SG Is Suspected: SG narrow range levels – NONE rising in an uncontrolled manner
		• Check AFW pumps running – MDAFPs – both running, TDAFP – running
		• Check Total AFW flow – GREATER THAN 240x10^3 PPH
		Minimize Unnecessary RCS Cooldown:
		• Check SG narrow range level Greater than 14%
		• Control feed flow to maintain SG narrow range level between 14% and 50%
		Check AFW Pump Discharge valves – OPEN or Throttled
		Check FW Isolation
		• Main feed pumps – BOTH TRIPPED
		Feed pump discharge valves – CLOSED
		• Feedwater regulating valves - CLOSED
		• Feedwater isolation valves – CLOSED
		Check RCS Temperature:
		• No RCPs running – RCS Cold leg temperatures stable at of trending to 547F
		RNO:
		• Stop dumping steam
		• Verify 1-DRV-407 CLOSED
		• If cooldown continues, then control total feed flow
		• If cooldown continued, then perform the following:
		  • Trip all SG stop valves closed
		  • Verify SG stop valve dump valves are closed
		Check PRZ PORVs ad Spray Valves CLOSED
		• PORV block valves at least one energized
		• Block valves at least one open
		Check IF RCPs Should Be Stopped:
		• RCS Pressure less than 1300 PSIG
		• ECCS pumps at least one running
		• Stop all RCPs
		Check If SG Secondary Pressure Boundaries are Intact:
		• Pressure in all SGs
		  • NO SG pressure lowering in an uncontrolled manner
		  • NO SG completely depressurized
		RNO: Go to E-2

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 6, 7, 8, 9

Event Description: **Steam line #3 break inside containment, Reactor trip failure (ATWS), Feedwater isolation does not occur in automatic, TDAFW pump does not start in auto**

Time	Position	Applicant's Actions or Behavior

	US
	Crew
		Announces entry into E-2
		
		Check SG Stop Valves CLOSED
		Check SG Stop Valve Dump Valves CLOSED
		Check if any SG secondary pressure boundary is intact
		• Pressure in all SGs – Any stable or rising
		Identify Faulted SG
		• Check pressure in all SGs
		  • Any SG Pressure Lowering in an Uncontrolled Manner or
		  • Any SG Completely Depressurized
		Isolate Faulted SG:
		  • Check feedwater valves for faulted SG CLOSED
		  • Check AFW valves for faulted SG CLOSED
		  • Check TDAFP steam supply valve for faulted SG CLOSED
		  • Check PORVs for faulted SG CLOSED
		  • Check blowdown isolation valve for faulted SG CLOSED
		  • Place 1-DRV-407, SG stop valves drain valve in CLOSED
		  • Check 1-DRV-407 CLOSED
		  • Check Steam line warming valves CLOSED
		Check CST Level Greater Than 15%
		Check Secondary Radiation:
		• Reset containment isolation Phase A if Necessary
		• Direct Chemistry to periodically sample all SGs for activity
		• Check SG PORV radiation monitors
		• Secondary radiation – NORMAL
		Check If ECCS Flow Should Be Reduced
		RCS subcooling based on core exit TCs – Greater than 40F
		Secondary heat sink:
		• Total feed flow to intact SGs – Greater Than $240x10^3$ PPH or
		• Narrow range level in at least one intact SG – Greater Than 14%
		RCS pressure - Stable or Rising
		PZR level - Greater than 21%
		Go to ES-1.1

Op-Test No.: Crews XX Scenario No.: 03 Event No.: 6, 7, 8, 9

Event Description: **Steam line #3 break inside containment, Reactor trip failure (ATWS), Feedwater isolation does not occur in automatic, TDAFW pump does not start in auto**

Time	Position	Applicant's Actions or Behavior
	US	Transition to OHP-4023-ES-1.1 SI Termination and Direct Actions
	US	Direct operator to Reset SI SI will NOT Reset with trip Breakers Closed Implement **SUP-016,** Resetting SI in the **SSPS** Cabinets, while continuing with Step 2.
	CREW	Stop CCP Reestablish Air to Containment • Verify Spray valves closed • Check Air Pressure • Open Containment Air Supply Valves Check RCS Pressure - Rising Isolate BIT Verify QMO-225 & 226 Open Close IMO-255 & IMO-256 Close ICM-250 and ICM-251 Establish Charging Flow Stop SI Pumps Stop RHR Pumps Verify RCS Pressure Stable Maintain RCS Temperature Restore Letdown per Sup 15
TERMINATE SCENARIO		

Facility: D C Cook Scenario No.: 4 Op-Test No.: 2014301

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: 12% power, main generator has just been paralleled.

