Facility:	St. Lucie HLC 20	Scenario No.: 1	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: 100% power MOL. Reduce power to 90% to remove the 2B Heater Drain Pump from service.

Turnover: 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. The 2B Heater Drain Pump is being carefully monitored by a predictive maintenance team due to a noisy bearing.

Critical Tasks:

- Emergency Borate
- Stop all RCP's within 10 minutes of SIAS or RCS subcooling <20°F whichever comes first
- Start 2B HPSI pump

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Reduce power to 90%
2	1	C / RO, SRO.	Boric Acid Control Flow Valve (FCV-2210Y) fails closed
3	2	SRO / T.S.	RCS loop (SG) flow instrument (PDT1111D) fails low
4	3	C / BOP	CEDM Fan 21A sheared shaft
5	4	C / RO, SRO SRO / T.S.	Slipped CEA # 59 >15 inches
6	5	M / All	Ejected CEA # 59 (LOCA)
7	6	C / RO, SRO	Three CEA's stuck out. Loss of 480V MCC 2A6 on trip Emergency Borate using gravity feeds
8	7	C / BOP	Two MSR Block valves fail to close on trip
9	8	C / RO, SRO	2B HPSI pump fails to start on SIAS. HCV-3617 fails to open on SIAS and cannot be opened.

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

DRAFT

SCENARIO EVENT DESCRIPTION
SCENARIO 1

The crew will perform a downpower to 90% and remove the 2B Heater Drain pump from service.

During the downpower FCV-2210Y, Boric Acid flow control valve will fail closed and cannot be opened. Alternate boration using the Emergency Borate valve and cycling the 2B Boric Acid makeup pump will be used to complete the downpower.

The RCS Loop 2A Channel D flow instrument (PDT-1111D) fails low causing a low flow indication and half trip signal (also appears on PDI-1101D on the RTGB). The crew must diagnose the problem and bypass the trip signal in accordance with 2-AOP-99-01, Loss of Tech Spec Instrumentation. The SRO will refer to T.S. for the appropriate action statement.

CEDM fan HVE-21A experiences a sheared shaft. The low flow alarm will annunciate but due actual plant 'work around' (failed low flow switch) the standby fan, HVE-21B will not automatically start. The Operator will be required to manually start the standby fan. This is a 45 minute shutdown requirement.

CEA #59 slips >15 inches. The crew is required to re-align the CEA to within 7 inches of other CEA's within that group. The SRO should refer to T.S. for the appropriate actions.

While withdrawing the slipped CEA, CEA #59 will eject from the Reactor Vessel resulting in a plant trip and LOCA. On the trip feeder breaker to MCC 2A6 will trip resulting in loss of various plant equipment including some ECCS injection valves and the 2B Boric Acid Makeup pump. Three CEA's will fail to insert during the trip. Emergency Boration will be required but due to no Boric Acid Makeup pump available the RO will be required to use the Gravity feeds. The VCT outlet valve V2501 fails to close on SIAS so if the RO fails to manually align emergency boration prior to SIAS the failed VCT outlet makes this critical. Also on the trip two MSR block valves will not close when the BOP attempts to close manually in accordance with post trip actions. The BOP will be required to close the MSR TCV's from the reheat control panel.

The plant will depressurize due to the CEA ejection (LOCA). When SIAS actuates the 2B HPSI fails to start. Due the loss of MCC 2A6 some HPSI 'A' side injection valves are without power and closed and HCV-3617 does not open. This results in inadequate ECCS flow and makes starting the 2B HPSI pump a critical task.

Op Test No.: 1	Scenario # 1	Event # 1	Page 3	of 19
Event Description:	Reduce power to 90%			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: For setup, place placard for 'B' protected train and OLRM YELLOW. If crew chooses 2- GOP-123, Turbine Shutdown - Full load To Zero Load, instead of 2-ONP-22.01, Rapid Down Power procedure then inform SRO the 2A Heater Drain Bearing is getting very noisy. The pump needs to be stopped ASAP.		
	SRO	Supervise/Coordinates Power reduction in accordance with 2-AOP-22.01 Rapid Down Power. (attached pages x-x) Power reduction to ~90% to remove pump.
		Directs Boration per Attachment 1 AOP-22.01 Rapid Down Power. (attached pages x-x) Note: Operator aide available
		Directs DEH programmed for desired load rate step 4.1.2 A / B
		Directs Lead group CEA insertion of 6 inches step 4.1.3.
		When T-ave decrease noted directs GO on the turbine step 4.2.1.
		Ensures BOP makes plant announcement 'Unit 2 is commencing a Rapid Downpower due to Heater Drain Pump problem'. Step 4.2.3
		Ensures System is notified of downpower step 4.2.4
		Direct Pzr. Placed on recirc IAW AOP-22.01 'Rapid Downpower' Step 4.2.5 refers to Attachment 5 (attachment 5 page *xx*)
		Direct additional Charging pump started IAW 2-AOP-22.01 'Rapid Downpower' Step 4.2.6 refers to Attachment 4 (attached page *xx*)
	RO	Begins Boration per Attachment 1 AOP-22.01 Rapid Down Power. (attached pages x-x)

Op Test No.: 1 Scenario # 1 Event # 1 Page 4 of 19

Event Description: Reduce power to 90%

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Inserts Lead CEA Group 6 inches. • Select MANUAL SEQUENTIAL. • Insert CEAs by taking IN/HOLD/OUT switch to insert.
		Sarts 2B Charging pump IAW AOP-22.01 'Rapid Downpower' Attachment 4 (attached page *xx*)
		Places Pzr. On recirc. IAW AOP-22.01 'Rapid Downpower' Attachment 5. (attached page *xx*)
	BOP	Programs the DEH per AOP-22.01 step 4.1.2 for the desired load reduction rate. • Set reference by ensuring REF selected and then depress desired MW endpoint, hit ENTER. • Depress LOAD RATE type in desired load rate and hit ENTER. • Depress GO pushbutton.
		Notifies Plant Dispatcher step 4.2.4
		When T-ave decrease is noted, starts Turbine down power per AOP-22.01 step 4.2.1.
	SRO	Continues to Supervise/Coordinate Power reduction in accordance with AOP-22.01 Rapid Down Power Steps 4.2.8 thru 4.2.14.
	RO	Controls ASI as directed by SRO with CEAs or per NOP-100.02, Axial Shape Index Control Per step 6.4.1 attached page xxx).
	RO/BOP	Maintains T-avg within 6.6°F of T-ref per step 4.2.8.

Op Test No.: 1	Scenario # 1	Event # 1	Page 5 of 19
Event Description:	Reduce power to 90%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	When desired power level reached stabilizes unit per step 4.2.14.
	BOP	When desired power level reached stabilizes unit per step 4.2.14.
		Notify NPO to place quench water on Heater Drain pump (open V38239)
		Stop 2B Heater Drain pump when directed.
		When 2B Heater Drain pump stopped, notify NPO to monitor 4B Heater level, LCV-11-18B controlling level.

Op Test No.: 1 Scenario # 1 Event # 2 Page 6 of 19

Event Description: Boric Acid Control Valve FCV-2210Y fails closed

Time	Position	Applicant's Actions or Behavior
Booth Operator Instruction: When directed Trigger Event 3, FCV-2210Y fails closed. Note: Failure should be inserted after downpower is started approx 97-95% power. **Booth Operator Response: When requested by I&C to investigate failure of FCV 2210Y respond will investigate. Response after investigation, valve diaphragm has failed resulting in the valve being unable to open.** **Control Room Indications Available: Boric acid flow goes to full scale low, indicating lights for FCV-2210Y goes from dual to green. Annunciator N-40 MAY come in.**		
	RO	Recognizes closed indication on FCV-2210Y and notifies SRO.
	SRO	Directs RO actions in accordance with 2-AOP-02.01 Boron Concentration Control (BCCS) Abnormal Operations. Procedure steps 4.2.1.4 (attached page *xx*)
		Ensures Boric Acid pump 2B is running step 4.2.1.4.A.
		Directs OPENING V2514, Emergency Borate step 4.2.1.4.B.
		Directs Placing Makeup Mode Selector Switch in MANUAL step 4.2.1.4.C.
		Directs cycling the Boric Acid pump as necessary to control boric acid addition rate and rate of power change step 4.2.1.4.D.
		Directs monitoring for any abnormal change in T-avg 4.2.1.4.E.
		Directs BOP to go to HOLD on turbine.
		Notifies Shift Manager of FCV-2210Y failure and entry into 2-AOP-02.01 Boron Concentration Control. Notifies I&C.
		Direct continuation of downpower with alternate Boration flowpath.

Op Test No.: 1 Scenario # 1 Event # 2 Page 7 of 19

Event Description: Boric Acid Control Valve FCV-2210Y fails closed

Time	Position	Applicant's Actions or Behavior
Booth Operator Instruction:		
Control Room Indications Available:		
	RO	Starts a 2B Boric Acid pump if not already running.
		Secures from previous lineup (close V2525, to suction of Charging pumps)
		OPENS V2514, Emergency Borate. o (This will cause annunciator M-42 Emergency Borate V2514 OPEN/OVLD/SS Isol to alarm.)
		Places Makeup Mode Selector Switch in MANUAL.
		Cycles the Boric Acid pump as necessary to control boric acid addition rate and rate of power change.
		Monitors for any abnormal change in T-avg. (Tave-Tref. Within 6.6°F)
	BOP	Puts turbine on HOLD as directed.
		Monitors plant parameters while event in progress.
		Continues Turbine downpower when directed.

Op Test No.: 1	Scenario # 1	Event # 3	Page 8	of 19
Event Description:	RCS Loop (SG) flow instrument PDT-1111D fails low			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instruction: When directed Trigger Event 2, PDT-1111D fails low RCS loop (SG) flow instrument PDT-1111D fails low **Control Room Indications Available: Annunciator L-10, L-18, SG ΔP 2A1 reads '0' on RTGB 203 apron section. PDI-1101D reads ~10.9 (half of normal) on RTGB.**		
	SRO /RO	Recognize alarms. Confirm failed channel
	SRO	Directs implementation of 2-AOP-99.01, Loss Of Tech Spec Instrumentation step 4.1.1 (attached page xx)
		Refers to step 4.2.16 and directs bypassing failed channel
	SRO T.S.	Recognize entry into T.S. 3.3.1 action 2#. (1 hour to place in trip or bypass) (attached pages xx)
		Notifies Shift Manager of PDT-1111D failure and entry into 2-AOP-99.01, Loss Of Tech Spec Instrumentation.
	BOP	Obtains key 103 and Bypasses Channel D RPS trip bistable as directed per of 2-AOP-99.01, Loss Of Tech Spec Instrumentation step 4.2.16.2.A

Op Test No.: 1 Scenario # 1 Event # 4 Page 9 of 19

Event Description: CEDM Fan 21A sheared shaft

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger Event 4 CEDM Fan 21A sheared shaft. **If directed to perform Attachment 1, report back in 5 minutes and state breakers are racked in and no flags are dropped.**		
Control Room Indications Available: HVE-21A AMP meter (AM-507) indicating low. **Annunciator X-8 low flow on CEDM fan 21A**		
	SRO	Implement 2-AOP-25.01 Loss of RCB Cooling Fans section 4.2.2 step 1-4 (attached page xxx)
		Directs placing HVE-21B to stop.
		Notifies SM on AOP entry
		After 10 minutes from time of trip start HVE-21B
	BOP	Recognize annunciator X-8 and identifies no CEDM cooling fans are running. (low amps on HVE-21B)
		Recognize TR-25-3 PT07 reads ~180°F
		Places HVE-21A to STOP
		Start HVE-21B when directed.
	SRO	If downpower stopped during this time, may direct ~5 gpm dilution to maintain Reactor power due to Xenon building in.

Op Test No.: 1 Scenario # 1 Event # 5 Page 10 of 19

Event Description: Slipped CEA #59 >15 inches

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 5 Slipped CEA#59 >15"		
Booth Operator Response: When I/C called to determine cause of abnormal condition wait five minutes and call back, 'a loose card was reseated' and CEA problem should be corrected. **If RE called, report no limitations on recovering CEA** **Control Room Indications Available: Annunciator K-11 CEA Motion Inhibit, K-30 deviation, ADS display.**		
	SRO / RO	Recognize CEA # 59 slipped > 15" (not dropped)
	SRO	Direct RO to secure dilution if initiated.
	SRO T.S.	Recognize T.S. 3.1.3.1 Action d, realign within 7" of other CEA's within COLR fig. 3.1-1a
		Direct Immediate Operator actions IAW 2-AOP-66.01, "Dropped or Misaligned CEA Abnormal Operations": • Direct RO to place CEDMCS control panel in off. • Verify all CEA motion has stopped • Verify No dropped CEA's: o Rod bottom lights o ADS Display CRT o DCS screen o Verify no multiple major malfunctions
		Implement 2-AOP-66.01, "Dropped or Misaligned CEA Abnormal Operations", subsequent operator actions step 4.2.1 through 4.2.6 (attached pages xxx-xxx)
		Step 4.2.6.2, Direct Attachment 4, Major Misalignment step 1 and 2, attached page xxxx
		Direct step 3 of attachment 4, Perform attachment 6, CEA functional test and operability determination attached page xxx

Op Test No.: 1 Scenario # 1 Event # 5 Page 11 of 19

Event Description: Slipped CEA #59 >15 inches

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Booth Operator Response:		
	SRO	Attachment 6, CEA functional test and operability, Determines CEA operable and Directs CEA re-aligned as per attachment 4 step 7 and 8 attached page xxxx
	RO	Secure dilution when directed
		Perform immediate Operator actions: • Place CEDMCS control panel in off. • Verify all CEA motion has stopped • Verify No dropped CEA's: o Rod bottom lights o ADS Display CRT o DCS screen o Verify no multiple major malfunctions
		Perform subsequent operator actions step 4.2.1 through 4.2.6 attached pages xxx-xxx as directed
		Perform attachment 4 as directed attached pages xxx
		Perform step 3 of attachment 4, Perform attachment 6, CEA functional test and operability determination as directed attached page xxx
		Re-align CEA as per attachment 4 step 7 and 8 as directed attached page xxxx while maintaining ΔT power level recorded in section 4.2 step 4 and Tave – Tref deviation within ± 2°F

Op Test No.: 1	Scenario # 1	Event # 5	Page 12 of 19
Event Description:	Slipped CEA #59 >15 inches		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Booth Operator Response:		
	BOP	Maintain Tave – Tref deviation ± 2°F by adjusting Turbine load as needed to meet the following: • Tave – Tref stable

Op Test No.: 1	Scenario # 1	Event # 6,7,8,9	Page 13 of 19
Event Description:	Ejected CEA, Three CEA's stuck out, Two MSR block valves don't close, Loss of 2A6 480V MCC, V2501 fails to close on SIAS, Emergency Borate using gravity feeds. 2B HPSI fails to start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When CEA is ~ 7" of it's group, enable CEA ejection.		
Examiners Note: when CEA #59 is within ~7 inches of the group, the CEA will eject resulting in a Loss of Coolant accident and unit trip. Three CEA's near CEA #59 will fail to insert. 480V MCC 2A6 de-energizes on trip requiring Boric Acid gravity feed valves be opened by RO to emergency borate. **Examiners Note: VCT outlet valve will not close on SIAS. Manual closing of this valve from RTGB 205 is critical for successful emergency boration.** **Control Room Indications Available: CEA display indicates CEA #59 loss of indication, Lowering RCS pressure, increasing Containment pressure.** **Booth Operator Response: Respond as NPO to perform Appendix X. 10 minutes later call Appendix X complete.**		
	SRO **CRITICAL TASK**	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: Identifies three CEA's not fully inserted. Directs Emergency Boration. • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
		Directs SBCS permissive taken to OFF to close SBCS valves
	CRITICAL TASK	On SIAS recognize 2B HPSI does not start. Direct starting of 2B HPSI
		Direct attempt to open HCV-3617
	CRITICAL TASK	Direct stopping ALL RCP's when RCS subcooling <20°F. If SIAS first direct stopping one RCP/LOOP
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions

Op Test No.: 1	Scenario # 1	Event # 6,7,8,9	Page 14 of 19
Event Description:	Ejected CEA, Three CEA's stuck out, Two MSR block valves don't close, Loss of 2A6 480V MCC, V2501 fails to close on SIAS, Emergency Borate using gravity feeds. 2B HPSI fails to start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: Due to the loss of 2A6 480V MCC, SBCS will fail open resulting in increasing cooldown. This should be recognized by the BOP when performing RCS Heat Removal due to lowering Tave and lowering SG pressure. To mitigate this failure the BOP should take the SBCS permissive switch to 'OFF'. This will close all the SBCS valves and terminate the cooldown.		
	BOP	Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses) o Recognize MCC 2A6 de-energized
		RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F o <525°F ensure SBCS valves restoring Tave • S/G pressure is between 835 and 915 psig o <835 psig close SBCS valves (permissive to OFF) Place ADV's in auto set to 900 psia. o <735 psig close MSIV's • Four MSR TCV Block valves closed o Close MSR TCV's due to two block valves did not close. • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED

Op Test No.: 1	Scenario # 1	Event # 6,7,8,9	Page 15 of 19
Event Description:	Ejected CEA, Three CEA's stuck out, Two MSR block valves don't close, Loss of 2A6 480V MCC, V2501 fails to close on SIAS, Emergency Borate using gravity feeds. 2B HPSI fails to start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120° F • Verify NO secondary plant radiation alarms
	RO / BOP **CRITICAL TASK**	Start 2B HPSI pump on SIAS
		When directed attempt to open HCV-3617
	RO **CRITICAL TASK**	Identifies three CEA's not inserted. Emergency Borate: Closes VCT outlet V2501 and opens both gravity feed valves.
		Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.
		Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%

Op Test No.: 1	Scenario # 1	Event # 6,7,8,9	Page 16 of 19
Event Description:	Ejected CEA, Three CEA's stuck out, Two MSR block valves don't close, Loss of 2A6 480V MCC, V2501 fails to close on SIAS, Emergency Borate using gravity feeds. 2B HPSI fails to start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia • Verify RCS subcooling is >20° F o Recognize RCS subcooling <20°F and stop ALL RCP's
		Core Heat Removal • Verify at least one RCP running with CCW (if SIAS identified CCW isolated) • Verify loop delta T is <10° F

Op Test No.: 1	Scenario # 1	Event # 6,7,8,9	Page 17 of 19
Event Description:	Ejected CEA, Three CEA's stuck out, Two MSR block valves don't close, Loss of 2A6 480V MCC, V2501 fails to close on SIAS, Emergency Borate using gravity feeds. 2B HPSI fails to start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO **CRITICAL TASK**	Stop all RCP's when directed (RCS subcooling <20°F) or if SIAS first, stop one RCP/LOOP.
	SRO	Exit EOP-01 and Implement 2-EOP-03, "Loss of Coolant Accident"
		• Directs STA to perform SFSC's
		• Contact SM to classify the event
		• Direct implementation of Appendix A EOP-99 Sampling SG's (attached page xxx)
		• Ensure SIAS flow adequate per Figure 2 SI flow Vs. RCS pressure.
		Within 30 minutes of SIAS ensure CCW to RCP's remains isolated by directing: • Placing four CCW valves to/from RCP's to close • Ensure RCP bleedoff remains isolated by placing two RCP bleedoff valves to close
		Ensure Both of the following: • CIAS actuated • MSIS actuated

Op Test No.: 1	Scenario # 1	Event # 6,7,8,9	Page 18 of 19
Event Description:	Ejected CEA, Three CEA's stuck out, Two MSR block valves don't close, Loss of 2A6 480V MCC, V2501 fails to close on SIAS, Emergency Borate using gravity feeds. 2B HPSI fails to start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Ensure Containment HVAC • At least one train SBVS • At least one train Containment fan coolers
		Ensure Containment spray if Containment pressure >5.4 psig: • CSAS actuated • Flow ≥ 2700 gpm each header
		Direct RCS cooldown not to exceed 50°F in any one hour period using ADV's.
	BOP	Verifies Figure 2 SI flow Vs. RCS pressure.
		Places four CCW valves to/from RCP's to close when directed
		Places two RCP bleedoff valves to close when directed
		Verifies one train SBVS and one train Containment fan coolers
	RO	Initiates cooldown using ADV's not to exceed 50°F in any one hour period
		Suggested termination point: the crew is performing a controlled cooldown and ECCS flow meets figure 1.