Turnover: The unit is at 12% power with the generator has just been paralleled to the grid. The unit was down powered to fix leak on the weld for FTR-258, FW Disch Header Temperature tap.. The work is complete and the plant is returning to 100% power. Procedure 1-OHP-4021-001-006, Power Escalation is complete up to step 4.28. Raise Power at 10%/hour to ~29%.

Event No.	Malf. No.	Event Type*	Event Description
1		N	Control Feed Flow In Manual
2		R	Raise Power
3	U1_MPC253 to 740	I(ATC)	Turbine impulse pressure instrument (MPC-253) fails HIGH
4	U1_MPP222 1500	C(BOP)	MPP 222 SG #2 PORV Pressure Channel
5	U1_FPC_250 A to 1 over 2 min	I(BOP)	Main Feedwater discharge pressure (FPC-250A) fails Low
6	U1_RC10D 10% over 5 Min	Major	Small break LOCA in containment (150 gpm with a 5 min ramp)
7	U1_RP10A U1_RP10B	I(ATC)	Auto SI fails
8	U1_TC02 U1_TC03	C(BOP)	Main turbine fails to trip
9	U1_RD0435 U1_RD0441	C(ATC)	Two rods fail to Drop (H4 & H6)
10	U1_ECP Stator Short	C(ATC)	East CCP trips on overcurrent 3 minutes after the RXtrip

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

Op-Test No.: Crews XX Scenario No.: 04 Event No.: 1&2

Event Description: **Control Feedwater Flow in Manual and Raise Power**

Time	Position	Applicant's Actions or Behavior
	US	Direct the BOP to SG Levels ~40% to 48% using Manual Control of FRV210-240 and Main FW Pump Speed/DP
	BOP	• Adjust FRV210 – 240 to Maintain SG levels within Designated band • Adjust Main FW Pump Speed / DP target to ensure adequate FW Discharge to SG DP • Place FW Regulating Valves in Auto if FRVs are open far enough
	RO	Calculates the dilution required per OHP-4021-005-002, Attachment 9, Boration or Dilution Volume Determination.
	RO	Briefs crew on reactivity plan for power escalation.
	US	Reviews / concurs with reactivity plan.
	US	Directs RO to commence Power Escalation in accordance with OHP-4021-001-006, Power Escalation (at step 4.77)
	RO	Performs DILUTION (batch add OR Continuous): • Place RC Makeup Blend control switch in STOP • Place RC Makeup Blend Control Mode switch in DILUTE or ALT DILUTE • Adjust PW to the desired flow rate and/or amount. • May close QRV-451 if aligning to CCP Suction Only • Place RC Makeup Blend control switch in START • May take QRV-303 to Manual and Open as required to maintain VCT Level and Pressure.
	RO	Commences escalation: • Raises turbine load (reactor power) using the DCS HMI. • Maintains Tavg/Tref deviation within limits by dilution and turbine load adjustments. • Ensures Axial Flux Difference (AFD) is maintained within target band by manual control rod movement as needed.
	RO	RO verifies appropriate reactivity feedback.

Op-Test No.: Crews XX Scenario No.: 04 Event No.: 3

Event Description: **Turbine impulse pressure instrument (MPC-253) fails HIGH**

Time	Position	Applicant's Actions or Behavior
	US BOP	Assure plant is stable then direct RO or BOP to review Annunciator Response Procedures. Respond to ANN Panel 111 Drop 20, Tavg Low Tavg<Tref Deviation Respond to ANN Panel 112 Drop 6, Main Turbine DCS Trouble
	RO/BOP	Reports instrument malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response:
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	US	Identify failed MPC-253 failed HIGH and go to OHP-4022-013-016, Turbine First Stage Impulse Pressure Instrument Malfunction.

	BOP	Check For Failed Turbine First Stage Impulse Pressure Instrument:
		Notify Shift Manager of the instrument failure.
		Channel 1, 1-MPC-253 – Indicating High, Go To RNO
		• Perform the following:
		  • Place AMSAC Bypass/Test Switch in Bypass/Test – 1-101-AM-2
		  • If Operating Steam Dumps in Tavg Mode – Place steam dump control selector switches in OFF

		Verify P-13 Status – PROPER for CURRENT PLANT CONDITIONS • Record Time P-13 Interlock Status verified
	US	Initiates actions to trip bistables for MPC-253 failure per Attachment A of 1-OHP 4022-013-016.
	US	Refers to ITS LCO: 1. 3.3.1 Reactor Trip System Instrumentation (Table 3.3.1-1, Function 18e – Cond L 2. 3.3.2 ESFAS Instrumentation (Table 3.3.2-1, Function 4e – Cond D) 3. TRM 8.3.6 ATWS Mitigation System Actuation Circuitry (AMSAC)

Op-Test No.: Crews XX Scenario No.: 04 Event No.: 4

Event Description: **SG #22 PORV controller fails OPEN (50%) and will not Close in Manual**

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and reports Annunciator Panel #114, Drop 24, 1-MRV-243 OP OR HSD1 PANEL OVERRIDE alarm that indicates SG #4 PORV (MRV-243) has opened. Panel 113 Drop 14 May also alarm.
	RO/BOP	Reports instrument malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Place SG PORV #4 in Manual and Closes #4 PORV.
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure. • Direct operator actions to determine cause, reclose SG #4 PORV, and monitor Reactor Power.
	US	Enters and directs actions of 1-OHP-4022-013-012, Steam Generator Pressure Instrument Malfunction procedure.
	BOP	Performs the following actions as directed: 1. Checks SG PORVs closed. 2. Reports MPP-242 has failed high. 3. Returns MFP ΔP controller to auto (if placed in manual).
	US	Refers to TSs / TRM: · TS 3.3.2 ESFAS Instrumentation (Table 3.3.2-1, Function 1.e (1& 2) & 4.d – all Condition D) · Trip bistables in 6 hours · TS 3.7.4, SG PORVs (Note: Only Manual Ops Required) – N/A · TRM 8.3.8. Radiation Monitoring Instrumentation (Table 8.3.8-1, Function 2.b – Condition C) · Declares MRA-1602 inoperable · Restore in 7 days
	US	Initiates actions to trip bistables associated with MPP-242 Steam Generator Pressure Instrument Failure per Attachment D-3 of 1-OHP-4022-013-012.

Op-Test No.: Crews XX Scenario No.: 04 Event No.: 5

Event Description: **Main Feedwater discharge pressure (FPC-250A & B) fails HIGH**

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports Ann.115 Drop 42, FPT DCS Trouble caused by FW DCS Screen Alarm Drop C-16 m2C_ALM2016 FPC-250A (B) - MFP DISCH HDR PRESS - XMTR DEVIATION and indications of a failure affecting main feedwater to all steam generators (SGs): • Main FW Pump Disch Pressure • All SG levels raising • All feedwater regulating valves closing • Main feedwater pumps speed raising
	RO/BOP	Reports instrument malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Verifies/Places both Main FW Pumps to speed control in manual and lowers output (MFW Pump Speed) to restore DP and match feedwater flow with steam flow and restore SG levels to program.
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	CREW	Identifies that Main Feedwater Pump Discharge Pressure Transmitter FPC-250A has failed low.
	BOP	Verify the failed channel disabled and restore FWP Delta-P. Monitors/adjusts MFP differential pressure to restore SG levels to program.
	RO	Monitors nuclear power during feedwater transient.