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0** **Unit 2 Unidentified RCS Leakage: 0.12**

Unit 2 Scheduled Activities per the OSP: Reduce power to 90% and remove the 2B Heater Drain Pump form service.

Upcoming ECOs to Hang or Release: 2B Heater Drain Pump

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-44 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status: Both Units at 100% power. 2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift.

Equipment Problems: 2B Heater Drain Pump bad bearing

Facility:	St. Lucie HLC 20	Scenario No.: 2	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: 45% power MOL. 2B Main Feedwater Pump has just been returned to service following repair of an oil leak.

Turnover: 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. Return the Unit to 100% power.

Critical Tasks:

- Close 2B EDG breaker post SIAS
- Crosstie the 2B AFW pump to feed the 2A SG at ≥150 gpm.
- Control RCS pressure / temperature within limits of figure 1A.

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Raise power to 100%
2	1	SRO / T.S.	RWT LIS-07-2B fails low
3	2	C / RO	RCP 2A1 seal HX CCW outlet valve HCV-11A1 fails closed
4	3	C / BOP	DEH swaps to manual during up power
5	4	SRO / T.S.	2B Charging Pump develops severe oil leak
6	5	C / RO	Letdown HIC-1110 goes to max flow
7	6	M / All	B MSIV closes at power. LOOP. Two B MSSV's stick open
8	7	C / BOP	MV-09-11 AFW to 2A SG fails to open. Open MV-09-9 when crosstie valves open and feed the 2A SG.
9	8	C / BOP	2B EDG output breaker fails to re-close after opening on SIAS.

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

DRAFT

The plant will be at 45% with the 2B Main Feedwater pump just returned to service. Instructions to the crew is to raise power to 100%.

During the up power RWT LIS-07-2B fails low. This is a T.S. call for the SRO. No plant transient results from this failure.

After RWT LIS-07-2B actions are taken, RCP 2A1 seal HX CCW outlet valve HCV-14-11A1 fails closed. Actions are taken IAW 0120034, Reactor Coolant Pump 'override open' HCV-14-11A1.

Continuing with the up power, the Turbine DEH systems swaps to manual control. Continuation of the up-power will be in Turbine Manual with the governor valves in single valve.

As the up power continues the SNPO will call the Control Room and inform them the 2B Charging pump has a severe oil leak. The crew should stop the pump. This results in only the 2A Charging pump available. The SRO should refer to T.S. and apply the appropriate action statement. When the 2B Charging pump is stopped the RO must adjust letdown to compensate for the reduced Charging flow. During this adjustment HIC-1110 malfunctions to maximum flow. Manual control should be taken to match letdown with Charging flow.

After Charging and Letdown are matched the B MSIV will close due to air line rupture resulting in a plant trip. On the trip a loss of offsite power (LOOP) will occur. Two MSSV's will lift and fail to reseat. An excess steam demand is now in progress.

As the RCS cools down due to the ESD, SIAS will actuate. Both Diesel Generator output breakers open but the 2B Diesel breaker does not re-close. The BRCO should close the 2B Diesel output breaker.

The 2B Steam Generator will continue to blow down. Due to the trip at low power, AFAS will not actuate. AFW will be manually started, aligned. When 2C AFW is started, MV-09-11 to 2A SG will not open and cannot be opened. Success path is to start the 2B AFW pump and open the crossties from the B side to the A side and feed the A SG.

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: B

Unit 2 Identified RCS Leakage: 0 **Unit 2 Unidentified RCS Leakage:** 0

Unit 2 Scheduled Activities per the OSP:

Raise power to 100%

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-44 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

Unit 1 at 100% power, Unit 2 at 45% power MOL. 2B Main Feedwater Pump has just been returned to service following repair of an oil leak. 2-GOP-201 is complete up to step 6.131.13.

Equipment Problems:

2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift

Op Test No.: 1	Scenario # 2	Event # 1	Page 4 of 16
Event Description:	Raise power to 100%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Place protected train B sign up, OLRM YELLOW. Initiate IC 3 45% power. Xenon building in, 9 gpm dilution rate. MOL. 2C Charging Pump OOS for repack. 2A AFW Pump OOS to repair oil leak. Start 2B MFW pump and leave in recirc. position. Place 2A AFW pump 2A BAM pump and 2C Charging pump to stop.		
Control Room Indications Available:		
	SRO	Continue with IAW 2-GOP-201 'Reactor Plant Startup –Mode 2 To Mode 1', step 6.131.14
		Control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached pages XX)
	RO	Raise dilution rate for power increase IAW 2-NOP-02.24 step 6.5.12 (attached page x)
		Withdraw CEA's to control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached page x) • CEA Withdrawal, select MS on the CEDMCS Control Switch • Move the IN/HOLD/OUT Switch to the OUT direction
		Divert letdown to WMS by placing V2500 to WMS to maintain VCT level within normal band.
	BOP	Program DEH for power increase at a rate not to exceed 4.2 MW/MIN IAW 2-GOP-101 step 6.1.2.D Category 4. (attached page 4) • Set reference by ensuring REF selected and then depress desired MW endpoint, select ENTER • Depress LOAD RATE type in desired load rate and select ENTER • Depress GO pushbutton

Op Test No.: 1	Scenario # 2	Event # 2	Page 5 of 16
Event Description:	RWT LIS-07-2B fails low		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger event 2 RWT LIS-07-2B fails low when directed.		
Control Room Indications Available: Annunciators S-19 RWT RAS and Q-2 ESFAS ATI Fault		
	SRO T.S.	Direct the implementation of 2-AOP-99.01 step 4.1 (*attached, Page X*) RWT level LIS-07-2B fail low. Implement T.S. 3.3.2 Table 3.3-3. (action 19). (attached page xx)
		Direct placing ESFAS channel MB RWT level in bypass or trip IAW 2-AOP-99.01 'Loss of Tech Spec Instrumentation' step 4.2.18.
	RO	Recognize LIS-07-2B has failed low. Annunciators S-19 RWT RAS and Q-2 ESFAS ATI.
	BOP	Bypass or trip ESFAS RWT level channel MA as directed. • Obtain key 114 and 131. • Ensure B Channel is bypassed.

Op Test No.: 1	Scenario # 2	Event # 3	Page 6 of 16
Event Description:	RCP 2A1 seal HX outlet valve HCV-11A1 fails closed		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 3, RCP 2A1 seal HX outlet valve HCV-11A1 fails closed.		
Control Room Indications Available: Annunciator J-25 2A1 RCP Seal Trouble, cooling Wtr Flow Low **Examiners note: When HCV is taken back to AUTO from OPEN, after a short time delay the HCV will re-close.**		
	RO	Acknowledge annunciator recognize and communicate HCV-14-11A1 is closed.
		Monitors 2A1 RCP seal temperatures
	SRO	Implement 2-0120034, 'Reactor Coolant Pump' step 6.5.7.
		Direct HCV to be taken to Open and back to Auto. Step 6.5.7.1
		When HCV re-closes direct HCV to be taken to Open and leave the control switch to Open. Step 6.5.7.2
	RO	When directed, place HCV-14-11A1 to OPEN and back to AUTO.
		When directed, place HCV-14-11A1 to OPEN and leave OPEN.

Op Test No.: 1	Scenario # 2	Event # 4	Page 7 of 16
Event Description:	DEH Swaps to manual during up-power		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 4, DEH swaps to manual. If requested, I&C reports up power can be continued using turbine manual.		
Control Room Indications Available: Indications Available: <u>No audible alarm</u> associated with this failure. DEH panel indicates: • **Turbine manual light is lit** • **OP Auto light is off**		
	SRO	Implement 2-AOP-22.03, 'DEH Turbine Control' step 4.2.1 (attached page xx). Determines applicable section of Table 1 is 4.2.2
		Implements section 4.2.2 (attached page xx)
		Direct power increase IAW step 4.2.2.6.1
		Notifies I&C
	BOP	Recognizes turbine manual light is lit, OP auto light is off. ADJUST load using the following pushbuttons at Operator Console B: 2-AOP-22.03 DEH Turbine Control System (step 4.2.2.6.1) • GV Raise
		Communicates with RO when GV raise is being used.
	RO	Monitors primary plant parameters as BOP increases Turbine load. Adjusts dilution rate as needed.

Op Test No.: 1 Scenario # 2 Event # 5 Page 8 of 16

Event Description: 2B Charging pump oil leak

Time	Position	Applicant's Actions or Behavior
		Booth Operator Instructions: When directed trigger event 5, 2B Charging Pump develops oil leak **When SNPO called report back oil all over the 2B Charging pump.**
		Control Room Indications Available: Annunciator M-31 2B Charging Pump Trouble. M-23 2B Charging Pump Suct Press low / OVRLD / Trip **Examiners note: Shortly after the Charging pump oil alarm the pump will trip. No applicable procedure for Charging pump tripping due to complete loss of charging flow did not occur.**
	RO	Acknowledge alarm and notify SNPO to investigate
		Communicate loss of 2B Charging pump. Adjust letdown level control HIC-1110 BIAS to match letdown with reduced charging flow.
	SRO	Refer to 2-AOP-02.03, Charging And Letdown. Recognize no specific guidance for loss of Charging pump.
	SRO T.S.	Recognize T.S. 3.1.2.4 (reactivity control) restore at least two pumps within 72 hours.
		Recognize T.S. 3.5.2 (ECCS) restore at least two pumps within 72 hours.
		Notify MM to repair and SM of T.S action required.

Op Test No.: 1	Scenario # 2	Event # 6	Page 9 of 16
Event Description:	Letdown HIC-1110 goes to Max flow		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 6, Letdown HIC-1110 goes to Max flow **When SNPO called to perform step 4.2.6.1.A.1.4 report back in 10 minutes no leaks or reliefs lifting were observed.**		
Control Room Indications Available: Annunciator M-13 Letdown Flow High, M-5 Letdown Press High/Low, LC-15 Letdown Relief V2345 Dish. Temp. High		
	RO	Acknowledge annunciators and recognize rising letdown flow.
	SRO	Implement 2-AOP-02.03, Charging and Letdown, step 4.2.6.1 attached page xx.
		Direct placing HIC-1110 in manual. Step 6.0.12.A.1 attached page xx
	RO	Places HIC-1110 in manual IAW 2-AOP-02.03, Charging and Letdown step 4.2.6.1.A.1 through A.1.3 attached page xxx
		Balance letdown in manual to match Pressurizer level to setpoint.
		Contact SNPO to walk down system observing for leaks or lifting relief valves. Step 4.2.6.1.A.1.4

Op Test No.: 1	Scenario # 2	Event # 7	Page 10 of 16
Event Description:	MSIV Closes, LOOP, Two MSSV's stick open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 7, MSIV closes, LOOP, two MSSV's stick open. **Call as Unit 1, we are also in a LOOP** **Two minutes after the trip, call as NPO and report two MSSV's on the 2B SG are open**		
Control Room Indications Available: Annunciator P-49 MSIV HCV-08-1B Air Press Low/DC Failure will annunciate a couple seconds before the MSIV closes, Unit trip.		
	SRO	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses)
		Recognize loss of offsite power and verify both EDG started and loaded on the busses.

Op Test No.: 1	Scenario # 2	Event # 7	Page 11 of 16
Event Description:	MSIV Closes, LOOP, Two MSSV's stick open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F • S/G pressure is between 835 and 915 psig o Close HCV-08-1A if SG pressure <735 psia • Four MSR TCV Block valves closed (N/A LOOP) o Close TCV's • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED (N/A LOOP)
		If RCS approaches 500°F ensure: • At least ONE RCP is stopped (N/A LOOP) • Emergency borate when directed (from RCS Heat Removal Safety Function) Ensure V2525 Load control valve closed Start 2B BAM Pump Close V2651 Tank 2B Recirc valve Open V2514 Emergency Borate valve
		Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120°F • Verify NO secondary plant radiation alarms

Op Test No.: 1	Scenario # 2	Event # 7	Page 12 of 16
Event Description:	MSIV Closes, LOOP, Two MSSV's stick open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: On SIAS the 2B EDG output breaker will open (as designed) but fails to re-close and sequence on the bus. Breaker can be closed manually from the RTGB.		
	SRO **CRITICAL TASK**	Direct closing 2B EDG output breaker after SIAS sequencing failed to reclose breaker.
	BOP **CRITICAL TASK**	Recognize 2B EDG breaker did not re-close on SIAS and close when directed.
	RO	Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
	RO	Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.
		Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia • Verify RCS subcooling is >20°F

Op Test No.: 1	Scenario # 2	Event # 7	Page 13 of 16
Event Description:	MSIV Closes, LOOP, Two MSSV's stick open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Core Heat Removal • Verify at least one RCP running with CCW (N/A LOOP) • Verify loop delta T is <10°F

Op Test No.: 1	Scenario # 2	Event # 7	Page 14 of 16
Event Description:	MSIV Closes, LOOP, Two MSSV's stick open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, trigger restore Instrument Air per Appendix H of EOP-99.** **If called as NPO to manually open MV-09-11, 2C AFW pump to 2A SG report back MV-09-11 is frozen and will not open.**		
Control Room Indications Available:		
	SRO	Enter 2-EOP-05 ESD after analysis from Diagnostic Flow chart
		Direct STA perform Safety Function Status Check's (SFSC) every 15 minutes. **NOTE:** When STA performs RCS Heat Removal Safety Function, he is to inform the US this Safety Function is not met due to SG levels are not being restored with Feedwater
		Notifies shift manager of event and need to classify
		Direct Appendix A EOP-99 Sampling SG's (attached page xxx)
		Direct AFW flow initiated to the 2A SG by starting the 2C AFW pump (MV-08-13, steam from the 2A SG) and MV-09-11 2C AFW to 2A SG. (may have been done earlier)
		Ensure SIAS (if setpoint reached)
		Ensure closed MSIV's and MFIV's
		If CCW lost to RCP's for >30 minutes ensure CCW remains isolated (attached page xx)
		Protect the Main Condenser. Perform Appendix X
	BOP	When directed to align the 2C AFW pump to feed the 2A SG report MV-09-11 2C to 2A will not open. Call NPO to investigate MV-09-11

Op Test No.: 1	Scenario # 2	Event # 8,9	Page 15 of 16
Event Description:	AFAS, MV-09-11 2C AFW to 2A SG fails to open. SIAS with 2B EDG breaker fail to re-close		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: If asked to attempt to manually open MV-09-11, three minutes later state the valve would not move and the handwheel broke in attempt to open. **When directed to open AFW crossties, wait three minutes and state MV-09-13 and MV-09-14 are open.**		
Control Room Indications Available: When AFW flow initiated, MV-09-11 2C AFW to 2A SG fails to open. On SIAS the 2B EDG output breaker will open (as designed) but fails to re-close and sequence on the bus. Breaker can be closed manually from the RTGB.		
	SRO	Implement 2-AOP-09.02 Auxiliary Feedwater Attachment 4 step 2 2B AFW pump to feed 2A S/G (attached page xx) **OR** 2-NOP-09.02, Auxiliary Feedwater System Operation, step 4.4.2 2B AFW Pump to 2A S/G.
	CRITICAL TASK	Direct opening MV-09-13 and MV-09-14 AFW crosstie valves and throttle MV-09-9 to restore feed to 2A SG using 2B AFW pump.
		When directed, call NPO to open MV-09-13 and MV-09-14 AFW crosstie valves. NOTE BOP should close MV-09-9 first
		When directed perform Appendix A of EOP-99 Sampling SG's
		When directed close CCW to / from RCPS's

Op Test No.: 1	Scenario # 2	Event # 8,9	Page 16 of 16
Event Description:	AFAS, MV-09-11 2C AFW to 2A SG fails to open. SIAS with 2B EDG breaker fail to re-close		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions		
Control Room Indications Available		
	BOP **CRITICAL TASK**	When MV-09-13 and MV-09-14 AFW crosstie valves are opened, throttle open MV-09-9 to feed the 2B SG.
	SRO	Direct isolation of the 2B SG per Appendix R (attached page xxx)
	CRITICAL TASK	When 2B SG has blown dry direct stabilization of RCS temperature within the limits of Figure 1A (attached page xxx) using the ADV's.
	RO **CRITICAL TASK**	Open ADV's to stabilize RCS temperature within the limits of Figure 1A.
	BOP	Isolate the 2B SG IAW EOP-99 Appendix R
		Suggested termination point: AFW restored to the 2A SG 2B SG is isolated and RCS temperature is controlled to within the limits of Figure 1A.

.Facility:	St. Lucie HLC 20	Scenario No.: 3	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: 100% power

Turnover: Both Units at 100% power. 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. Perform downpower due to increasing RCS leakage. RCS Leak rate went from .012 to 0.4 over the last 24 hours.

Critical Tasks:

- Close 2A Diesel Generator output breaker
- Restore AFW and feed the SG(s) at $\geq$ 150 gpm.

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Downpower to remove unit from service to investigate increasing RCS leakage.
2	1	I / RO SRO / T.S	Pressurizer Level transmitter LT-1100X (selected) fails low
3	2	C / All SRO / T.S.	2MA Instrument Inverter fails
4	3	C / BOP	2A Intake Cooling Water Pump trips
5	4	C/ RO	Letdown valve V2515 fails closed, stop Charging
6	5		Switchyard malfunction loss of Midway Line
7	6	M / All	Switchyard malfunction loss of second Midway Line. Manual Trip. LOOP 2B Diesel Generator fails to start. 2A Diesel output breaker fails to close. PORV lift, fail to reset.
8	7	C / BOP	2C AFW overspeed on AFAS start.

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

DRAFT

Unit is at 100% power. Direction is given to perform a unit shutdown to investigate increasing RCS leakage.

During the down power Pressurizer Level transmitter LT-1100X (selected) fails low. This will result in letdown lowering to minimum. RO should transfer level control to the 'Y' channel.

MA Instrument Inverter fails requiring the crew to place the MA Instrument bus on the Isolimeter using 2-AOP-49.02, 120V Instrument AC System (Class 1E). As a result of the Instrument Inverter failure the 2A BAM pump stops and 2B BAM pump is unavailable and cannot be restarted until the Instrument Bus is re-energized. Also, as a result of the Instrument bus failure all Pressurizer heaters will de-energize and will need to be restored in accordance with 2-0120035 Pressurizer Pressure and Level. Only half of the Pressurizer heaters will be able to be restored resulting in the SRO entering T.S. 3.4.3 Action A restore within 72 hours.

After the Instrument bus has been energized, the 2A Intake Cooling Water pump trips. The 2C Intake Cooling water pump should be started on the 'A' header using 2-AOP-21.03A, 2A Intake Cooling Water System Header.

Letdown valve V2515 fails closed. RO stops Charging pumps IAW immediate operator actions of 2-AOP-02.03 Charging and Letdown.

When the Intake cooling water system is restored loss of a Midway line will occur. No action is needed for loss of only one line other than referring to 0-AOP-53.04, Reduced Offsite Transmission Capacity. Turnover will be given that both Units are at 100% power. A loss of a second midway lines occurs shortly thereafter. Based on increasing RCS leakage Unit 2 should be tripped. A LOOP will occur. Upon the trip PORV 1474 will open and not close. The crew will be required to close the block valve. Close/override will not be successful. When the crew closes the block valve, the valve will close partially and the breaker will trip resulting in a LOCA. The 2B Diesel will fail to start and the 2A Diesel output breaker will not close. Success path will be to close the 2A Diesel output breaker.

Shortly after the crew enters 2-EOP-03, LOCA the 2C AFW pump will trip on mechanical overspeed. Because this is the only AFW source the overspeed must be reset and AFW flow established.

Success path for the crew will be to close the 2A Diesel output breaker and reset the 2C AFW pump overspeed and feed the Steam Generators.

Op Test No.: 1	Scenario # 3	Event # 1	Page 3 of 19
Event Description: Reduce power			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Supervise/Coordinates Power reduction in accordance with 2-AOP-22.01 Rapid Down Power. (attached pages x-x)
		Directs Boration per Attachment 1 (Operator aid) AOP-22.01 Rapid Down Power. (attached pages x-x)
		Directs DEH programmed for desired load rate step 4.1.2 A / B
		Directs Lead group CEA insertion of 6 inches step 4.1.3.
		When T-ave decrease noted directs GO on the turbine step 4.2.1.
		Ensures BOP makes plant announcement 'Unit 2 is commencing a Rapid Downpower due excessive RCS leakage, Step 4.2.3
		Ensures System is notified of downpower step 4.2.4
		Direct Pzr. Placed on recirc IAW AOP-22.01 'Rapid Downpower' Attachment 5. (attached page *xx*)
		Direct additional Charging pump started IAW 2-AOP-22.01 'Rapid Downpower' Attachment 4 (attached page *xx*)
		Direct isolation of Zinc injection
	RO	Begins Boration per Attachment 1 AOP-22.01 Rapid Down Power. (attached pages x-x)

Op Test No.: 1	Scenario # 3	Event # 1	Page 4 of 19
Event Description: Reduce power			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Inserts Lead CEA Group 6 inches. • Select MANUAL SEQUENTIAL. • Insert CEAs by taking IN/HOLD/OUT switch to insert.
		Sarts 2B Charging pump IAW AOP-22.01 'Rapid Downpower' Attachment 4 (attached page *xx*)
		Places Pzr. On recirc. IAW AOP-22.01 'Rapid Downpower' Attachment 5. (attached page *xx*)
	BOP	Programs the DEH per AOP-22.01 step 4.1.2 for the desired load reduction rate. • Set reference by ensuring REF selected and then depress desired MW endpoint, hit ENTER. • Depress LOAD RATE type in desired load rate and hit ENTER. • Depress GO pushbutton.
		Notifies Plant Dispatcher step 4.2.4
		When T-ave decrease is noted, starts Turbine down power per AOP-22.01 step 4.2.1.
	SRO	Continues to Supervise/Coordinate Power reduction in accordance with AOP-22.01 Rapid Down Power Steps 4.2.8 thru 4.2.14.
	RO	Controls ASI as directed by SRO with CEAs or per NOP-100.02, Axial Shape Index Control Per step 6.4.1 attached page xxx).

Op Test No.: 1 Scenario # 3 Event # 1 Page 5 of 19

Event Description: Reduce power

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO/BOP	Maintains T-avg within 6.6°F of T-ref per step 4.2.8.

Op Test No.: 1	Scenario # 3	Event # 2	Page 6 of 19
Event Description:	Pressurizer Level transmitter LT-1100X (selected) fails low		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 2, Pressurizer Level transmitter LT-1100X fails low.		
Control Room Indications Available: Annunciators: H-17 PZR level high/low and Letdown flow lowering, LIC-1110X offscale low, LI-1110X offscale low, loss of half of PZR heaters.		
	RO	Identifies abnormal Pressurizer level indications and letdown at minimum.
		Implements Immediate Operator Actions IAW 2-AOP-01.10, 'Pressurizer Pressure and level' by: Step 4.1.4 VERFIY selected Pressurizer level control channel LIC-1110X, LEVEL, NORMAL Step 4.1.4.1 PLACE LEVEL CONTROL CHANNEL selector to non-affected control channel.
	SRO	Directs Immediate Operator Actions IAW 2-AOP-01.10, 'Pressurizer Pressure and level' (attached page xxx)
		Enter sections 4.2.6 'Selected Pressurizer Level Control Channel Failure (attached page xx)
		Enters T.S. 3.4.3 Action a, one group of heaters inoperable, restore within 72 hours.
NOTE: If Pressurizer pressure lowers to 2225 psia, the SRO should enter DNB T.S. 3.2.5 restore pressure within 2 hours.		
		Direct Attachment 5 to recover available heaters (attached page xx) Note: not able to regain P-1, B-1, 2 ,3 heaters due to level channel failure.

Op Test No.: 1 Scenario # 3 Event # 3 Page 7 of 19

Event Description: MA Instrument Inverter failure

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 3, MA Instrument Inverter failure **When SNPO asked for indications on bus state: Inverter AC volts low and Over/Under frequency alarm** **When SNPO called to restore Instrument bus, trigger Restore MA instrument Bus.**		
Control Room Indications Available: key alarm B-43 MA inst. Bus trouble **Containment evacuation alarm, 2B Boric Acid makeup pump stops. 2A QSPDS de-energized.**		
	SRO/BOP /RO	Recognize numerous alarms, 4 Reactor Trip Circuit Breakers open. Channel A RPS and ESFAS de-energized. 2MA Instrument bus de-energized.
	SRO	Direct implementation of 2-AOP-49.02, 120V Instrument AC System (Class 1E) Subsequent Operator Actions (attached pages xxx-xxx
		Direct Turbine placed on hold due to loss of Boric Acid makeup pump.
	SRO T.S.	Recognize entry into T.S. 3.8.3.1 Action b (24 hours to energize from inverter connected to DC bus, 2 hours to re-energize bus)
	RO	Ensure plant parameters stable step 4.2.1
		Recognize loss of 2B Boric Acid makeup pump.
	SRO	Notify SNPO to place MA Instrument bus on its isolimiter IAW 2-AOP-49.02 step 4.2.3 and refer to Attachment 3 (attached pages xxx xxx) and perform steps 1-5 for 2MA Instrument bus.
Note: 2B Boric Acid Makeup pump will restart when Instrument bus re-energized if left in Run Position.		

Op Test No.: 1 Scenario # 3 Event # 4 Page 8 of 19

Event Description:

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Respond as electrical to investigate cause of Inverter loss.		
Control Room Indications Available:		
	SRO	Implement 2-AOP-26.02, Area Radiation Monitors (step 4.2.1.3) to: Verify no personnel in Containment (2-AOP-26.02, Area Radiation Monitors (step 4.2.2.2)
		Notify electrical to investigate cause
		Direct attachment 2 to close TCB's (attached page xxx)
		Direct attachment 1 page 1-5 to verify loads restored (attached page xxx)
	BOP	Place DEH on hold when directed
	RO / BOP	When directed review Attachment 1, bus loads to verify loads have been restored
	BOP	When directed close TCB's IAW attachment 2 of AOP-49.02 (attached page xxx)
		Clear ATI fault as follows (obtain key 114 for ESFAS cabinet): RESET ESFAS bistables trips channel A RESET ATI fault
	BOP	Recognize RPS channel A SG low level bistable did not reset after Instrument bus re-energized.

Op Test No.: 1	Scenario # 3	Event # 4	Page 9 of 19
Event Description:	2A Intake Cooling Water Pump trips		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 4, 2A Intake Cooling water pump trip. **When directed by BOP Trigger 2C ICW PP discharge valve 10 turns open. When directed by BOP and 2C ICW PP running, slowly open discharge valve.**		
Control Room Indications Available: Increasing Amps on the 2A ICW pump. **Annunciator: E-6 2A ICW PUMP OVRLD/TRIP** **E-30 ICW HEADERS PRESS LOW, E-17 HYPO LOCAL ALARM**		
	BOP	Recognize rising amps on the 2A ICW pump. Stops 2A ICW pump and place switch in Pull to Lock position, of if pump already tripped, place switch in pull to lock position.
	SRO	Implement 2-AOP-21.03A 2A Intake Cooling Water System Header section 4.2.2 attached page xxx.
		Direct performance of attachment 1 section 2.0, attached page xxx. (NPO to perform steps 13-15 of attachment 1)
	BOP	Notify ANPO/NPO to throttle 2C ICW pump discharge valve SB21206 appx. 10 turns open when directed.
	RO	When directed Bypass IX by placing V2520 IX bypass valve to BYPASS. Step 2.0.5 attachment 1 page 3 of 5
	BOP	Monitor Generator Cold Gas temperature
	BOP	Announce and start 2C ICW pump when directed.
		When pressure rises on 2A ICW header direct ANPO/NPO to slowly open 2C ICW discharge valve SB21206.

Op Test No.: 1 Scenario # 3 Event # 5 Page 10 of 19

Event Description: Letdown Isolation valve V2515 fails closed

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 5, Letdown Isolation valve V2515 fails closed		
Control Room Indications Available: Annunciator M-5 Letdown Press High/Low		
	RO	Recognize loss of letdown and perform IOA's, secure Charging pumps and places control switches to AUTO. (step 4.1.1.A.B 2-AOP-02.03, Charging and Letdown.
	SRO	Implement 2-AOP-02.03, Charging and Letdown. Confirms IOA's have been performed.
		Directs Reactor power and temperature stabilized. Step 4.2.1.1.A
		Implements step 4.2.3.1 (attached page xx) Directs Charging pump started if Pressurizer level lowers to 2% less than setpoint.
	RO	Starts a Charging pump when directed. Monitors Pressurizer level and stops Charging pump when level reaches 2% greater than setpoint. Places control switch to AUTO. Step 4.2.3.1 A-C

Op Test No.: 1	Scenario # 3	Event # 6	Page 11 of 19
Event Description:	Switchyard malfunction, loss of Midway line		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 6, switchyard malfunction, loss of Midway line #1. **When system dispatcher called, inform the control room will investigate loss of Midway line**		
Control Room Indications Available: Annunciators: LR-6, Midway #1 low load.		
	BOP	Recognize loss of Midway line #1
	SRO	Implement 0-AOP-53.04, Reduced Offsite Transmission Capacity
		Refers to attachment 1 and determines two lines in service after the loss of one line. Action 2 is applicable. Declare transmission system in ALERT. Notify SM. Contact System for additional requirements.
		Determines outside air temperature is N/A for current conditions. (air temp is 77°F)
	BOP	Monitor Main Generator MW, Voltage and Vars.

Op Test No.: 1	Scenario # 3	Event # 7	Page 12 of 19
Event Description:	Loss of Second Midway line, Manual trip, LOOP, 2B Diesel fails to start, 2A Diesel breaker fail to close, PORV lift fail to reseat..		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 7, loss of second Midway line. If asked to check brk. 41221, PORV block valve, state breaker is tripped and will not reset.		
Control Room Indications Available: Annunciator LR-24, Midway 1,2,3 current high. LR-18, Midway No. 3 Load Low.		
	SRO	Determines Transmission system in Action 3 from attachment 1 of 0-AOP-53.04, Reduced Offsite Transmission Capacity. Required to trip the Unit within 9 minutes. Option to trip either Unit but Unit 2 should be tripped due to RCS leakage.
		Direct manual trip and carry out 2-EOP-01 Standard Post Trip Actions.
	SRO/RO	On trip identifies PORV 1474 lifted and directs PORV taken to CLOSE/OVERRIDE and block valve closed. Identifies Block valve breaker tripped when going closed.
	SRO	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions

Op Test No.: 1	Scenario # 3	Event # 7	Page 13 of 19
Event Description:	Loss of Second Midway line, Manual trip, LOOP, 2B Diesel fails to start, 2A Diesel breaker fail to close, PORV lift fail to reseat..		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses)
	BOP	Identifies 2B Diesel did not start and 2A Diesel output breaker did not close.
	SRO **CRITICAL TASK**	Directs attempt to start 2B Diesel and manual breaker closure of 2A Diesel
	BOP **CRITICAL TASK**	Close 2A Diesel output breaker and attempt to start 2B Diesel. 2A Diesel breaker closes, 2B Diesel fails to start.

Op Test No.: 1	Scenario # 3	Event # 7	Page 14 of 19
Event Description:	Loss of Second Midway line, Manual trip, LOOP, 2B Diesel fails to start, 2A Diesel breaker fail to close, PORV lift fail to reseat..		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F • S/G pressure is between 835 and 915 psig o Open one ADV on each SG • Four MSR TCV Block valves closed o Close MSR TCV's • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED (N/A)
		Places one ADV on 'A' side and one ADV on 'B' side in MANUAL/MANUAL and throttles open. Places the other ADV on 'A' and the other ADV on 'B' side in AUTO/AUTO set to 900 psia.
		Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120° F • Verify NO secondary plant radiation alarms
	RO	Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal

Op Test No.: 1 Scenario # 3 Event # 7 Page 15 of 19

Event Description: Loss of Second Midway line, Manual trip, LOOP, 2B Diesel fails to start, 2A Diesel breaker fail to close, PORV lift fail to reseat.

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.
		Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%
		Pressure Control • Verify RCS pressure is between 1800-2300 psia o Recognize PORV open, close block valve, take PORV switch to override. • Verify RCS pressure is trending 2225-2275 psia • Verify RCS subcooling is >20° F
		Identifies Pressure control NOT met due to PORV open and pressure lowering.
		Core Heat Removal • Verify at least one RCP running with CCW (N/A LOOP) • Verify loop delta T is <10° F
	SRO	Exit EOP-01 to EOP-03 LOCA

Op Test No.: 1	Scenario # 3	Event # 8	Page 16 of 19
Event Description:	2C AFW Pump mechanical overspeed trip. LOCA, EOP-03		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Suggested to trigger event 8, 2C AFW overspeed trip after crew enters EOP-03, LOCA **As NPO perform Attachment 1 of 2-AOP-09.02 step 1.C.(2) to reset mechanical overspeed trip. If asked to drain oil from underside of governor, perform step 1.E(2).** **Booth Operator Instructions: When directed, trigger restore Instrument Air per Appendix H of EOP-99.**		
Control Room Indications Available: Annunciator G-46 2C AFW Pump Turbine Failure/Trip/OVRLD/SS ISOL. Closed position indication of MV-08-3 and G-46 locked in, indicates mechanical overspeed trip.		
	BOP	Recognizes alarm and indications that 2C AFW pump has tripped on mechanical overspeed.
	SRO	Directs implementation of 2-AOP-09.02 'Auxiliary Feedwater' Attachment 1 to reset 2C AFW pump mechanical overspeed trip. (attached page xx)
		Implement 2-EOP-03, "Loss of Coolant Accident"
		• Directs STA to perform SFSC's
		• Contact SM to classify the event
		• Direct implementation of Appendix A EOP-99 Sampling SG's (attached page xxx)
		• Ensure SIAS flow adequate per Figure 2 SI flow Vs. RCS pressure.
		Within 30 minutes of SIAS ensure CCW to RCP's remains isolated by directing: • Placing four CCW valves to/from RCP's to close • Ensure RCP bleedoff remains isolated by placing two RCP bleedoff valves to close

Op Test No.: 1	Scenario # 3	Event # 8	Page 17 of 19
Event Description:	2C AFW pump mechanical overspeed trip, LOCA EOP-03		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	CRITICAL TASK	When 2C AFW pump overspeed reset, direct both SG level restored to 60-70% NR
	BOP **CRITICAL TASK**	When 2C AFW pump overspeed reset, feed both SG's to restore SG level to 60-70% NR
	SRO	Ensure Both of the following: • CIAS actuated • MSIS actuated
		Ensure Containment HVAC • At least one train SBVS • At least one train Containment fan coolers
		Ensure Containment spray if Containment pressure >5.4 psig: • CSAS actuated • Flow ≥ 2700 gpm each header
		Direct RCS cooldown not to exceed 50°F in any one hour period using ADV's.
	BOP	Verifies Figure 2 SI flow Vs. RCS pressure.
		Places four CCW valves to/from RCP's to close when directed

Op Test No.: 1	Scenario # 3	Event # 8	Page 18 of 19
Event Description:	2C AFW pump mechanical overspeed trip, LOCA EOP-03		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Places two RCP bleedoff valves to close when directed
		Verifies one train SBVS and one train Containment fan coolers
	RO	Initiates cooldown using ADV's not to exceed 50°F in any one hour period
		Suggested termination point: AFW restored feeding both SG's Controlled RCS cooldown in progress

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0.08** **Unit 2 Unidentified RCS Leakage: 0.32**

Unit 2 Scheduled Activities per the OSP: Reduce power IAW 2-AOP-22.01, 'Rapid Downpower' and bring Unit off line to investigate increasing RCS leakage.

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-24 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

Both Units are at 100% power

2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift

Equipment Problems:

Excessive Unit 2 RCS leakage

Facility:	St. Lucie HLC 20	Scenario No.: 4	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: 30% power. BOL. IC #14

Turnover: 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. Plant has been on chemistry hold due to small condenser tube leak. Tube has been plugged and the chemistry hold has been released. Increase power to 100%.