Op-Test No.: Crews XX Scenario No.: 04 Event No.: 6,7,8,9,10

Event Description: **Small break LOCA in containment (150 gpm with a 5 min ramp), Auto SI fails, Main Turbine Fails to Trip, Two Rods Fail to Drop, East CCP trips on overcurrent**

Time	Position	Applicant's Actions or Behavior
	CREW	Acknowledges Ann. Panel 122, Drop 83, ICE CONDENSER INLET DOORS OPEN, alarm and/or RMS PPC Alarms on Panel 111 and determines that a loss of reactor coolant is occurring based on the following: • Pressurizer and VCT level change • Charging and letdown flow mismatch • Containment radiation monitoring trend • Containment pressure rise • Containment sump level rise

	US
	
	ATC
		Direct implementation of 1-OHP-4022-002-020, EXCESSIVE REACTOR COOLANT LEAKAGE
		
		Monitor PRZ Level
		• Maintain PRZ level by adjusting 1-QRV-251 and 1-QVR-200 as necessary
		• Reduce or isolate letdown flow as necessary to maintain PZR level
		  • Close letdown valves
		  • Start second CCP
		  • If level cannot be maintained Trip the reactor and go to E-0

	US	Directs entry into E-0

	ATC/BOP	Performs the immediate actions of E-0:
		• Checks reactor trip.(Announces that 2 rods not fully inserted.)
		• Checks turbine trip. - **(Auto Failed)**
		  • **Manually trips the main turbine**
		  • **Acutate AMSAC**
		  • **Isolate Main Steam Lines**
		• Checks power to AC emergency buses.
		• Checks safety injection status.
		•

	US	Ensures immediate actions of E-0 are complete Directs subsequent actions of E-0

Op-Test No.: Crews XX | Scenario No.: 04 | Event No.: 6,7,8,9,10

Event Description: **Small break LOCA in containment (150 gpm with a 5 min ramp), Auto SI fails, Main Turbine Fails to Trip, Two Rods Fail to Drop, East CCP trips on overcurrent 3 minutes after the trip**

Time	Position	Applicant's Actions or Behavior
	ATC	Announces that 2 rods not fully inserted. Manually trips the reactor Announces East CCP trip May reset and attempts one restart. Start West CCP
	Crew	Manually Actuates Safety Injection
	Crew	Completes all actions of E-0 through step 19 (Check If RCS Is Intact).
	US	Announces transition to E-1, Loss Of Reactor Or Secondary Coolant (at step 19 of E-0).
	Crew	Reviews E-1 Foldout Page Criteria. Check if RCPs should be stopped Check If SG Secondary Pressure Boundaries Are Intact: Check Intact SG Levels Check Secondary Radiation Check PRZ PORVs and Block Valves
	US	Checks if SI Termination Criteria is MET: ▪ RCS Subcooling >40°F. ▪ Secondary Heat Sink (AFW Flow >240x103 or SG >14% [28% ADVERSE]). ▪ RCS Pressure rising or stable. ▪ Pressurizer Level >21% [25%ADVERSE].
NOTE: May transition to ES-1.1 SI Termination based on the Small Leak Size		
	CREW	Check if Containment Spray Should be Stopped – Check If RHR Pumps Should Be Stopped – Check RCS And SG Pressures: Check If DGs Should Be Stopped:

Facility: D C Cook Scenario No.: 5 Op-Test No.: 2014301

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: 79% power, Power reduction in progress.

Turnover: Unit is stable at 79% power and continuing a power reduction to take the unit off line. Currently performing Step 4.11.1 of 02-OHP 4021.001.003, Power Reduction. Remove the North Condensate Booster pump from service – was run for engineering data collection.

Event No.	Malf. No.	Event Type*	Event Description
1		N	Remove North Condensate Booster from service
2	U1_QLC451 To 0%	I(ATC) TS	VCT level instrument (QLC-451) fails low
3		R	Power reduction
4	U1_MFC140 to 0	I(BOP) TS	Steam flow channel (MFC-140) fails low (Controlling)
5	U1_RCR20 to 5	C(ATC)	Pressurizer PORV (NRC-153) leaking (requires isolation) – 5% open **NOTE: Time compression may be used as the procedure requires a 15 minute wait time after unisolating each PORV.**
6	U1_RC23D to 30 over 10 min	Major	Reactor Trip with S/G #4 tube rupture (600 gpm (60%) ramp to 30% over 10 minutes – raise to 60% on trip)
7	U1_MS06D to 80%	C(BOP)	Steam generator safety valve (SV3-4) opens – 80%

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

Op-Test No.: Crews XX | Scenario No.: 05 | Event No.: 1

Event Description: **Shutdown the North Condensate Booster Pump**

Time	Position	Applicant's Actions or Behavior
	US	Directs actions of 1-OHP-4021-054-001, Attachment 2, Operation of Hotwell (HW) and Condensate Booster (CB) Pumps to stop the North CB pump.
	BOP	Performs the following to shutdown the CB pump as directed: 1. Verifies the following switches in NEUTRAL: • Standby Hotwell pump • Standby TACW pump 2. Stops the North CB pump
NOTE:	**Ann. 116, Drop 73, CNDST BOOSTER PUMP DISCH PRESSURE LOW may annunciate during this evolution.**	
	US	Directs the following actions to realign condensate system: • Stop the North CB pump • Notify chemistry of condensate system configuration change.

Op-Test No.: Crews XX Scenario No.: 05 Event No.: 2

Event Description: **VCT level instrument (QLC-451) fails low**

Time	Position	Applicant's Actions or Behavior
	Crew	Acknowledge ANNUNCIATOR #109 RESPONSE: BORIC ACID, Drop 49 alarm, VOLUME CONTROL TANK LEVEL LOW
	RO/BOP	Reports instrument malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: • Check VCT Level Channels - BOTH LESS THAN 78%, • Check Auto VCT Makeup - NOT IN PROGRESS • Place Reactor Coolant Makeup Blend Control to STOP/NEUTRAL:
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	US	Directs entry into 1-OHP-4022-013-017
	ATC	Check 1-QLC-451, VCT level channel failed – Full scale Low • 1-QLC-451 NOT trending with VCT pressure • 1-QLC-452 reading expected VCT level Initiate makeup per 1-OHP-4021-005-002, Operation of the Unit 1 Boric Acid Blender. If needed Verify pressurizer level control functioning properly. Operate Boric Acid Blender In Manual As Required To Maintain VCT Level Greater Than 15% on 1-QLC-452
	US	Refers to the Technical Requirements Manual (TRM): • TRM 8.1.1 Boration System - Operating Condition A.1 – Restore to operable within 72 Hours (RWST to CVCS auto swapover)

Op-Test No.: Crews XX Scenario No.: 05 Event No.: 3

Event Description: **Power reduction**

Time	Position	Applicant's Actions or Behavior
	RO	Calculates boric acid addition per OHP-4021-005-002, Attachment 9, Boration or Dilution Volume Determination.
	RO	Briefs crew on reactivity plan for power reduction.
	US	Reviews / concurs with reactivity plan.
	US	Directs RO to commence Power Reduction in accordance with OHP-4021-001-003.
	RO	Energize Pressurizer Backup Heaters
	RO	Performs BORATION: ▪ Place RC Makeup Blend Control Switch in STOP. ▪ Place RC Makeup Blend Control Mode Selector Switch in BORATE. ▪ Set desired batch on BA Flow Totalizer. ▪ Adjust BA Flow Ctrl (RU-33) to desired flow. ▪ Place RC Makeup Blend Control Switch in START.
	RO	Commences power reduction: · Lowers turbine load (reactor power) using HMI. · Maintains Tavg/Tref deviation within limits by boration and turbine load adjustments. · Ensures Axial Flux Difference (AFD) is maintained within target band by manual control rod movement as needed.
	BOP/RO	BOP acts as peer checker for RO during blender operations and RO verifies appropriate reactivity feedback.
	BOP	Monitors main electrical generator temperatures.