Critical Tasks:

- Close 2B MSIV
- Stop all RCP's within 10 minutes of SIAS
- Establish HPSI flow to meet figure 2

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Raise power to 100%
2	1	T.S. SRO	CIS RM RIS-26-4-2 (B Channel) fails high. Bypass ESFAS bistable
3	2	C / RO	Running Primary water pump trips. Unable to dilute. Start backup Primary water pump.
4	3	C / BOP	2A MFRV fails to respond to up power. Place 2A MFRV in manual
5	4	C / RO	RCP bleedoff isolation V2505 fails closed. When V2507 is opened RCP 2B2 middle seal fails.
6	5	T.S. SRO	2A SGTL rapid downpower
7	6	M / ALL	2A SGTR unit trip
8	7	C / BOP	2A MSIV fails to close from the Control Room. Locally close the 2A MSIV.
9	8	C / BOP	2A HPSI pump does not start on SIAS. 2B HPSI pump is air bound.

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

DRAFT

SCENARIO EVENT DESCRIPTION
NRC SCENARIO 4

The Unit is at 30% power due to previous secondary chemistry issues. A Condenser tube has been plugged and secondary chemistry is within limits to raise power to 100%.

During the up power Containment Radiation monitor RIS-26-4-2 will fail high resulting in a Containment evacuation alarm. The SRO is required to place the monitor out of service and enter the appropriate T.S.

The running Primary water pump will trip. Dilution for the up power will stop and this will put the up power on hold until the backup pump can be started.

When the up power resumes the 2A SG level will lower due to the MFRV not responding to the increasing steam flow. The MFRV will be placed in manual to control SG level.

RCP bleedoff isolation valve V2507 will fail closed. Restoration of bleedoff will be required within 30 minutes or the unit must be tripped. Alternate bleedoff flow to the Quench Tank can be established by opening V2507. When V2507 is opened, 2B2 RCP middle seal will fail. Plant shutdown is not required for one failed seal but increased monitoring will be initiated.

A Steam Generator tube leak (6 gpm) occurs on the 2A SG. The crew should initiate a Rapid Downpower. During the downpower the leak escalates into a rupture and the unit must be tripped.

The crew will enter the Steam Generator Tube Rupture procedure (2-EOP-04). When implementing Appendix R to isolate the 2A SG the 2A MSIV will fail to close from the Control Room. Appendix I 'MSIV Local Closure' should be initiated to locally close the MSIV.

Upon SIAS the 2A HPSI pump does not start and the 2B HPSI pump is air bound. The crew can be successful by initiating HPSI flow from either HPSI pump as long as Figure 2, 'SI Flow Vs. RCS press' is met.

Termination is when the 2A MSIV is closed and HPSI flow meets Figure 2.

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0.01** **Unit 2 Unidentified RCS Leakage: 0.11**

Unit 2 Scheduled Activities per the OSP:

Raise power to 100%

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-24 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

30% power BOC,1209 ppm boron. Unit was up to 100% power for two weeks then came off line for a condenser tube leak. Unuit was shut down for a week. Chemistry hold released. RE guidance is 3MW/Min up to 50% power then IAW 2-GOP-101. Xenon appx. -58 pcm, dilution rate of 2.5 gpm. 2B Main Feedwater pump is warming up. 2-GOP-201 is complete up to step 6.129.

Equipment Problems:

2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift

Op Test No.: 1	Scenario # 4	Event # 1	Page 4 of 19
Event Description:	Raise power to 100%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Place protected train 'B' placard and ORLM YELLOW n RTGB. When called, respond as NPO Appendix AA step 2 is complete.		
Control Room Indications Available:		
	SRO	Direct power increase IAW 2-GOP-201 'Reactor Plant Startup – Mode 2 To Mode 1', step 6.129 (attached page xx)
		Direct performance of Appendix AA of 2-GOP-502, Placing MSR's in Service at approximately 300 MW. (attached page xxx)
		Control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached pages XX)
	RO	Raise dilution rate for power increase IAW 2-NOP-02.24 step 6.5.12 (attached page x)
		Withdraw CEA's to control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached page x) • CEA Withdrawal, select MS on the CEDMCS Control Switch • Move the IN/HOLD/OUT Switch to the OUT direction
		Divert letdown to WMS by placing V2500 to WMS to maintain VCT level within normal band.
	BOP	Program DEH for power increase at a rate not to exceed 4.2 MW/MIN IAW 2-GOP-101 step 6.1.2.D Category 4. (attached page 4) • Set reference by ensuring REF selected and then depress desired MW endpoint, select ENTER • Depress LOAD RATE type in desired load rate and select ENTER • Depress GO pushbutton

Op Test No.: 1	Scenario # 4	Event # 1	Page 5	of 19
Event Description:	Raise power to 100%			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	When directed coordinate with NPO and place MSR's in service IAW Appendix AA of 2-GOP-502, Placing MSR's in Service

Op Test No.: 1	Scenario # 4	Event # 2	Page 6 of 19
Event Description:	CIS RM RIS-26-4-2 (B Channel) fails high		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 2, CIS RIS-26-4-2 fails high.		
Control Room Indications Available: Annunciator: NOTE: Containment evacuation alarm will annunciate for 30 seconds (cannot be silenced). Annuncaitors P-5, P-15, Q-2		
	SRO / RO T.S.	Recognize CIS RM Channel B off scale high. Implement 2-AOP-99.01, Loss of Tech Spec Instrumentation Step 4.2.15 ESFAS Channel Malfunction (attached page XX)
		Direct bypassing RIS-26-4-2 (MB) step 6.3.2.D.1, within one hour. T.S. 3.3.2 table 3.3-3, Action 13.
	BOP	Make plant announcement, invalid Containment evacuation alarm
	SRO	Implement 2-AOP-26.02 Area Radiation Monitors section 4.2.2 (attached page xxx) Contact SM and I/C.
		Refer to attachment 1 of 2-AOP-26.02 Area Radiation Monitors for inoperable monitor (attached page xxx). Note: after T.S. action applied, this attachment is not applicable.
	BOP	When directed, Using key 114 to open ESFAS door and key 130, bypass channel B CIS.

Op Test No.: 1 Scenario # 4 Event # 3 Page 7 of 19

Event Description: Running Primary Water Pump trips

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger Event 3, running Primary Water Pump trips. **When called as SNPO report back bearing housing is hot and discolored.**		
Control Room Indications Available: Annunciator F-15, Primary Water Disc. HDR Press LO-LO. **NOTE: Standby pump will not auto start. Standby pump has caution tag to minimize use due to small leak.**		
	RO / BOP	Recognize standby pump did not auto start.
	RO	Secure dilution lineup
	SRO	Direct Turbine up-power stopped
		Implement 2-AOP-15.01, Primary Water System section 4.2.1. Direct a manual start attempt of the 2B Primary Water Pump.
		Notify MM, EM and SNPO to investigate loss of 2A Primary water pump. Notify HP of possible primary water leak from the 2B Primary water pump.
	BOP	Stop Turbine up power when directed.
		Start standby Primary Water pump when directed
	SRO	Direct up-power continued after standby pump started.
	RO	Line up dilution IAW 2-NOP-02.24 Boron Concentration Control.
	BOP	Set up DEH for up-power IAW GOP-201
		Initiate GO on Turbine when directed

Op Test No.: 1	Scenario # 4	Event # 4	Page 8	of 19
Event Description:	2A Main Feed Reg Valve fails to respond to up-power			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 4, 2A MFRV fail to respond.		
Control Room Indications Available: 2A SG level lowering, Annunciator G-1 2A SG level Hi Lo. **Examiners Note: This failure may be triggered any time but should be triggered early with enough time for up-power to distinguish SG level anomaly.** **SRO may direct up-power to be stopped**		
	RO / BOP	Recognize 2A SG level lowering as up-power progresses.
	SRO	Implement 2-AOP-09.01 Feedwater Control System Abnormal Operations section 4.1.1, Direct manual control of 2A feed flow and stabilize 2A S/G level 60-70% NR. (may direct hold on up-power)
	BOP	From the DCS panel, place FCV-9011 in manual. Open FCV-9011 to control 2A S/G level to 65% NR.
	RO	If directed terminate dilution.
	BOP	If directed terminate turbine up-power
	SRO	Direct step 4.2.2.2.1 through 2.5 (attached page xxx) for FCV-9011 S/G 2A
	BOP	When directed perform steps 4.2.2.2.1 through 2.5 for FCV-9011 S/G 2A
	SRO	When 2A S/G level controlled within normal band, may direct continuation of up-power.
	RO	When directed line up dilution IAW 2-NOP-02.24 Boron Concentration Control.

Op Test No.: 1 Scenario # 4 Event # 4 Page 9 of 19

Event Description: 2A Main Feed Reg Valve fails to respond to up-power

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	When directed set up DEH for up-power IAW GOP-201

Op Test No.: 1	Scenario # 4	Event # 5	Page 10 of 19
Event Description:	RCP Bleedoff isolation V2505 fails closed. When V2507 opened RCP 2B2 middle seal fails		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 5 RCP bleedoff isolation V2505 fails closed (cannot be re-opened).		
Control Room Indications Available: Annunciator M-8, M-16, J-25 thu J-28		
	RO	Acknowledge annunciators and determines V2505 has failed closed. Refers to annunciator summary (M-8) and notifies SRO to attempt to open V2505.
	SRO	Implement 2-0120034, Reactor Coolant Pump, section 6.3 RCP Seal Problems/Anomalies. (attached page xxx)
		Directs opening V2507, RCP Bleedoff Relief Stop Vlv. IAW step 6.3.5.1
	RO	Attempts to open V2505 then when directed opens V2507, RCP Bleedoff Relief Stop Vlv.
		When V2507 opens, monitors RCP seals and determines 2B2 seal has failed (middle seal).
NOTE: due to PT-1153 OOS, diagnostics of middle or upper seal failure cannot be made, however the crew can tell only **one** seal has failed.		
	SRO	Implements step 6.3.7 of 2-0120034, Reactor Coolant Pump (attached page xx). Uses diagnostic table and determines middle seal failed.
		Directs 30 minute readings on CBO and cavity pressures using Data Sheet 1 of 2-0120034, Reactor Coolant Pump (attached page xx) for RCP 2B2
	RO	When directed, obtains first set of readings IAW Data Sheet 1

Op Test No.: 1 Scenario # 4 Event # 6 Page 11 of 19

Event Description: 2A SGTL 6 GPM

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 6, 2A SGTL		
Control Room Indications Available: Charging and Letdown mismatch, SJAE, Blowdown radiation rise on PC-11 (SJAE first)		
	RO	Recognize mismatch between Charging and Letdown of ~5 gpm. Monitors Pressurizer level and pressure.
	BOP	Monitors PC-11 and recognize increasing trends on SJAE radiation monitor and SG blowdown monitor. (SJAE will rise and alarm first)
	SRO	Implement 2-AOP-08.02, Steam Generator Tube Leak, section 4.2.1. Notifies SM of SGTL. (attached page xx) If Charging and letdown mis-match not identified early, SRO may enter AOP-26.01 Process Monitors but this is a valid alarm and should enter 2-AOP-08.02.
		If up power in progress, direct stopping up power
		Notify Chemistry for sampling
		Notify RP to conduct secondary radiation surveys
		Request RO to estimate leak rate based on Charging and Letdown mis-match. Refers to daily Chemistry sheet to help determine leak rate.
	SRO T.S.	Determine T.S. 3.4.6.2. c (Action a) HSB within 6 hours
		Confirm SGTL, step 4.2.1.8
		Direct field Operator to the SGBTF step 4.2.1.10 (attached page xxx) to perform actions.
		Notify Unit 1 to isolate blowdown and vacuum drag. Step 4.2.1.11

Op Test No.: 1 Scenario # 4 Event # 6 Page 12 of 19

Event Description: 2A SGTL 6 GPM

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	If Quench tank high level alarm, H-32 (due to RCP bleedoff now directed to QT) drain QT IAW 2-NOP-01.07 step 4.3. Open nitrogen hdr. V6741 and QT drain V1401. Drain to between 60-70% level.
	SRO	Verify SG Blowdown aligned to Monitor Storage tanks. Step 4.2.1.12
	RO	Terminate dilution when directed
	BOP	Place Turbine on hold when directed
	RO	Monitor Pressurizer pressure and level, Charging and Letdown, determine leak rate of approximately 6 gpm.
	SRO	Step 4.2.2.1.1 Direct rapid downpower IAW 2-AOP-22.01.
	RO	Begin boration IAW 2-NOP-02.24 Boron Concentration Control.
	BOP	Program DEH for a downpower rate as directed by SRO.
	SRO	Direct CEA lead group insertion of approximately 6 inches. Step 4.1.3
		When Tave lowering noted direct Turbine GO on DEH.
	BOP	When directed depress GO on DEH panel

Op Test No.: 1	Scenario # 4	Event # 7	Page 13 of 19
Event Description: 2A SGTR 300 GPM			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger event 7, SGTR when directed		
Control Room Indications Available: Pressurizer Pressure and Level rapidly lowering		
	RO	Recognizes rapid lowering of Pressurizer level and pressure
	SRO	Direct isolation of Letdown
	RO	Closes Letdown isolation valves when directed
	SRO	Direct manual trip of reactor and implement 1-EOP-01, Standard Post Trip Actions
	SRO	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses)

Op Test No.: 1	Scenario # 4	Event # 7	Page 14 of 19
Event Description: 2A SGTR 300 GPM			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F • S/G pressure is between 835 and 915 psig • Four MSR TCV Block valves closed • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED (required to be done to maintain SBCS for cooldown)
		Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120°F • Verify NO secondary plant radiation alarms

Op Test No.: 1 Scenario # 4 Event # 7 Page 15 of 19

Event Description: 2A SGTR 300 GPM

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.
		Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35% (not trending)
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia (not trending) • Verify RCS subcooling is >20°F
		Core Heat Removal • Verify at least one RCP running with CCW • Verify loop delta T is <10°F
	SRO	Enter 2-EOP-04 Steam Generator Tube Rupture after analysis from Diagnostic Flow chart

Op Test No.: 1	Scenario # 4	Event # 8,9	Page 16 of 19
Event Description:	EOP-04, 2A MSIV fails to close from the Control Room. 2A HPSI fails to start on SIAS. 2B HPSI pump is air bound		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Direct implementation of 2-EOP-04, Steam Generator Tube Rupture.
		Direct BOP/STA to perform SFSC's of EOP-04
		Implements place keeper (attached pages xx)
		Notifies shift manager to classify the event
		Direct performance of EOP-99 Appendix A, sampling SG's (attached page xx) (note: cannot open sample valves due to no CCW to sample coolers)
		Direct BOP to verify SI flow per Figure 2 (attached page x) • Ensure all available charging pumps are operating (Note: Figure 2 will not be met until at least one HPSI pump is operating)
	CRITICAL TASK	Direct all RCP's stopped within 10 minutes of SIAS.
		If CCW lost to RCP's >30 minutes: • Ensure CCW to RCP's will remain isolated by placing the four to/from CCW valves to close. • Ensure RCP controlled bleedoff will remain isolated by placing the two RCP bleedoff valves to close.
		Directs RO to perform controlled cooldown to $<510^0$F T_{hot} using SBCS in manual, not to exceed 100^0F in any one hour period

Op Test No.: 1	Scenario # 4	Event # 8,9	Page 17 of 19
Event Description:	EOP-04, 2A MSIV fails to close from the Control Room. 2A HPSI fails to start on SIAS. 2B HPSI pump is air bound		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Direct RO to depressurize RCS IAW step 11 EOP-04 • Within Figure 1A (attached page xx) • <930 psia • Above RCP minimum pressure • Approx. Equal to 2A SG pressure (within 50 psia)
		(Note: at least ONE HPSI pump has to be restored and ECCS flow meeting Figure 2 to meet the critical task)
		Recognize 2A HPSI pump failed to start upon A side SIAS actuation. Directs manual start of 2A HPSI pump.
		Recognize 2B HPSI pump low amps. Direct stopping 2B HPSI pump. Direct BOP to notify SNPO to investigate 2B HPSI pump.
	CRITICAL TASK	Direct venting 2B HPSI pump
	OR	
	CRITICAL TASK	Direct starting the 2B HPSI pump when venting complete
		Direct MSIS blocked when block permissive received at 685 psia.(must be done before MSIS occurs at 600 psia)
		Directs BOP to isolate 2A Steam Generator when Thot is <510^{0}F IAW 2-EOP-99, Appendix R (attached page xx)
	CRITICAL TASK	Direct performance of 2-EOP-99 Appendix I, MSIV local closure, to close HCV-08-1A, 2A MSIV (attached page xx)
	SRO	When 2A SG has been isolated cooldown should be limited to 30^{0}F / hr or if subcooling not met 100^{0}F / hr.

Op Test No.: 1	Scenario # 4	Event # 8,9	Page 18 of 19
Event Description:	EOP-04, 2A MSIV fails to close from the Control Room. 2A HPSI fails to start on SIAS. 2B HPSI pump is air bound		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When called as SNPO for 2B HPSI pump report back pump is running with very little discharge pressure. When directed to vent wait 3 minutes and report back a lot of air was vented.		
Control Room Indications Available: Low discharge pressure on 2B HPSI pump		
	BOP	Start 2A HPSI pump when directed
		Call SNPO to investigate the status of 2B HPSI pump. State low amps, low flow was observed.
		Direct SNPO to vent the 2B HPSI pump
		Start the 2B HPSI pump when directed
		Isolate 2A Steam Generator IAW Appendix R, when directed. Identify (attached page xx)
		Communicate HCV-08-1A 2B MSIV did not close.
		Inform the US HCV-08-1A, 2A MSIV is closed when NPO communicates Appendix I is complete.
		Block MSIS when directed by SRO

Op Test No.: 1	Scenario # 4	Event # 7,8	Page 19 of 19
Event Description:	Unit trip, 2A HPSI fails to start on SIAS, 2A MSIV fails to close from the RTGB when Appendix R performed		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Cooldown the RCS to <510°F T_{hot} using SBCS, in manual, not to exceed 100°F in any one hour period.
		When directed, depressurize the RCS IAW step 11 EOP-04. Examiners Note: Use Auxiliary spray. • Within Figure 1A (attached page) • <930 psia • Above RCP minimum pressure • Approx. Equal to 2A SG pressure (within 50 psia)
		Notify SRO when T_{hot} <510°F. Adjust cooldown as directed by SRO when 2A SG has been isolated.
		Suggested termination point: • 2A HPSI is started and 2B HPSI is vented and running • 2A SG is isolated IAW Appendix R • 2A MSIV is closed

Facility:	St. Lucie HCL 20	Scenario No.:	5	Op Test No.:
Examiners:		Operators:	SRO:	
			RO:	
			BOP:	

Initial Conditions: 100% power. MOL

Turnover: 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. Security has reported increasing seaweed intrusion in the intake.