Op-Test No.: Crews XX Scenario No.: 05 Event No.: 4

Event Description: **SG#4 Steam flow channel 1 (MFC-140) fails low (Controlling)**

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports annunciators on Panel #114 (Drops 41, 43, and 32) which are indicative of a steam flow instrument failure.
	BOP	Reports instrument malfunction and performs the immediate actions of OHP-4022-IFR-001, Instrument Failure Response: Determine SG 4 level is lowering and that its Feedwater Regulating Valve (FRV-240) is not responding as expected. • Notify US and takes manual control of FRV-240. • Determine failure affects MFPs, and take ΔP controller to MANUAL. • Stabilize SG 4 level in manual.
	US	Enters and directs actions of OHP-4022-IFR-001, Instrument Failure Response procedure.
	US	Enters and directs actions of 1-OHP-4022-013-014, Steam Flow Instrument Malfunction procedure.
	BOP	Performs the following actions as directed: 1. Restores SG 4 level using MANUAL control of FRV-240. 2. Places MFP ΔP controller in MANUAL and maintains pressure. 3. Reports MFC-140 has failed high. 4. Places 1-FS-542C selector switch in channel 2 position. 5. Nulls and returns FRV-240 controller to AUTO. 6. Returns MFP ΔP controller to AUTO.

	US	Refers to the following Tech Specs (TS):
		▪ TS 3.3.1 RTS Instrumentation (Table 3.3.1-1)
		  ▪ Condition A – Refer to Table
		  ▪ Function 15 Condition D - Trip Bistables in 6 Hours
		▪ TS 3.3.2 ESFAS Instrumentation (Table 3.3.2-1)
		  ▪ Condition A – Refer to Table
		  ▪ Function 4e Condition D - Trip Bistables in 6 Hours

	US	Initiates actions to trip bistables associated with MFC-140 failure per Attachment D-1 of 1-OHP-4022-013-014.

Op-Test No.: Crews XX Scenario No.: 05 Event No.: 5

Event Description: **PRZ PORV (NRV-153) Leak by (5 gpm)**

Time	Position	Applicant's Actions or Behavior
	RO	Recognizes Annunciators on Panel 108, Drop 24, PRZ PORV Disch Temp Hi, and Drop 31, PRZ PRT Press Hi/Lo, which are indicative of PORV leakage.
Note:		**Procedure OHP-4022-002-009 is written to identify the leaking valve and isolate it. The crew may determine that the Acoustic Monitor provides indication as to which valve is leaking and so may directly isolate the applicable PORV.** **Time compression may be used as the procedure requires a 15 minute wait time after unisolating each PORV. If required, provide the crew that indications remain the same for PORV NRV-151 & NRV-152.**
	US	Enters and directs operator actions per OHP-4022-002-009, Leaking PORV.
	RO	Performs actions as directed by US: • Closes PORV Block Valves as directed. • Reopens Block Valves and Monitors PRT/Temperatures to determine which PORV is leaking. • Monitors PORV Discharge Temperatures. • Monitors PRT. • Place PORV in Close when identified as leaking PORV.
Note:		**The crew may elect to implement OHP-4022-002-020, Excessive Reactor Coolant Leakage.** **The Crew may perform actions of OHP-4021-002-006, PRT Operations, to restore the PRT conditions if required.**
	US	May Direct operator action per OHP-4022-002-020, RCS Leakage: • Check PRZ Level and adjust Charging as required. • Check VCT Level • Determine RCS Leakrate • Check PRZ PORV and Safety Valve Leakage
	US	Refers to Tech Specs (TS): • TS 3.4.11 Pressurizer Power Operated Relief Valves (PORVs). Condition A - Closes Block Valve 1-NMO-153 within 1 hour with power maintained to block valve. *May Refer to TS :* • TS 3.4.12 Low Temperature Overpressure Protection (LTOP) System - Mode 4 & 5 applicability • TS 3.4.13, RCS Operational LEAKAGE, if leak is not isolated.
	RO	Monitors PRZ pressure control system and ensures pressure remains at normal conditions (~2085 psig).