Critical Tasks:

- Manual actuation of 'B' channel MSIS
- Stop all RCP's within 10 minutes of SIAS
- Control RCS pressure / temperature within RPV limits following ESD.

Event No.	Malf. No.	Event Type*	Event Description
1	1	T.S. SRO	2A Main Steam Line Monitor pegs (fails) high.
2	2	R / RO, SRO N / BOP	Traveling screen ΔL alarms and rapidly rising ΔL. 2A1 is trending higher than others. Throttle CWP discharge valves. Perform rapid downpower.
3	3	C/BOP	Trip the 2A1 CWP at 40" Δ Level and rising
4	4	T.S. SRO	2B Charging pump recirc valve fails to close when pump started
5	5	I/RO	TIC-2223 Letdown Temperature Controller malfunction.
6	6	C/BOP	The 2A Turbine Cooling Water pump has high amps due to bad bearing. Stop 2A TCW pump.
7	7	M/All	Loss of vacuum. Manual trip. Feed line break on 2B SG in the Containment.
8	8	C/RO	Failure of 'B' channel MSIS actuation. Manually actuate 'B' channel MSIS.

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

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2A Main Steam line monitor (fails) pegs high. T.S. 3.3.3.1 Table3.3-6 Action 27

Seaweed intrusion results in the traveling screen ΔP rising on all screens. 2-AOP-21.01, 'Circulating Water System' is entered. The 2A1 is the highest. At 20" Δ Level the affected CWP discharge valve(s) will be throttled. At 40" Δ Level a rapid downpower is required. If 40" Δ Level cannot be reduced the crew will trip the associated CWP.

When starting the 2B Charging pump the recirc valve fails to close. Until the manual isolation valve can be closed the pump must be declared out of service and appropriate T.S. applied. This leaves only one operable Charging Pump.

TIC-2223 Letdown Temperature controller malfunctions requiring manual control.

During the downpower the 2A Turbine Cooling Water pump bearing temperature alarms and displays high amps. This should be noticed by the BOP and the pump should be stopped.

During the downpower a loss of vacuum occurs and the crew should manually trip the Unit. A feed line break occurs in the Containment a few minutes after the trip. The 'B' channel of MSIS does not actuate. Manually actuation and/or manual closure of affected valves will be successful.

When the 2B SG blows down the crew will stabilize RCS temperature and pressure. HPSI flow will add inventory to the RCS and control of this inventory will be necessary to prevent subcooling from exceeding the upper limits.

Op Test No.: 1 Scenario # 5 Event # 1 Page 3 of 16

Event Description: 2A Main Steam Line Monitor fails high

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Place protected train 'B' placard and ORLM ???? on RTGB. Five minutes after turnover, call as security reporting there appears to be increasing seaweed coming in the intake. **When ANPO called to report Intake status, report back stating some seaweed coming in but not major.** **When directed trigger 2A Main Steam Line Monitor Fail High. (RIM-26-71)**		
Control Room Indications Available: PC-11 (RIM-26-71) in hi alarm.		
	SRO T.S.	Recognize Main Steam Line Monitor T.S. 3.3.3.1 Table 3.3.6 Action 27. Restore within 72 hours or initiate alternate method of monitoring.
	SRO	Direct BOP to notify Chemistry to initiate alternate sampling.
		Notify I/C and SM of monitor failure
	BOP	Acknowledge PC-11 alarm. Recognize Main Steam Line Monitor failed high.(reading 1.00e+05 mr/hr)
		Notify Chemistry when directed.
	SRO	When Security calls, notify ANPO to report status of intake. Implement 2-NOP-21.15, Degraded Intake Monitoring. (attached page xx) Refer to Attachment 3, monitoring especially Traveling Screen Δ levels.
		May direct manual starting of screen wash system. (step 4.0.6) attached page xx.

Op Test No.: 1	Scenario # 5	Event # 2,3	Page 4 of 16
Event Description:	Traveling screen high Δ level, Trip 2A1 CWP, Initiate Rapid Downpower.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Trigger event 2, Traveling Screen Δ level when directed. **When called to throttle 2A1 CWP discharge valve, trigger 'throttle 2A1 CWP Dish'.**		
Control Room Indications Available: No initial alarms until 10" Δ level then Annunciator E-28 Traveling Screen Δ level		
	BOP	Recognize Screen wash pumps started and traveling screens started prior to alarms.
		Call ANPO to check status of intake and screen wash system.
		Acknowledge alarm and recognize Traveling screen Δ level rising. Ensure screens shift to fast speed at 10" Δ level
	SRO	Implement 2-AOP-21.01, Circulating Water System, section 4.2.4 (attached page xx) ensure screen wash pumps running.
		Refers to Attachment 5, 'Intake System Material Intrusion Checklist' of 2-AOP-21.01, Circulating Water System
		Direct throttling of CWP discharge valves IAW Attachment 4 when Δ level reaches 20" step 4.2.4.4 (attached page xx)
		At 40" Δ level direct tripping affected CWP (2A1 CWP) and begin Rapid Downpower IAW 2-AOP-22.01, Rapid Downpower. (attached page xx)
		When 2A1 CWP is tripped, align 2C ICW pump to the 'A' header IAW 2-NOP-21.03C, 2C ICW pump Operation. (attached page xx) step 4.1.1 thru 4.1.15
		Directs closing 2A1 V12516, 2A CNDSR TO HOGGING EJECTORS ISOL

Op Test No.: 1	Scenario # 5	Event # 2,3	Page 5 of 16
Event Description:	Traveling screen high Δ level, Trip 2A1 CWP, Initiate Rapid Downpower.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When ANPO directed to verify alignment of 2C ICW pump on the A header (step 4.1) report back in five minutes alignment verified. **Trigger closed SH21204 and isolation for PT-21-8A (step 5 and 6). Reopen previously closed valves when 2C ICW pump started.**		
Control Room Indications Available:		
	BOP	Coordinate with ANPO to throttle 2A1 CWP discharge IAW Attachment 4 of 2-AOP-21.01
		Recognizes 40" Δ level reached on 2A1 Intake well. Trips 2A1 CWP when directed. Monitors condenser backpressure when 2A1 CWP stopped.
		When 2A1 CWP stopped contact ANPO to close 2A1 V12516
		When directed coordinate with NPO and align 2C ICW pump to the 'A' header IAW 2-NOP-21.03C, 2C ICW pump Operation. (attached page xx) step 4.1.1 thru 4.1.15
	SRO	Direct starting the 2C ICW pump and stopping the 2A ICW pump when ANPO states pump is ready to start.
	BOP	Start 2C ICW pump and stop 2A ICW pump and place in pull to lock.

Op Test No.: 1	Scenario # 5	Event # 2,3,4	Page 6 of 16
Event Description:	Traveling screen high Δ level, 2B Charging pump recirc valve failure. Trip 2A1 CWP, Initiate Rapid Downpower.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When SNPO called to close V2548, manual isolation for 2B recirc, call back in 5 minutes and report V2548 is closed.		
Control Room Indications Available: **Examiners Note: When 2B Charging pump is started, the recirc valve will not close resulting in the pump becoming inoperable. If the manual discharge valve is closed, the pump can be declared operable.**		
	SRO	Supervise/Coordinates Power reduction in accordance with 2-AOP-22.01 Rapid Down Power. (attached pages x-x)
		Directs Boration per Attachment 1 AOP-22.01 Rapid Down Power. (attached pages x-x)
		Directs DEH programmed for desired load rate step 4.1.2 A / B
		Directs Lead group CEA insertion of 6 inches step 4.1.3.
		When T-ave decrease noted directs GO on the turbine step 4.2.1.
		Ensures BOP makes plant announcement 'Unit 2 is commencing a Rapid Downpower due to high Δ level on traveling screens. Step 4.2.3
		Directs Pressurizer placed on recirc IAW Attachment 5 (attached page xx)
		Directs 2B Charging pump started IAW Attachment 4 (attached page xx)

Op Test No.: 1	Scenario # 5	Event # 2,3,4	Page 7 of 16
Event Description:	Traveling screen high Δ level, 2B Charging pump recirc valve failure. Trip 2A1 CWP, Initiate Rapid Downpower.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO T.S	Recognizes 2B Charging pump is inoperable. Apply T.S. 3.1.2.4 Reactivity Control. With only one Charging pump operable, restore two within 72 hours.
		T.S. 3.5.2 ECCS Action 2, restore two Charging pumps within 72 hours.
		Direct recirc manual isolation valve V2548 closed. When closed, T.S. action statement exited.
		Directs starting 2B Charging pump after recirc isolated
	RO	Begins Boration per Attachment 1 AOP-22.01 Rapid Down Power. (attached pages x-x)
		Inserts Lead CEA Group 6 inches. • Select MANUAL SEQUENTIAL. • Insert CEAs by taking IN/HOLD/OUT switch to insert.
		Places Pzr. On recirc. IAW AOP-22.01 'Rapid Downpower' Attachment 5. (attached page *xx*)
		Places V2520, Ion Exchanger Bypass Valve to BYPASS RESET, then start the 2B Charging pump when directed IAW Attachment 4. Recognize recirc valve is not closing and Charging flow is not increasing.
		Recognize recirc valve is not closing and Charging flow is not increasing.

Op Test No.: 1 Scenario # 5 Event # 2,3,4 Page 8 of 16

Event Description: Traveling screen high Δ level, 2B Charging pump recirc valve failure. Trip 2A1 CWP, Initiate Rapid Downpower.

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Programs the DEH per AOP-22.01 step 4.1.2 for the desired load reduction rate. • Set reference by ensuring REF selected and then depress desired MW endpoint, hit ENTER. • Depress LOAD RATE type in desired load rate and hit ENTER. • Depress GO pushbutton.
		Notifies Plant Dispatcher step 4.2.4
		When T-ave decrease is noted, starts Turbine down power per AOP-22.01 step 4.2.1.
	SRO	Continues to Supervise/Coordinate Power reduction in accordance with AOP-22.01 Rapid Down Power Steps 4.2.8 thru 4.2.14.
	RO	Controls ASI as directed by SRO with CEAs or per NOP-100.02, Axial Shape Index Control Per step 6.4.1 attached page xxx).
	RO/BOP	Maintains T-avg within 6.6°F of T-ref per step 4.2.8.

Op Test No.: 1	Scenario # 5	Event # 5	Page 9	of 16
Event Description:	TIC-2223 Letdown Temperature Controller Failure.			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger event 5, TIC-2223 failure		
Control Room Indications: Rising temperature on letdown		
	RO	Identifies increasing temperature on TIC-2224.
		Observes FIS-14-6 'Letdown Hx Flow' lowering (CCW flow to LD heat exchanger)
		Places TIC-2223 to manual. Controls letdown temperature in manual to less than alarm setpoint.
	SRO	Implements 2-AOP-02.03 Charging and Letdown step 4.2.8 (attached page xx)
		If not in bypass, directs placing V2520 in BYPASS/RESET
		Directs TIC-2223 placed in manual. Step 4.2.8.1.1B
		Contact SM and IC

Op Test No.: 1	Scenario # 5	Event # 6	Page 10 of 16
Event Description:	2A Turbine Cooling Water pump high amps. Trip 2A Turbine Cooling Water Pump.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 6: Turbine Cooling Water pump high amps. **When NOP contacted trigger SB13139 open.**		
Control Room Indications Available: Increasing Amps on 2A TCW pump. **Examiners Note: Power should be around 60% for one TCW pump.**		
	BOP	Recognize increasing amps on 2A Turbine cooling water pump. Trip pump when directed.
	SRO	Implement 2-AOP-13.01, Turbine Cooling Water System, step 4.2.3. (attached page xx) lower VARS to minimum. Continue with Rapid Downpower if previously stopped.
		Direct TCW Discharge Crosstie SB13139 open. Step 4.2.3.D
		Direct stopping 2A Turbine Cooling water pump IAW 2-0330020, TCW System Normal Operation, Appendix E (attached page xx)
	BOP	Contact NPO to open SB13139 when directed.
	SRO	Continue with previous rapid downpower. Direct Main Generator temperatures monitored (Vars are already at minimum)
		Montior Main Generator Gas temperature. (<48°C cold gas and <90°C on RTD 24 Slot 1
	BOP	Monitor TR 09-5B (back of RTGB 202) point 47 and 48, TE-13-9A and 9B. TCW Hx outlet temperature.

Op Test No.: 1	Scenario # 5	Event # 7	Page 11 of 16
Event Description:	Loss of Vacuum. Manual Trip. Feed line break in Containment on 2B SG.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, Trigger event 7, Loss of vacuum, feed line break.		
Control Room Indications Available: D-13, Turbine vacuum low. Back pressure rising, megawatts lowering.		
	BOP	Recognize increasing backpressure and lowering megawatts.
		If time permits, notifies NPO to place the Hogging Ejectors in service when directed. (attached page xx)
	SRO	Implements 2-AOP-12.01, Loss of Condenser Vacuum
		If time permits direct placing hogging ejector in service IAW attachment 3 (attached page xx)
		Directs manual Reactor trip when back pressure approaches or reaches 5.5 inches Hg.
	RO	Trips the Reactor when directed.
	SRO	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions

Op Test No.: 1	Scenario # 5	Event # 7	Page 12 of 16
Event Description:	Loss of Vacuum. Manual Trip. Feed line break in Containment on 2B SG.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses)
		RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F • S/G pressure is between 835 and 915 psig • Four MSR TCV Block valves closed • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED
		Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120° F • Verify NO secondary plant radiation alarms

Op Test No.: 1 Scenario # 5 Event # 7 Page 13 of 16

Event Description: Loss of Vacuum. Manual Trip. Feed line break in Containment on 2B SG.

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.
		Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia • Verify RCS subcooling is >20° F
		Core Heat Removal • Verify at least one RCP running with CCW (if SIAS identified CCW isolated) • Verify loop delta T is <10° F
	SRO **CRITICAL TASK**	Recognize failure of HCV-09-2A, HCV-09-2B FW isolation valves and HCV-08-1B MS isolation valve failed to close on MSIS. Direct closure
	RO **CRITICAL TASK**	Close HCV-09-2A, HCV-09-2B FW isolation valves and HCV-08-1B MS isolation valve when directed.

Op Test No.: 1	Scenario # 5	Event # 8	Page 14 of 16
Event Description:	Failure of HCV-09-2A, HCV-09-2B FW isolation valves and HCV-08-1B MS isolation valve '		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Exit EOP-01 to EOP-05 'Excess Steam Demand'
		Direct STA perform Safety Function Status Check's (SFSC) every 15 minutes.
		Notifies shift manager of event and need to classify
		Direct Appendix A EOP-99 Sampling SG's (attached page xxx)
		Ensure SIAS (if setpoint reached)
		Ensure closed MSIV's and MFIV's
		If CCW lost to RCP's for >30 minutes ensure CCW remains isolated (attached page xx)
		Protect the Main Condenser. Perform Appendix X
		Determine the most affected S/G (2B S/G)
		Isolate the 2B S/G IAW Appendix R (attached page xx)
	SRO **CRITICAL STEP**	When 2B SG has blown dry direct stabilization of RCS temperature within the limits of Figure 1A (attached page xxx) using the ADV's. (attached page xx)

Op Test No.: 1	Scenario # 5	Event # 8	Page 15 of 16
Event Description:	Failure of HCV-09-2A, HCV-09-2B FW isolation valves and HCV-08-1B MS isolation valve '		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Perform Appendix A EOP-99 Sampling SG's
		When directed isolate CCW to the RCP's by closing the four To/From Containment CCW valves and place the two RCP bleedoff valves to close.
		Isolate the 2B S/G IAW Appendix R when directed.
	RO **CRITICAL STEP**	When 2B SG has blown dry stabilize RCS temperature within the limits of Figure 1A (attached page xxx) using the ADV's
	CRITICAL TASK	Direct all RCP's stopped within 10 minutes of SIAS
	RO **CRITICAL TASK**	Stop all RCP's when directed (within 10 minutes of SIAS)
		Suggested termination point: RCS pressure and temperature are controlled and within the limits of Figure 1A.

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0.01** **Unit 2 Unidentified RCS Leakage:** **0.11**

Unit 2 Scheduled Activities per the OSP:

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-24 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

Both Units at 100% power.

Equipment Problems:

2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift

Facility:	St. Lucie HLC 20	Scenario No.: 6	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: 30% power. MOL

Turnover: 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. Plant has been on chemistry hold due to small condenser tube leak. Tube has been plugged and the chemistry hold has been released. Increase power to 100%.

Critical Tasks:

- Stop running RCP's
- Restore feedwater

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Raise power to 100%
2	1	T.S. SRO	Containment pressure PT-07-2B fails hi.
3	2	I / RO	Reactor Reg temperature element TE1111X fails high.
4	3	T.S. SRO C / BOP	HVS-1C Containment cooler trips. Start idle Containment cooler.
5	4	C / BOP	2A MFW Pump high bearing temp. Start 2B MFW pump, stop 2A MFW Pump. Hold up power at approximately 45% power.
6	5	C/ RO	'A' train CIAS module fails, actuating some CIAS components
7	6	M / All	Total loss of Instrument air. Manual trip required.
8	7	C/ BOP	TLOF / Failure of 2C AFW pump to come up to speed. Failure of 2B AFW pump bearing.
9			Restore feed water to 2A and / or 2B SG(s)

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

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After the crew has initiated a up power Containment Pressure PT-07-2B fails high. The SRO should refer to T.S. 3.3.1 and 3.3.2 and implement 2-AOP-99.01, Loss Of Tech Spec Instrumentation, Action 2.a bypass or trip within one hour.

Reactor Reg temperature element TE1111X will fail high after the power ascension has begun. This failure will cause pressurizer level setpoint to go high which will cause letdown to go to minimum and actual level to trend high. The RO will be required to select Reactor Reg 2 and the SRO to implement 2-AOP-01.10, "Pressurizer Pressure and Level".

HVS-1C Containment cooler trips. The BOP should start idle Containment cooler. Upon start of the idle fan cooler, HVS-1D, annunciator T-18, flow low / Vibration high alarm will come in and not clear. The SRO will be required to implement the appropriate T.S. HVS-1D should be declared inoperable and T.S. 3.6.2.1, Action b, restore inoperable cooling train within 7 days.

2A Main Feedwater Pump bearing will degrade and require the pump to be stopped. The crew should start the 2B Main Feedwater pump, stop the 2A Main Feedwater Pump and continue the power ascension to a maximum power level of 45%.

'A' train CIAS module fails actuating some CIAS components (letdown valve, RCP bleedoff valves, letdown isolation valve and HCV-18-1 Instrument air to Containment will fail closed). The crew will be required to implement 2-AOP-69.01, Inadvertent ESFAS Actuation and realign components. When HCV-18-1 is re-opened a loss of instrument air will occur. The crew should implement 2-AOP-18.01, 'Instrument Air Malfunction.' Air pressure will continue to degrade and the crew will be required to manually trip the Reactor. On the trip the B side 6.9 KV bus does not swap to Auxiliary transformer (loss of running feedwater pump). Due to trip from low power AFAS will not actuate. When AFW manually aligned the 2B AFW will start but failed bearing results in overload trip. The 2C AFW pump will start but due to governor problems the pump does not come up to speed. When NPO contacted, they will state the manual control knob on the governor is in the counter-clockwise position. This knob must be in the fully clockwise position to come to full speed. The crew should direct the NPO to place the governor control knob to the fully clockwise position. When this is performed the crew can feed both SG's with the 2C AFW pump.

The crew may elect to enter 2-EOP-09, LOOP / LOFC if AFW not initiated when exiting EOP-01. If EOP-09 is entered RCS heat removal safety Function will not be met due to FW not restoring SG levels. EOP-06, Total loss of Feedwater should be entered at that time.

Op Test No.: 1	Scenario # 6	Event # 1	Page 3 of 19
Event Description:	Raise power to 100%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Place protected train 'B' placard and ORLM ???? on RTGB. Have GOP-201 marked up and save copy in I/F. Sign off applicable steps of 2-NOP-12.03 Cond. System Operation and 2-NOP-09.01 Main Feedwater System Operation for starting the 2B Condensate and Feedwater pumps. **When called, respond as NPO Appendix AA step 2 is complete.**		
Control Room Indications Available:		
	SRO	Direct power increase IAW 2-GOP-201 'Reactor Plant Startup – Mode 2 To Mode 1', step 6.129 (attached page xx)
		Direct performance of Appendix AA of 2-GOP-502, Placing MSR's in Service at approximately 300 MW. (attached page xxx)
		Control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached pages XX)
	RO	Raise dilution rate for power increase IAW 2-NOP-02.24 step 6.5.12 (attached page x)
		Withdraw CEA's to control Rx power and ASI IAW 2-GOP-101 Rx Operating Guidelines step 6.1 (attached page x) • CEA Withdrawal, select MS on the CEDMCS Control Switch • Move the IN/HOLD/OUT Switch to the OUT direction
		Divert letdown to WMS by placing V2500 to WMS to maintain VCT level within normal band.

Op Test No.: 1	Scenario # 6	Event # 1	Page 4 of 19
Event Description:	Raise power to 100%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: NPO to verify eight (8) MSR TCV's are closed IAW Appendix AA of 2-GOP-502. Respond as NPO eight MSR TVC's are closed.		
Control Room Indications Available:		
	BOP	Program DEH for power increase at a rate not to exceed 4.2 MW/MIN IAW 2-GOP-101 step 6.1.2.D Category 4. (attached page xx) • Set reference by ensuring REF selected and then depress desired MW endpoint, select ENTER • Depress LOAD RATE type in desired load rate and select ENTER • Depress GO pushbutton
	BOP	When directed coordinate with NPO and place MSR's in service IAW Appendix AA of 2-GOP-502, Placing MSR's in Service. (attached page xx)

Op Test No.: 1	Scenario # 6	Event # 2	Page 5 of 19
Event Description:	Containment Pressure PT-07-2B fails high		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger PT-07-02B fails high.		
Control Room Indications Available: Annunciators P-13, P-23, Q-2, Q-3, S-17, RPS 'B' Cont. Press. Bistable in trip.		
	RO	Recognize Containment pressure channel 'B' failed high.
	BOP	Recognize RPS Channel B Containment pressure Bistable in trip
	SRO T.S.	Implement 2-AOP-99.01, Loss Of Tech Spec Instrumentation (attached page xx)
		Implement RPS T.S. 3.3.1 and ESFAS T.S. 3.3.2 bypass or trip within one hour. Action 13,14
		Direct Hi Cnmt Press (RPS), Cont. Press SIAS, Cntmt Press CIS, and Cnmt Press CSAS (ESFAS) to be bypassed.
	BOP	Place RPS Cont. pressure to bypass (key 109). Place ESFAS (ESFAS Door key 114) SIAS (key 127), CIS (key 129) and CSAS (key 128) Cntmt Press to bypass.
		Reset the ATI fault to clear annunciator

Op Test No.: 1	Scenario # 6	Event # 3	Page 6 of 19
Event Description:	Reactor Reg. temperature element TE1111X fails high		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 3, TE1111X fail high.		
Control Room Indications Available: Multiple alarms. Key alarm H-5 2A Hot Leg Temp Hi. TIA-1111X fail high. H-17 Pzr. Level Channel X and H-18 Pzr. Level Channel Y, K-17, K-18		
	RO	Recognize TE 1111X failed high. Tave high (581°F)
		Recognize Pressurizer Level setpoint at 63%
		Recognize TIA 1111X and TR 1111X at 615°F
		Recognize letdown flow deviation (letdown lowering)
		Immediate Operator Actions: step 4.1.3, AOP-01.10 Pressurizer Pressure and Level. Place RRS selector switch to RRS #2.
		Verify Pressurizer Level returns to normal after RRS #2 in service. Stop dilution if directed.
NOTE: ΔT power from DCS rises to ~112% due to Thot failing to 615°F.		
	SRO	Recognize TE 1111X failed high 615°F
		Implement 2-AOP-01.10 Pressurizer Pressure and Level: Direct Immediate Operator Actions, step 4.1.3, Place RRS selector switch to RRS #2. May direct stopping dilution.
		Refer to step 4.2.5, Selected RRS Channel Failure (attached page xx)
	BOP	When directed Navigate to SBCS screen and reset TAVE signal if required. (not needed when RRS swapped) Step 4.2.5.3. Place turbine on hold if directed.

Op Test No.: 1	Scenario # 6	Event # 4	Page 7 of 19
Event Description: HVS-1C Containment Cooler trips			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger event 4, HVS-1C trips. **When SNPO asked to check reflash panel state Hi vibration on HVS-1D. When SNPO directed to perform Attachment 4, report back in five minutes, Attachment 4 complete.**		
Control Room Indications Available: Annunciator T-12, CNTMT FAN CLR HVS-1C OVRLD/TRIP		
	BOP	Acknowledge alarm and recognize HVS-1C tripped.
	SRO	Implement 2-AOP-25.01, Loss Of RCB Cooling Fans Section 4.2.5 (attached page xxx)
		Direct starting HVS-1D
	BOP	Start HVS-1D when directed. Acknowledge annunciator T-18 and communicate annunciator did not clear when fan started.
	SRO	Direct stopping HVS-1D when communicated Hi vibration on HVS-1D from SNPO on reflash panel.
		Direct monitoring Containment air temperature
		Direct Attachment 4 of 2-AOP-25.01 (attached page xxx)
	T.S. SRO	Recognize fan is not operable. Review T.S. 3.6.2.1 Action 1.b restore inoperable containment cooling train within 7 days.
	BOP	Monitor Containment air temperature

Op Test No.: 1	Scenario # 6	Event # 5	Page 8 of 19
Event Description:	2A MFW pump develops high bearing temp. Start 2B MFW pump and stop 2A MFW pump. Hold up-power to no more than 45%.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger 2A MFW bearing		
When NPO called to investigate bearing temp. report temperature on Panel B-2733 is 195°F. (have section 4.2.6 available) TIS-09-7-1A2 Motor inboard bearing		
Control Room Indications Available: Annunciator G-42, 2A FW Pump Brg Temp High.		
	SRO	Implement 2-AOP-09.04, Feedwater, Condensate, and Heater Drain Pump Abnormal operations. Step 4.2.6 (attached page xxx)
		Direct NPO to investigate annunciator G-24.
		If 2B Main Feedwater pump is not running, direct starting 2B Condensate and 2B Main Feedwater pump IAW 2-GOP-201 step 6.131.8 (this step refers to 2-NOP-12.03, Condensate pump and 2-NOP-09.01, Main Feedwater) (attached page xxx)
		When 2B Condensate and Main Feedwater Pump are running, direct stopping 2A Main Feedwater Pump. (attached page xx) IAW 2-NOP-09.01 'Main Feedwater System Operation'
		Direct stopping up-power if current power is close to 45%.
	BOP	Contact NPO to report 2A MFW pump bearing temperatures.
		When directed, start 2B Condensate pump and 2B MFW pump. IAW 2-NOP-12.03, 'Condensate System Operation' (attached page xx)

Op Test No.: 1	Scenario # 6	Event # 6	Page 9 of 19
Event Description: 'A' train CIAS module actuates			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger event 6, 'A' train CIAS module fails.		
Control Room Indications Available: Annunciator P-3 CIAS Channel A/B actuate, P-13 CNMT Pressure Hi CIAS Channel Trip, P-23 CNMT Pressure Hi CIAS Channel Pre Trip. CIAS Channel A trip red light lit. ESFAS panel channel A, CIAS module AM 518 red light. **Letdown valve closing, RCP bleedoff closing, HCV-18-1 Instrument air to Containment closing.** **Examiners Note: When HCV-18-1 is re-opened, a total loss of Instrument air will occur.**		
	RO	Respond to alarms and recognize HCV-18-1, instrument air to Containment closed, RCP bleedoff isolation closed, letdown isolation valve closed. Stop running Charging pumps and place switches to AUTO.
		Recognize CCW to RCP's going closed
	SRO	Recognize 'A' CIAS partial actuation. (CIAS module AM 518 Channel A)
		Implement 2-AOP-69.01, Inadvertent ESFAS Actuation. Direct stopping running Charging Pumps, placing control switches to AUTO. Step 4.1.1.A and B.
		Implement General Actions 4.2.1.4.A & B inadvertent CIAS (attached page xx)
		Perform recovery actions step 4.2.1.7, refer to Section 4.2.2 Recovery from inadvertent CIAS (attached page xx)
NOTE: when HCV-18-1 is re-opened, a loss of Instrument air will occur.		
		Direct HCV-18-1 Instrument air to Containment, close/override and then to open. Step 4.2.2.A and B

Op Test No.: 1	Scenario # 6	Event # 7	Page 10 of 19
Event Description:	Total Loss of Instrument Air		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: Annunciator F-5, Inst. Air Pressure Hi / Lo		
	SRO	Implement 2-AOP-18.01 Instrument Air Malfunction, step 4.2.1.A and B. Crosstie Station air and bypass air dryer.
		When air pressure lowers to <75 psia, evaluate need to shutdown plant per 2-AOP-22.01, Rapid Downpower.
Note: pressure will degrade such that Rapid Downpower will probably not be implemented.		
	BOP	Acknowledge low Instrument air pressure. Notify NPO to crosstie station air, open SH18718 and bypass dryer, open V18075 2A/2B.
		Verify standby air compressor started, step 4.2.2.A
		Dispatch personnel to look for leaks, step 4.2.2.B
	SRO	Direct Reactor trip if instrument air pressure lowers to <60 psig.

Op Test No.: 1 Scenario # 6 Event # 6 Page 11 of 19

Event Description: Total Loss of Instrument Air.

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Re-open HCV-18-1 when directed
		When directed call NPO to cross tie Instrument air to Station air. Direct opening SH18718 and bypass dryer, open V18075, step 4.2.1.A and 4.2.1.B
		When directed call NPO to verify standby air compressor started, step 4.2.2.A
		When directed dispatch personnel to look for leaks, step 4.2.2.B
		If directed to close HCV-18-1, inform SRO HCV-18-1 did not close.
	SRO	Direct Reactor trip when Instrument air pressure lowers to less than 60 psig.

Op Test No.: 1	Scenario # 6	Event # 7	Page 12 of 19
Event Description:	Manual Trip, EOP-01		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: **Examiners Note: The 'B' side 6.9KV bus will not transfer to the Startup Transformer on the trip resulting in no Main Feedwater. Due to trip from lower power levels, AFAS will not actuate in EOP-01. SRO may direct manual start and manual opening of AFW pumps and valves. 2C AFW will not come up to speed and 2B AFW pump will trip on overload.**		
	SRO	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses) o Recognize loss of 'B' 6.9 KV bus. Attempt to close 2-20102 (will not close)

Op Test No.: 1	Scenario # 6	Event # 7	Page 13 of 19
Event Description: Manual Trip, EOP-01			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
		RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR Recognize 2A MFW pump auto start, AMPS pegged high. Stops 2A MFW pump. • Verify RCS Tavg is between 525 and 535°F • S/G pressure is between 835 and 915 psig o ADV's will be required due to loss of air, no SBCS. • Four MSR TCV Block valves closed • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED (N/A loss of air)
	BOP	Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120° F • Verify NO secondary plant radiation alarms
	RO	Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.

Op Test No.: 1 Scenario # 6 Event # 7 Page 14 of 19

Event Description: Manual Trip, EOP-01

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia • Verify RCS subcooling is >20° F
		Core Heat Removal • Verify at least one RCP running with CCW (CCW lost due to loss of Inst. Air)) • Verify loop delta T is <10° F
NOTE: Crew may elect to exit to EOP-09, LOOP/LOFC due to no RCP's running. If EOP-09 entered, RCS Heat Removal will not be met due to Feedwater NOT restoring SG levels. The crew should exit EOP-09 to EOP-06, TLOF, within 15 minutes of recognizing not meeting Safety Function. (Below are the fist steps of EOP-09)		
	SRO	Direct Safety Functions performed every 15 minutes
		(note: STA will inform SRO RCS heat removal will not be met due to Feedwater not restoring SG level.)
		Direct Appendix A, sampling SG. (note due to loss of Inst. Air sample valves cannot be opened. Local surveys must be performed)
		Direct CCW remain isolated to RCP's. Place the FOUR To/From CCW valves to close.
		Direct RCS depressurized to 1800 to 1850 psia using Aux. Spray.

Op Test No.: 1	Scenario # 6	Event # 7	Page 15 of 19
Event Description: Manual Trip, EOP-01			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Direct MSIV's and SGBD valves closed.
NOTE: At about this point the SRO should exit EOP-09 and enter EOP-06, Total Loss of Feedwater.		
	BOP	When directed perform Appendix A, sampling SG. (note due to loss of Inst. Air sample valves cannot be opened. Local surveys must be performed)
		When directed, place the FOUR To/From RCP CCW valves to close
	RO	When directed depressurize the RCS to 1800 to 1850 psia using Aux. Spray

Op Test No.: 1	Scenario # 6	Event # 8,9	Page 16 of 19
Event Description:	Exit EOP-01, Enter EOP-06, Total Loss Of Feedwater. Restore feedwater		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Exit EOP-01 (EOP-09) to EOP-06 'Total Loss Of Feedwater' (attached pages xx)
		Direct SFSC's for EOP-06 performed every 15 minutes.
		Notify BOP to implement Appendix A, Sampling Steam Generators. (Note: SG sample valves will not open due to loss of Instrument air)
		Direct HP to perform secondary surveys
	CRITICAL TASK	Direct stopping the running RCP's (if not performed in EOP-01) and direct RCS depressurized to 1800 to 1850 psia using auxiliary sprays.
Note: Due to loss of letdown, Charging will need to be closely monitored to ensure Pressurizer level and pressure are within limits, especially when using Aux. Spray.		
		Direct CCW to RCP's remains isolated by placing CCW valves to/from RCP's to close. (attached step xx)
		Direct attempt to restore AFW. per 2-NOP-09.02, Auxiliary Feedwater System Operation. NOTE: no specific guidance for low RPM on 2C AFW pump.
		When informed 2B AFW pump tripped, direct 2C AFW pump started. When informed 2C AFW pump has low discharge pressure implement 2-AOP-09.02, Auxiliary Feedwater. NOTE: no specific guidance for low RPM on 2C AFW pump.
		Direct closing of SG blowdown and sample valves. (valves have failed closed on loss of air)

Op Test No.: 1	Scenario # 6	Event # 8,9	Page 17 of 19
Event Description:	Exit EOP-01, Enter EOP-06, Total Loss Of Feedwater. Restore feedwater		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When crew calls to investigate 2C AFW pump state the pump is running but low RPM and low discharge pressure. If asked the status of 2B AFW pump state there is oil on the floor and inboard pump bearing housing paint is burnt.		
Control Room Indications Available: Low discharge pressure on 2C AFW pump.		
	SRO	Direct EOP-99 Appendix X section 2
	RO **CRITIAL TASK**	Stop running RCP's when directed (may have been performed in EOP-01)
		When directed, depressurize the RCS to 1800-1850 psia using Aux. Sprays.
Note: There is no explicit guidance for the low RPM of the 2C AFW pump, but given the symptoms explained by the NPO, the crew should realize the governor is not allowing full speed of the pump.		
	BOP	When directed to restore AFW. Start 2B AFW pump 2-NOP-09.02, Auxiliary Feedwater System Operation. start 2B AFW and recognize high amps. Trip 2B AFW pump.
	BOP	When directed refer to 2-AOP-09.02, Auxiliary Feedwater. restore 2C AFW. NOTE: no specific guidance for low RPM on 2C AFW pump.
	BOP	When directed to restore AFW start 2C AFW and recognize low discharge pressure. Notify SRO and NPO to investigate.
	SRO	Direct NPO to check operation of 2C AFW pump governor.

Op Test No.: 1	Scenario # 6	Event # 8,9	Page 18 of 19
Event Description:	Exit EOP-01, Enter EOP-06, Total Loss Of Feedwater. Restore feedwater		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: One minute after being asked to check status of governor, call back and state the knurled knob was not fully clockwise. State I have turned the knob to the required position.		
Control Room Indications Available: 2C AFW pump normal discharge pressure.		
	BOP	Report normal discharge pressure on 2C AFW pump.
	SRO	Direct AFW flow established to 2A and 2B SG's.
	RO	Monitor primary plant temperatures and pressures when AFW flow established.
		Suggested termination: • AFW flow restored to 2A and 2B SG's • RCS pressure controlled to 1800-1850 psia • RCS temperature controlled ~532°F using ADV's.

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0.01** **Unit 2 Unidentified RCS Leakage:** **0.11**

Unit 2 Scheduled Activities per the OSP:

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-44 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

Unit 1 is at 100% power. Unit 2 is at 30% power MOC, starting up from '0' power xenon free. Unit was shutdown due to a condenser tube leak. Chemistry hold released. Xenon appx. -58 pcm, dilution rate of 2.5 gpm. 2B Main. 2-GOP-201 is complete up to step 6.129. 2-NOP-12.03, Condensate System Operation and 2-NOP-09.01Appendix E has been signed off up to the applicable steps. Main Feedwater System Operation section 4.5 is available when ready to start 2B MFW Pump.

Permission granted to raise power to 100%. 2B Condensate pump and 2B Main Feedwater pump are available and ready to be started when needed.

Equipment Problems:

2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift.