Op-Test No.: Crews XX Scenario No.: 05 Event No.: 6,7

Event Description: **Reactor Trip with S/G 14 tube rupture (600 gpm), Steam generator safety valve (SV3-4) opens – 80%**

Time	Position	Applicant's Actions or Behavior

	RO/BOP	Perform the following:
		• Recognizes and reports excessive charging flow demand as indicated by:
		  ○ Lowering Pressurizer level
		  ○ Lowering Pressurizer pressure
		  ○ PRZ level deviation alarm
		• Recognize SG leakage based on RMS alarm on 1805 (GS Cond) and/or 1905 (SJAE) monitor.

	US	May enter and direct operator actions per OHP-4022-002-021 SG Tube Leakage (or OHP-4022-002-020, Excessive RCS Leakage): • Raise charging flow and isolate letdown • Start the second CCP • Maintain VCT level
	RO	Recognizes and reports RCS leak rate greater than the capacity of charging pump **-OR-** unable to maintain Pressurizer level/VCT level
	US	Directs RO/BOP to manually trip the reactor and perform the immediate actions of E-0, Reactor Trip or Safety Injection (based on RCS leak rate beyond charging system capability, may also initiate SI).
	CREW	Performs the immediate actions of E-0: • Checks reactor trip. • Checks turbine trip. • Checks power to AC emergency buses. • Checks safety injection status. Status light LIT •
	BOP **Critical Step Isolate**	• Review Foldout Page Criteria • Check Main Steamline Isolation NOT Required • Check CTS NOT Required • Implement Attachment A (Page 27) While Continuing With This Procedure • Check If Ruptured SG is Suspected – Recognize SG14 is Ruptured • **Close AFW Valves 1-FMO-241 and 242 (When >14%)** • Check AFW Pumps Running

Op-Test No.: Crews XX | Scenario No.: 05 | Event No.: 6,7

Event Description: **Reactor Trip with S/G 14 tube rupture (600 gpm), Steam generator safety valve (SV3-4) opens – 80%**

Time	Position	Applicant's Actions or Behavior
	SG AFW Flow	• Check Total AFW flow – Greater than $240x10^3$ PPH • Minimize Unnecessary RCS Cooldown • Check AFW Pump Discharge Valves – Open or Throttled • Check FW Isolation • Check RCS Temperature • Check PRZ PORVs and Spray valves • Check if RCPs Should be stopped • Check if SG Secondary Pressure Boundaries are Intact – • Recognize that the SG Safety Valve is OPEN Go To E-2, Faulted Steam Generator Isolation
NOTE : Crew May transition to E-2 first or May transition to E-3 First and then Return to E-2		
	US	Direct entry into E-2
	Crew **Critical Step Isolate SG #4 Steam Linefrom other SGs**	• Check SG Stop Valves Closed • Check SG Stop Valve Dump Valves Closed • Check If any SG Secondary Boundary is Intact • Identify Faulted SG • Isolate Faulted SG • Check CST Level – Greater Than 15% • Check Secondary Radiation NOT Normal • GO TO E-3, Steam Generator Tube Rupture, Step 1 •
	US	Direct enter into E-3
	Crew	• Check If RCPs Should be Stopped • Identify Ruptured SG • Isolate Flow From Ruptured SG • Check Ruptured SG Level • Check Ruptured SG –Isolated From at Least One Intact SG • Check Ruptured SG Pressure – Greater Than 450 PSIG • Enter RNO GO TO ECA-3.1, SGTR With Loss of Reactor Coolant – Subcooled Recovery Desired, Step 1

Op-Test No.: Crews XX Scenario No.: 05 Event No.: 6,7

Event Description: **Reactor Trip with S/G 14 tube rupture (600 gpm), Steam generator safety valve (SV3-4) opens – 80%**

Time	Position	Applicant's Actions or Behavior
	US	Directs entry into ECA-3.1
	Crew	• Reset SI • Reset Containment Isolation • Establish Control Air to Containment • Trip All PZR Heaters • Check If Containment Spray Should be Stopped • Check Ruptured SG Level • Check If RHR Pumps Should be Stopped • Initiate Evaluation of Plant Status • Check If SG Secondary Pressure Boundaries are Intact • Check all faulted SG isolated • Check All AC Buses – Energized By Offsite Power • Check Intact SG Levels