Facility:	St. Lucie	Scenario No.: 7	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: ~4.5% power preparing for Turbine roll (storepoint 44)

Turnover: Reactor power is ~4.5%, 200 EFPH, Xenon free. RCS boron is 1618 ppm. 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. Direction for the crew is raise power, roll the turbine and place on line.

Critical Tasks:

- Stop all RCP's within 10 minutes of SIAS
- Isolate 2A Steam Generator (Appendix R)

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Power increase to 10-12%
2	1	T.S. / SRO	AFAS SG 2A – 2B Δ pressure PT-8013B fails low
3	2	C / RO	ADV MV-08-18A opens on up-power
4	3	C / BOP	When 20/ET depressed, DEH pump trips, start backup DEH pump
5	4	C/ BOP	Turbine overspeed when latched. Manually trip Turbine
6	5	C / RO T.S. SRO	In-service PORV (V1474) leakage. Close PORV Block valve
7	6	M / All	SGTL / SGTR Cooldown and isolate 2A SG
8	7	C / BOP	On Appendix R, close Blowdown isolation valves FCV-23-3 and FCV-23-4.

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

DRAFT

SCENARIO EVENT DESCRIPTION
NRC SCENARIO 7

Reactor power is 4.5% BOC, 200 EFPH. RCS boron is 1618 ppm. Xenon free. Reactor power was previously 75% when a DEH leak required the turbine to be taken offline. The Unit has been off line for 4 days.

The crew is directed to raise power to 10-12%, roll the Turbine and place the Unit on line.

AFAS SG 2A – 2B Δ pressure PT-8013B fails low. SRO to evaluate T.S. Bypass or trip within 1 (one) hour. T.S. 3.3.2 Table 3.3-3.

During the up-power, ADV MV-08-18A fails open resulting in RCS cooldown. The crew should isolate MV-08-18A by closing its isolation valve MV-08-14. 2-AOP-08.01 'Steam Leak' Off-Normal Operating Procedure should be implemented to terminate the uncontrolled cooldown.

When the crew stabilizes at 10%-12% power and depresses 20/ET PB, the running DEH pump will trip. Backup DEH pump should be started. When backup DEH pump started and Turbine latched, Turbine RPM will ramp up to the point of overspeed. The crew should manually trip the Turbine. At the current power level, the reactor will not trip on the turbine trip signal. When the Turbine is tripped the In-service PORV (V1474) experiences leakage. Block valve closes but red and green position indicating lights are still illuminated. SRO to apply T.S. 3.4.4 and remove power from the block valve.

A SGTL of approximately 5 gpm develops on the 2A SG. The crew will be required to enter Abnormal Operating Procedure 2-AOP-08.02, "Steam Generator Tube Leak". The SRO will evaluate Technical Specifications. When SG blowdown radiation monitor reaches hi alarm the 2A SG blowdown isolation valves FCV-23-3 and FCV-23-4 do not close. The procedure will require them to trip the unit when pressurizer level cannot be maintained after Letdown is isolated and all available Charging Pumps are running. After performance of 2-EOP-01, "Standard Post Trip Actions", the crew will transition to 2-EOP-04, "Steam Generator Tube Rupture".

AFAS will not actuate due to the low power level when the Unit was tripped. The crew may elect to maintain Main Feedwater or manually start AFW Pump 2A and/or 2C AFW pump (steam from the 2B SG). If the 2A AFW pump is used, it must be manually cross tied to feed the 2B SG. If 2C AFW pump is used, steam supply should be from the 2B SG.

Op Test No.: 1	Scenario # 7	Event # 1	Page 3 of 17
Event Description:	Power increase to 10-12%		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Sign off applicable steps in 2-GOP-201 up through step 6.10. and steps 6.13, 6.16 thru 6.21 and 6.45 and 6.46 as N/A. (make copy to keep in I/F) for future reference. **If Chemistry called for blowdown rate, state 80 gpm / SG.**		
Control Room Indications Available:		
	SRO	Direct power increase to 10-12% IAW 2-GOP-201 step 6.11 in preparation to roll the Turbine. (attached page____)
		2-GOP-201 step 6.12, When Reactor is in Mode 1, contact Chemistry to determine SG blowdown rate IAW 2-NOP-23.02 Steam Generator Blowdown System Operations, (attached page_____)
	RO	If directed, commence Dilution for power increase IAW 2-NOP-02.24 step 6.5.12, 13, 14 (attached page_____)
		Withdraw CEAs in 'Manual Sequential' as directed to control Rx power.
NOTE: Power should be raised initially by CEA's. CEA's should be withdrawn to at least 102" prior to 20% power to meet LTSSIL		
	BOP	Monitor SBCS for proper operation during power increase.
		When directed call Unit 1 to determine SG blowdown flow rate.
		Adjust SG blowdown to no more than 100 gpm per SG. IAW 2-NOP-23.02 Steam Generator Blowdown System Operations step 6.5.1.C (2A SG). Step 6.5.2.C (2B SG) (attached page____)
		If directed depress RESET pushbutton on Reheat Control Panel. Step 6.22.1. Notify NPO to verify steps 6.22.2 and 6.22.3 TCV's and isolations closed. (attached page____)

Op Test No.: 1	Scenario # 7	Event # 1	Page 4	of 17
Event Description: Power increase to 10-12%				

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **If NPO asked to ensure MSR tube side vents aligned to condenser (step 6.22, 2-GOP-201) state this step has been verified** **If Chemistry asked for SG Blowdown flow rate, state 100 gpm per SG.** **If asked from SNPO state PCV-23-2 and PCV-23-3 SG blowdown PCV's are in auto.** **If Unit 1 asked for SG blowdown flow rate state 40 gpm per SG.**		
Control Room Indications Available:		
	BOP	When Reactor power reaches 5%, make plant announcement 'Reactor is in Mode 1'
		When ready to

Op Test No.: 1	Scenario # 7	Event # 2	Page 5 of 17
Event Description:	AFAS SG 2A – 2B Δ pressure PT-8013B fails low		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger, AFAS SG 2A-2B Δ pressure PT-8013B fails low.		
Control Room Indications Available: Annunciators L-19, L-27, P-17, Q-2, H-2. **PIA 1102B reads 2500 psia.**		
	BOP	Acknowledge alarm and determine PT-8013B indicates failed low. RPS bistable trips on channel B TMLP and 2A SG pressure
		AFAS cabinet B SG-1 ΔP PT-T illuminated
	RO	Recognizes and communicates PIA-1102B reads 2500 psia and PI-8013B 2A SG reads '0'.
	SRO	Implement 2-AOP-99.01, Loss Of Tech Spec Instrumentation. Confirm failed channel, step 4.1.1 Refer to Attachment 5, Channel Failure Impact.
		Implement 2-AOP-99.01, Loss Of Tech Spec Instrumentation step 4.2.10. Tech. Spec. 3.3.2, Table 3.3-3, Action 20, bypass within one hour.
		Direct bypassing Lo Press S/G trip unit, RPS (key 105), TMLP press, RPS (key 107), AFAS-1 AFAS-2 (door key 202), Channel B (key 204) ESFAS Door (key 114) ESFAS 2A MSIS 2A S/G (key 134)
	BOP	When directed bypass the above channels.

Op Test No.: 1	Scenario # 7	Event # 3	Page 6 of 17
Event Description:	ADV MV-08-18A opens. Isolate MV-08-18A.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger event 2, ADV MV-08-18A opens		
Control Room Indications Available: Tave lowering, power increasing, Pressurizer pressure lowering, SG pressure lowering, letdown flow lowering. Annunciator H-14, 1B2 Spray line temp. low.		
	RO	Recognize Tave lowering, power increasing. Pressurizer pressure lowering, SG pressure lowering, letdown flow lowering.
		If ADV MV-08-18A open not recognized, call NPO to look for secondary steam leak.
	SRO	Implement 2-AOP-08.01, Steam Leak. When recognized MV-18-18A open. Refer to step 4.2.2.4.1
		Direct isolation valve MV-08-14 closed.
	BOP	Close MV-08-14, ADV-MV-08-18A isolation when directed.
	SRO	When MV-08-14 closed, continue with plant startup.
		Continue to raise Reactor power to 10-12%. Step 6.23 GOP-201 (attached page xx)
		Direct Turbine startup 6.24 through Turbine latched step 6.36 (attached page xx)
	RO	Evaluate ASI trends with respect to LPD trip setpoints, step 6.26. (ASI well within limits)

Op Test No.: 1	Scenario # 7	Event # 4,5	Page 7 of 17
Event Description:	Latch Turbine. DEH pump trips. Turbine RPM uncontrolled increase		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: If SRO stops the Turbine startup due to one DEH pump, state as SM 'lets roll the Turbine to 1800 RPM then stop the plant startup to trouble shoot the tripped DEH pump'.		
Control Room Indications Available: DEH Pump trips when 20/ET PB depressed (step 6.36.7). Annunciator D-47 DEH Press Hi / Lo. DEH pressure lowering **NOTE: When 'GO' button depressed (step 6.55) on DEH panel to roll Turbine, the Turbine will continue to accelerate.**		
	BOP	Recognize DEH pump tripped. ARP for annunciator D-47 'Ensure standby Pump Started' BOP Starts standby DEH pump.
	BOP	Operate DEH in preparation to latch / roll the Turbine. Step 6.27 – 6.35. Latch Turbine, Step 6.36.1 thu 6.36.7. Call NPO to locally latch Turbine, step 6.36.8, 6.36.9 and 6.39.10.
		Make announcement to stay clear of Turbine front standard while latching Turbine.
		Continue steps to roll the Turbine. Steps 6.37 through 6.55 (attached page xx)
	SRO	Direct Turbine trip when uncontrolled RPM increase noted.
	BOP	Trip Turbine when directed.
	RO	Monitor primary plant, SBCS when Turbine tripped.
NOTE: when Turbine tripped 15% FW bypass valves will go to 5% flow. Reset should be performed to regain control of Main feedwater and place 15% controllers back to Auto. (Ref. step 6.39)		

Op Test No.: 1 Scenario # 7 Event # 7 Page 8 of 17

Event Description: PORV Leakage

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: PORV 1474 leakage will start when the Turbine is tripped. **Trigger Open PORV block valve breaker when SNPO called to open breaker, wait 3 minutes then trigger open PORV breaker and report back breaker is open.**		
Control Room Indications Available: PORV Line temperature TIA-1110 rising. Annunciator H-36, PORV 1474 Relief Line Temp High, Pressurizer pressure lowering. Quench Tank level hi alarm Q-32 will annunciate about 5 minutes after PORV leakage.		
	RO	Recognize increasing temperature on TIA-1110, PORV relief line temperature and lowering Pressurizer pressure. Verify Spray valves closed or closing.
	BOP	Recognize one LED illuminated on acoustic monitor.
	SRO	Implement 2-AOP-01.10, Pressurizer Pressure and Level Section 4.1.1.1 IOA if PORV has failed open place the PORV in override and close block valve V1476. NOTE: PORV not failed open. SRO may enter section 4.2.2. 'PORV or Safety Valve OPEN or Leaking. (same actions are taken) (attached page xx)
		Direct placing V1474, PORV, in override and V1476 PORV Block Valve closed. (step 4.2.2.4)
		Direct placing V1475, PORV in service by opening block valve V1477 (step 4.2.2.8)
	RO	When directed, place PORV 1474 in override and close the PORV Block Valve V1476. Recognize red and green position indicating lights are still illuminated. Monitor Pressurizer pressure to determine if block valve closed. Report Pressure returning to normal.

Op Test No.: 1 Scenario # 7 Event # 7 Page 9 of 17

Event Description: PORV Leakage

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: Annunciator Q-32 clears when QT drained.		
	SRO T.S.	Recognize Tech Spec Implementation T.S. 3.4.4 Action A, block valve inoperable and within 1 hour remove power to block valve.
	SRO T.S	If Pressurizer pressure lowers to <2225 psia, DNB T.S. 3.2.5 should be entered. Restore to >2225 psia within 2 hours
	RO	Indentifies Quench Tank high level alarm (Q-32). Recommends to SRO, QT needs to be drained.
	SRO	Directs RO to drain QT IAW 2-NOP-01.07, Quench Tank Operation.
	RO	Drains QT IAW 2-NOP-01.07 section 4.3 (attached page xx)

Op Test No.: 1	Scenario # 7	Event # 7	Page 10 of 17
Event Description:	S/G Tube Leakage		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger SGTL (50 gpm tube leak)		
Control Room Indications Available: Letdown flow lowering, Pressurizer pressure lowering. Air Ejector radiation alarm on PC-11.		
	RO	Recognize letdown flow lowering.
		Isolate letdown when directed.
		Start 2B Charging Pump if not already running, when directed.
	SRO	Implement 2-AOP-08.02, Steam Generator Tube Leak and direct additional Charging Pumps started, step 4.2.1.1.1 (attached page xx) (May not enter if immediate trip directed)
		Direct letdown isolated, start additional Charging Pump.
	BOP	Recognize PC-11 Air Ejector radiation increasing.
		Recognize Main Steam Line monitor radiation increasing on the 2A SG.

Op Test No.: 1	Scenario # 7	Event # 7	Page 11 of 17
Event Description:	Steam Generator Tube Rupture, Reactor trip		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: **NOTE: When Reactor tripped SGTR of ~300 gpm will commence.**		
	SRO	Direct Reactor trip when Pressruizer level cannot be maintained with Letdown isolated and all available Charging Pumps running.
	RO	Trip Reactor when directed.
	SRO	Direct manual trip of reactor and implement 1-EOP-01, Standard Post Trip Actions
		Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses)

Op Test No.: 1	Scenario # 7	Event # 7	Page 12 of 17
Event Description:	Steam Generator Tube Rupture, Reactor trip		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F • S/G pressure is between 835 and 915 psig • Four MSR TCV Block valves closed • MSR warmup valves are closed • If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED
		Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120°F • Verify NO secondary plant radiation alarms (SJAE will be in alarm)
	RO	Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal
		Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.

Op Test No.: 1	Scenario # 7	Event # 7	Page 13 of 17
Event Description:	Steam Generator Tube Rupture, Reactor trip		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35% (trending down)
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia (trending down) • Verify RCS subcooling is >20°F
		Core Heat Removal • Verify at least one RCP running with CCW • Verify loop delta T is <10°F

Op Test No.: 1	Scenario # 7	Event # 8	Page 14 of 17
Event Description:	EOP-04, Isolate the 2A SG. Close blowdown isolation valves FCV-23-3 and FCV-23-4.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Enter 2-EOP-04 Steam Generator Tube Rupture after analysis from Diagnostic Flow chart
		Direct BOP/STA to perform SFSC's of EOP-04
		Implements place keeper (attached pages xx)
		Notifies shift manager to classify the event
		Direct performance of EOP-99 Appendix A, sampling SG's (attached page xx)
		If SIAS, direct BOP to verify Si flow per Figure 2 (attached page x)
	CRITICAL TASK	Direct all RCP's stopped within 10 minutes of SIAS.
		If CCW lost to RCP's >30 minutes: • Ensure CCW to RCP's will remain isolated by placing the four to/from CCW valves to close. • Ensure RCP controlled bleedoff will remain isolated by placing the two RCP bleedoff valves to close.
		Directs RO to perform controlled cooldown to $<510^0$F T_{hot} using SBCS in manual, not to exceed 100^0F in any one hour period
	RO **CRITCAL TASK**	Stop RCP's when directed

Op Test No.: 1	Scenario # 7	Event # 8	Page 15 of 17
Event Description:	EOP-04, Isolate the 2A SG. Close blowdown isolation valves FCV-23-3 and FCV-23-4.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Direct RO to depressurize RCS IAW step 11 EOP-04 • Within Figure 1A (attached page xx) • <930 psia • Above RCP minimum pressure • Approx. Equal to 2A SG pressure (within 50 psia)
		Direct MSIS blocked when block permissive received at 685 psia.(must be done before MSIS occurs at 600 psia)
	CRITICAL TASK	Directs BOP to isolate 2A Steam Generator when Thot is <510^{0}F IAW 2-EOP-99, Appendix R (attached page xx)
Note: If not recognized previously, when Appendix R is being performed the BRO should identify the 2A SG blowdown isolation valves, FCV-23-3 and FCV-23-4 are not closed and manually close the valves.		
	BOP **CRITICAL TASK**	Perform EOP-99 Appendix R and isolate the 2A SG
		Recognize 2A SG blowdown valves have not closed and close FCV-23-3 and FCV-23-4

Op Test No.: 1	Scenario # 7	Event # 8	Page 16 of 17
Event Description:	EOP-04, Isolate the 2A SG. Close blowdown isolation valves FCV-23-3 and FCV-23-4.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	RO	Cooldown the RCS to <510°F T_{hot} using SBCS.
		When directed, depressurize the RCS IAW step 11 EOP-04. Examiners Note: Use Auxiliary spray. • Within Figure 1A (attached page) • <930 psia • Above RCP minimum pressure (N/A RCP's off) • Approx. Equal to 2A SG pressure (within 50 psia)
		Suggested termination point is when the 2A SG is isolated and the 2A SG blowdown isolation valves FCV-23-3 and FCV-23-4 have been closed.

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: **B**

Unit 2 Identified RCS Leakage: **0** **Unit 2 Unidentified RCS Leakage: 0.12**

Unit 2 Scheduled Activities per the OSP:

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

Reactor power is ~4.5%, 200 EFPH, Xenon free. RCS boron is 1618 ppm. 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. Direction for the crew is to increase power, roll the turbine and place on the Unit on line. 2A Main Feedwater and 2A Condensate pump are in service, along with SBCS. Crew is implementing 2-GOP-201, Reactor Plant Startup – Mode 2 to Mode 1. Raise reactor power IAW step 6.11 of 2-GOP-201.

Equipment Problems:

2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift.

Facility:	St. Lucie	Scenario No.: 8	Op Test No.:
Examiners:		Operators:	SRO:
			RO:
			BOP:

Initial Conditions: 90% power MOL. 2B Main Feedwater Pump has an oil leak. (storepoint 45)

Turnover: 2A Boric Acid Makeup pump is out of service to replace shaft seal. 2C Charging pump is out of service for leaking plunger. 2A Auxiliary Feedwater pump is out of service due to motor oil leak. Reduce power to 45% power and remove 2B MFW form service.

Critical Tasks:

- Initiate Once Through Cooling when both SG's levels are less than 15% wide range.
- Start the 2C CCW pump

Event No.	Malf. No.	Event Type*	Event Description
1		R / RO, SRO N / BOP	Reduce power to 45%
2	1	T.S. / SRO	Containment personnel air lock door fails leak test.
3	2	C / RO	CEA # 57 fails to insert with group in manual sequential. Use manual Individual for CEA #57 to insert and align with group.
4	3	C / RO	Letdown backpressure control fails open.
5	4	T.S./ SRO	RPS TCB 2 fails open, will not reclose.
6	5	C / BOP	RAB Flooding due to fire header rupture. Close HCV-25-1 Thru 7
7	6	M / All	Manual trip of 2B MFW pump, LOOP, 2B EDG fails to start.
8	7	M / All	On AFAS 2C AFW pump overspeeds, unrecoverable, TLOF
9	8	M / All	Once through cooling EOP-15.
10	9	C/ BOP	Start the 2C CCW pump

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

DRAFT

The Crew is to perform a down power to remove the 2B MFW pump from service due to an oil leak.

Engineering has just left the Containment after a short entry to take some measurements for an upcoming PCM. Shortly after the turnover the test group will call the Control room and notify them the outer personnel airlock door has failed the leak test. SRO will evaluate T.S. and enter 2-AOP-68.01, Loss of Containment Integrity / Air Locks.

Upon inserting CEA's for ASI control, CEA # 57 fails to insert with group. Manual individual of CEA # 57 will be successful. SRO to evaluate T.S. 3.1.3.1. if CEA misaligned >7".

Continuing with the down power, the inservice Letdown pressure control fails open. Place PIC-2201 in manual in accordance with 2-NOP-02.02 Charging and Letdown.

TCB-2 opens and will not reclose. SRO to evaluate T.S.3.3.1. Refers to table 3.3.1 and Ops Policy OPS 503, Reactor Trip Breakers. Directs TCB 6 to be opened (same trip path TCB) T.S. 3.3-1 Action 4, place in trip condition within one hour.

A Fire pump running alarm will be received. A few minutes later a safeguards sump hi hi level alarm will annunciate. The SNPO will call and state safeguards sump is overflowing. A fire main header rupture in RAB will be identified by the SNPO. BOP to close HCV-25-1 Thru 7 IAW 2-AOP-24.01 RAB flooding. The SNPO will close V15656, 'Fire Protection RAB Main Hdr Isol' valve to terminate the leak. SRO to implement 0010239, Fire Protection System Impairment to notify Risk Management within 48 hours and take contingency actions.

The 2B MFW pump oil leak worsens to the point of requiring a manual trip of the Unit and stopping the pump. Upon manual trip a LOOP occurs and the 2B Diesel fails to start and will not start. The 2A Diesel starts and sequences loads.

On AFAS the 2C AFW will overspeed and is unable to be reset. This will result in a total loss of feedwater (EOP-06).

As the crew attempts to regain feedwater in EOP-06, once through cooling (OTC) criteria will be met and the crew must enter EOP-15 to initiate OTC.

When the Crew enters once through cooling criteria and manual SIAS is initiated, the 2A Diesel output breaker opens and re-closes as designed. The 2A CCW pump re-starts but trips. The BOP should manually start the 2C CCW pump. This is a critical task as the only source of Cooling to the HPSI pump and Containment cooling is the 2C CCW pump.

Op Test No.: 1	Scenario # 8	Event # 1	Page 3	of 16
Event Description:	Containment air lock door fails leak test.			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Sign off step 6.7 of 2-GOP-123. Handout during turnover. Make copy for I/F. **Shortly after the turnover, call the Control Room and notify the SRO the Containment outer personnel air lock door has failed the leak test.**		
Control Room Indications Available: None		
	SRO	Notify SM of door failure.
		Implement 2-AOP-68.01, 'Loss of Containment Integrity / Air Locks' step 4.2.2.2.1 (attached page xx)
		Applies T.S. 3.6.1.3 determines Action a.1 maintain the operable door closed and either restore the inoperable door to operable status within 24 hours or lock the Operable door closed.
		Direct Data Sheet 30 (surveillance tracking) to track inoperable airlock door.

Op Test No.: 1	Scenario # 8	Event # 2	Page 4 of 16
Event Description:	Reduce power to 45%.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO	Continues with downpower at current rate referring to 2-GOP-123, 'Turbine Shutdown – Full Load to Zero Load'. (attached page xx)
	RO	Monitors boration and T-avg and Tref and maintain as close as possible. Step 6.11.
		Control ASI IAW 0-NOP-100.02, 'Axial Shape Index Control' within transient band ± 0.1 recommended but should be ± 0.2. Step 4.5.2 (attached page xx)
	BOP	Monitors DEH for proper turbine valve positions as downpower progresses. Step 6.8.
		Monitor Main Generator Hydrogen Cold gas temperature. (attached page xx)
		Monitors secondary (attached page xx)
	RO	May receive annunciator L-15, 15% power change in one hour. If annunciator received, call chemistry to perform a RCS iodine sample.

Op Test No.: 1	Scenario # 8	Event # 3	Page 5 of 16
Event Description:	CEA # 57 fails to insert with group		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When RO moves CEA's to control ASI CEA #57 does not move with group. **If RE called for guidance, state there is no issues to realign.**		
Control Room Indications Available: Deviation on ADS of CEA #57. Annunciator K-32 CEA Position Deviation Warning (DCS) may come in if deviation of ≥3" highest to lowest CEA within group.		

	RO	Recognize CEA # 57 is not moving with the group. Stop CEA movement and notify SRO. Carries out immediate operator actions:
		• Place CEDMCS Mode Select switch in OFF
		• Verify all CEA motion has Stopped
		• Verify no dropped CEA's
		  • Rod bottom lights
		  • ADS Display CRT
		  • DCS screen
		  • Verify no multiple major misalignments

	SRO	NOTE: If misaligned CEA identified prior to 7" misalignment the AOP is not required to be implemented, however the SRO will probably refer to of Attachment 5 for realignment which will refer to attachment 6 for operability determination. Implement 2-AOP-66.01, Dropped Or Misaligned CEA Abnormal Operations. Verify immediate operator actions have been performed. (step 4.2.6.3 attached page xx)
Note: the RO should identify the CEA is not moving with the group before the T.S. limit of 7" and stop CEA motion. If >7" misalignment the SRO should evaluate T.S. for CEA operability.		
	SRO	Direct implementation of Attachment 5, Other Misalignments (attached page xx)

Op Test No.: 1	Scenario # 8	Event # 3	Page 6 of 16
Event Description:	CEA # 57 fails to insert with group		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	SRO T.S.	NOTE. T.S. is applicable only if CEA becomes misaligned >7" of CEA's within its group. Refer to T.S. 3.1.3.1. Perform Attachment 6 of 2-AOP-66.01, Dropped Or Misaligned CEA Abnormal Operations to determine operability (attached page xx)
	RO	When directed perform Attachment 5, 'other misalignments'
		When directed perform Attachment 6, 'operability determination'
	RO/BOP	If annunciator K-32 comes in, reset IAW 2-NOP-102.01 DCS Operations. (attached page xx)

Op Test No.: 1	Scenario # 8	Event # 4	Page 7 of 16
Event Description:	Letdown backpressure fails low		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed trigger PIC-2201 fails low. If SNPO called to check for leaks or lifting of reliefs, call back in ten minutes and report no leaks or lifting of reliefs.		
Control Room Indications Available: Annunciator M-5 letdown pressure high/low, M-13 Letdown flow high		
	RO	Recognize and communicate increasing letdown flow
		Place PIC-2201 in manual and adjust letdown pressure to a value consistent with plant conditions when directed.
	SRO	Implement 2-AOP-02.03, 'Charging and Letdown' Perform General Actions. Determines step 4.2.7 Letdown Pressure control malfunction applicable (attached page xx)
		Direct placing PIC-2201 in manual. Step 4.2.7.A.1
		Direct adjustment of PIC-2201 to match plant conditions. Step 4.2.7.A.2
		Direct walkdown to check for leaks or lifting of reliefs. Step 4.2.7.A.3

Op Test No.: 1	Scenario # 8	Event # 5	Page 8 of 16
Event Description:	TCB 2 fails open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger TCB-2 fails open. **If SNPO called to investigate, report back no apparent problem.** **If Electrical called, report back in 10 minutes, need breaker racked out to inspect.** **When SNPO called to open TCB-6, wait one minute and trigger open TCB-6**		
Control Room Indications Available: Annunciator K-1 Rx Trip Bkr TCB-2 Open		
	RO	Acknowledge alarm and report TCB 2 is open.
	SRO	Notify SM and electrical maint.
	T.S. SRO	Implement T.S. 3.3.1 Action 4. Open TCB 6 within one hour. Refer to OPS-503 'Reactor Trip Breakers' for specific guidance.
	RO	Refer to annunciator summary K-1. Dispatch SNPO to investigate.

Op Test No.: 1	Scenario # 8	Event # 6	Page 9 of 16
Event Description:	RAB flooding		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When directed, trigger RAB flooding. Call as Unit 1 and state the Fire pump is running. A few minutes after SNPO called to investigate fire pump, call and state there is massive flooding in the RAB. Appears the main fire main is ruptured. When called to attempt to isolate the leak report I have closed V15656 and leak has stopped. If asked if any SIAS pumps or valves affected, state NO, the water level is only about 1 inch deep on the floor.		
Control Room Indications Available: F-8 Fire pump running, 2-3 minutes later, LA-2 B Safeguards Room Sump level Hi Hi, LB-8 B Safeguards Sump level Hi / Hi Hi		
	BOP	Acknowledge and communicate alarms.
	SRO	Direct NPO and ANPO investigate why Fire pump is running. Direct SNPO to check Safeguards sump levels.
		When notified of fire main break, request SNPO to attempt to isolate the rupture.
		Implement 2-AOP-24.01, 'RAB Flooding' (attached page xx) Immediate Operator Actions: PLACE HCV-25-1 THRU 7 Drain Valves to RAB Sump to CLOSE. PLACE HCV-25-1A THRU 7A Drain valves to RAB Sump to CLOSE.
		Direct subsequent actions 4.2.1-15 (attached page xx)
		When leak isolated call Unit 1 to stop the Fire Pump.
	SRO	Notify Fire Protection department of isolated fire main in RAB. Contingency actions to run temporary fire hoses to affected area until repairs made. Implement 0010239, 'Fire System Impairment' Step 8.2, notify fire protection and Risk Management.

Op Test No.: 1	Scenario # 8	Event # 7	Page 10 of 16
Event Description:	Manual trip, stop 2B Main Feedwater pump, LOOP, 2B Diesel Fails to start,		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: When called, report as NPO, 2B Main feedwater pump oil leak is massive. If called to reset 2B Diesel lockout, report back in three minutes the lockout relay will not reset.		
Control Room Indications Available: Annunciator G-31 2B MFW Pump trouble alarm. DCS panel indicates 2A Main Feedwater bearing oil pressure low. **Examiners Note: The Crew should be 75-80% power when manual trip directed. 2C AFW pump will trip within EOP-01 (When AFAS started). This will result in OTC criteria being met ~35 minutes after trip.**		
	SRO	Direct Reactor trip and stopping of the 2B Main Feedwater Pump.
	BOP	Trips 2B Main Feedwater pump when directed.
		Identifies Lockout annunciator (Diesel will not start) on the 2B Diesel Generator and communicates to SRO.
	SRO	Directs implementation of 2-EOP-01, "Standard Post Trip Actions" as follows: • RO: Reactivity control, Inventory Control, Pressure control, Core Heat Removal • BOP: Vital Auxiliaries, RCS heat removal, Containment Conditions.
	BOP	Notify NPO to perform Appendix X (NPO Actions) section 1 of EOP-99. (attached page XXX)
		Performs EOP-01 Safety functions as directed for: Maint of Vital Auxiliaries RCS Heat Removal, Containment Conditions.
		Maintenance of Vital Auxiliaries • Verifies turbine governor and throttle valves closed • Verify GEN Brk open (East breaker, Mid Breaker and Exciter Breaker) • Verify all vital and non vital AC Buses energized. (2A1, 2A2, 2A3 2AB, 2B1, 2B2 and 2B3 6.9 and 4.16kv buses) LOOP, 2B Diesel does not start.

Op Test No.: 1	Scenario # 8	Event # 7	Page 11 of 16
Event Description:	Manual trip, stop 2B Main Feedwater pump, LOOP, 2B Diesel Fails to start,		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	RCS Heat Removal • Verify at least one SG has BOTH of the following o SG level is between 20 and 83% NR o Feedwater is available and level is being restored to between 60 and 70% NR • Verify RCS Tavg is between 525 and 535°F o <525°F ensure SBCS valves restoring Tave • S/G pressure is between 835 and 915 psig o Place (2) ADV's in auto set to 900 psia due to LOOP, loss of SBCS. • Four MSR TCV Block valves closed o Close all MSR TCV's due to LOOP. (depress reset pushbutton on reheat control panel) • MSR warmup valves are closed If maintaining vacuum desired, ENSURE MV-08-814 Spillover bypass valve is CLOSED (N/A LOOP)
		Containment Conditions • Verify containment pressure <2 psig • Verify NO containment radiation monitors in alarm • Verify containment temperature is less than 120° F • Verify NO secondary plant radiation alarms (Note: with LOOP local surveys required)
	RO	Trips Reactor when directed. Performs EOP-01 Safety Functions as directed for Reactivity Control, Inventory Control, Pressure Control, Core Heat removal.

Op Test No.: 1	Scenario # 8	Event # 7	Page 12 of 16
Event Description:	Manual trip, stop 2B Main Feedwater pump, LOOP, 2B Diesel Fails to start,		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: 2C AFW pump trip on Mechanical Trip		
Control Room Indications Available: Annunciator G-46		
	RO	Reactivity Control • Verify Reactor power is lowering. • Verify startup rate is negative. • Verify ALL CEA's are fully inserted.
		Inventory Control • Verify pressurizer level is between 10 and 68% • Pressurizer level is trending to 30 – 35%
		Pressure Control • Verify RCS pressure is between 1800-2300 psia • Verify RCS pressure is trending 2225-2275 psia • Verify RCS subcooling is >20° F
		Core Heat Removal • Verify at least one RCP running with CCW (if SIAS identified CCW isolated) (N/A LOOP) • Verify loop delta T is <10° F
	BOP	Recognize and communicate 2C AFW pump trip. Annunciator G-46. Total loss of Feedwater.

Op Test No.: 1	Scenario # 8	Event # 8	Page 13 of 16
Event Description:	Enter 2-EOP-06, Total loss of Feedwater		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: Restore Instrument air when directed (appendix H) **When NPO called to reset overspeed, wait two minutes and state mechanical reset will not reset.**		
Control Room Indications Available:		
	SRO	Exit EOP-01 to EOP-06 'Total Loss Of Feedwater' (attached pages xx)
		Direct SFSC's for EOP-06 performed every 15 minutes.
		Notify BOP to implement Appendix A, Sampling Steam Generators. Attached page xx Direct appendix H to restore Instrument air.(attached page xx) (Note: SG sample valves will not open due to loss of Instrument air)
		Direct HP to perform secondary surveys
		Direct RCS depressurized to 1800 to 1850 psia using auxiliary sprays. (with letdown isolated, Pzr. Level will be high and should be monitored closely)
	BOP	Call NPO to perform Appendix H to restore Instrument air.
	SRO	Direct CCW to RCP's remains isolated by placing CCW valves to/from RCP's to close. (attached step xx)
		Direct attempt to restore AFW. per 2-NOP-09.02, Auxiliary Feedwater System Operation. Implement 2-AOP-09.02, Auxiliary Feedwater. Attachment 1 to reset 2C AFW pump overspeed.
		Direct MSIV's closed

Op Test No.: 1	Scenario # 8	Event # 8	Page 14 of 16
Event Description:	Enter 2-EOP-06, Total loss of Feedwater		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available:		
	BOP	Communicate with NPO in attempt to reset 2C AFW pump overspeed trip, attachment 1 of 2-NOP-09.02, Auxiliary Feedwater System Operation.
	SRO	Direct Appendix X, stabilize secondary plant.
		Verify RCS heat removal by at least ONE S/G has 15% WR level and RCS T_{cold} is stable and lowering.
		Direct to 2-EOP-15, 'Functional Recovery' Success path 3 RCS and Core heat removal: Once Through Cooling when BOTH SG's levels are less than 15% WR level. (attached page xx)
	CRITICAL TASK	Direct BOP to perform SP 3, Once Through Cooling (attached page xx)
	BOP **CRITICAL TASK**	Initiate Once Through Cooling IAW HR-3 when directed. Note: SBCS is not available due to LOOP

Op Test No.: 1	Scenario # 8	Event # 9	Page 15 of 16
Event Description:	OTC from HR-3 of EOP-15. 2A CCW pump fails after Diesel breaker closes. Start 2C CCW pp.		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Control Room Indications Available: **Examiners note: when SIAS manually initiated, the 2A CCW pump will fail to start on Diesel breaker re-closure. The 2C CCW pump should be manually started.**		
	BOP/ RO	Recognize failure of 2A CCW pump to start after Diesel Breaker closes and communicate to SRO.
	SRO **CRITICAL TASK**	Direct starting of 2C CCW pump on the 'A' header.
	BOP **CRITICAL TASK**	Start 2C CCW pump on the 'A' header when directed
		Suggested termination point: • Once through cooling has been initiated • 2C CCW pump has been started on the 'A' header

OPERATIONS SHIFT TURNOVER REPORT

UNIT 2 CONTROL ROOM **Day: Today**

Desk RCO: **Board RCO:**

Protected Train: B

Unit 2 Identified RCS Leakage: 0 **Unit 2 Unidentified RCS Leakage:** 0.12

Unit 2 Scheduled Activities per the OSP:

Upcoming ECOs to Hang or Release:

Tech Spec Action Statement:

2A AFW pump T.S. 3.7.1.2 Action a.

2A BAM Pump N/A with 2B BAM pump available

2C Charging Pump N/A with 2A and 2B Charging pumps available.

OPS 513's:

Locked in Annunciators:

G-44 2A AFW Pump Brk Fialure/CS Stop/SS Isol

N-47 2A BAM Pump OVRLD/CS Stop/ SS Isol

M-48 2C Charging Pump SS Isol/2553 OVRLD

Current Status:

Unit 1 is at 100% power. Unit 2 is at 90% power MOL. 2B Main Feedwater Pump has an oil leak. The Pressurizer has been placed on Recirc. IAW 2-GOP-101, Reactor Operating Guidelines During Steady State and Scheduled Load Changes, Appendix A. The Unit has started a downpower using 2- GOP-123, Turbine Shutdown - Full load To Zero Load, to remove the 2B Main Feedwater pump from service. R.E. requests ASI be held to the 100% value during the downpower. DEH has been programmed for 3MW/Min. downpower with a 10gpm rate of Boric Acid addition to the suction of the Charging pumps. Turbine is on hold and the crew is on step 6.8 of GOP-123.

Engineering has just left the Containment after a short entry to take some measurements for an upcoming PCM. Personnel Air lock leak test is being performed.

Equipment Problems:

2A AFW pump removed from service two hours ago due to motor oil leak. 2A BAM pump removed form service three hours ago to replace shaft seal. 2C Charging pump removed from service to replace plunger seals. None of the above are expected to be returned to service this shift. Reduce power to 45% and remove 2B MFW from service.