

2008 NRC EXAMINATION

Facility: <u>Catawba Nuclear Station</u>	Scenario No.: <u>1</u>	Op-Test No.: _____
Examiners: _____	Operators: _____	_____
<p><u>Initial Conditions:</u> Stable at 10-8 amps</p> <p><u>Turnover:</u> Increase power to 1%.</p>		

Event No.	Malfunction No.	Event Type*	Event Description
1	RO	R	Increase power from 10-8 amps and stabilize at 1%.
2	BOP	I	Total Sealwater Flow meter fails high
3	BOP SRO	I TS	I/R channel N35 loss of high voltage (fails low)
4	RO	C	1C S/G feedwater bypass valve fails open
5	BOP SRO	C TS	Loss of KC train, must swap to alternate train
6	RO	C	1D S/G PORV fails open
7	ALL	M	Main Steam Line Break Outside Containment on 1A S/G <u>Additional Failures</u> Failure of automatic feedwater (CF) isolation Failure of automatic S/I both trains 1A MSIV failed open/ 1C MSIV fails to close in auto 1ND-59B failed closed

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

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Op-Test No. _____ NRC Scenario No. <u>1</u> Event No. <u>1</u> 1 Page		
Event Description: Increase power from 10-8 amps and stabilize at 1%.		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a REACTIVITY event using OP/1/A/6100/001 (Controlling Procedure For Unit Startup).
	ALL	NOTE: <ol style="list-style-type: none"> 1. Control rod withdrawal shall NOT exceed the temporary rod withdrawal limits specified in Unit One R.O.D. Section 2.3. 2. Refer to Unit One R.O.D. Section 2.4 for the rate at which reactor power can be changed. 3. The throttling of a S/G bypass reg valve affects the other S/G bypass reg valves. Therefore, SM/CF ΔP needs to be monitored as the unit approaches POAH. 4. If NC boron concentration is greater than 1000 ppmB, T-AVG control may be very sensitive above the POAH due to a positive MTC. Refer to Unit One R.O.D. Section 5.10 for the MTC at the current conditions. 5. When approaching the POAH, a startup rate of < 0.2 dpm is recommended; this rate should NOT be exceeded until the turbine is placed on line. (SOMP 01-02).
	RO	2.159 Increase reactor power to 1%. (R.M.)
END EVENT		

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Op-Test No. _____ NRC Scenario No. <u>1</u> Event No. <u>2</u> 1 Page		
Event Description: Total Sealwater Flow meter fails high		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is an INSTRUMENT event using OP/1/B/6100/010H (Annunciator Response for Panel 1AD-07), C/4 – NCP SEAL WATER LO FLOW
		EXAMINER NOTE: SRO may refer to AP/1/A/5500/008 (Malfunction of Reactor Coolant Pump), however, this is not required.
		Immediate Actions
	BOP	1. Dispatch an operator to 1RFM-14 on 1RFMP1 (AB-574, BB-55, Rm 491) to identify the affected pump(s) and acknowledge the alarm.
	BOP	2. Position 1NV-309 (Seal Water Inj Flow) to increase seal water flow.
	SRO	3. Refer to AP/1/A/5500/08 (Malfunction of Reactor Coolant Pump).
		Supplemental Actions
	SRO	1. IF any NC pump is tripped, refer to AP/1/A/5500/04 (Loss of Reactor Coolant Pump).
	BOP	2. Ensure KC flow to NC Pump thermal barrier is normal.
	BOP	3. Monitor #1 seal leak-off flow and #1 seal outlet temperature.
	BOP	4. IF filling the seal water injection filter housing after filter replacement, perform the following: 4.1 Verify flow to the NCPs is maintained. 4.2 WHEN filling is complete, verify flow returns to normal.
		END EVENT

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Op-Test No. _____ NRC Scenario No. <u> 1 </u> Event No. <u> 3 </u> 1 Page(s)		
Event Description: I/R channel N35 blown fuse – fails low		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is an INSTRUMENT event using AP/1/A/5500/016 (Malfunction of Nuclear Instrumentation System).
	RO	1. Verify reactor power – GREATER THAN 10%.
	RO	1RNO 1. Stop any power increase.
	RO	2. Verify 1AD-2, C/3 "I/R HI FLUX LEVEL ROD STOP" – DARK
	RO	3. Identify affected I/R channel: <ul style="list-style-type: none"> • N-35 OR • N-36.
	BOP	NOTE 1AD-2, C/4 "N/I SYS S/R & I/R TRIP BYPASS" will actuate in the following step. 4. At the affected I/R drawer, perform the following: a. Place the "LEVEL TRIP" switch for affected channel in "BYPASS". b. Verify the "LEVEL TRIP BYPASS" light on the affected I/R drawer – LIT.
	RO	5. Verify the affected I/R channel trip bypass status light (1SI-19) – LIT.
	RO	6. Verify 1AD-2, C/4 "N/I SYS S/R & I/R TRIP BYPASS" – LIT.
	RO	7. Ensure the "NIS RECORDER" – ALIGNED TO THE OPERABLE I/R CHANNEL.
	RO	8. WHEN the operable I/R channel is less than 10-10 Amps, THEN ensure S/R channels are reset.
	ALL	9. Determine and correct cause of I/R malfunction.
		EXAMINER NOTE: Tech Spec 3.3.1 #4 Condition F applies.
	SRO	10. Ensure compliance with Tech Spec 3.3.1 (Reactor Trip System (RTS) Instrumentation).
		EXAMINER NOTE: No notifications at this time.
	SRO	11. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	BOP	12. Notify Reactor Group Engineer of occurrence.
	SRO	CAUTION Installing I/R fuses with any P/R channel inoperable or in a tripped condition, may result in a reactor trip on P/R rate trip due to voltage spikes. 13. WHEN the affected I/R channel is repaired, THEN ensure IAE returns the channel to service.
	SRO	14. Determine long term plant status. RETURN TO procedure in effect.
		END EVENT

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Op-Test No. _____ NRC Scenario No. <u>1</u> Event No. <u>4</u> 1 Page		
Event Description: 1C S/G feedwater bypass valve fails open		
Time	Position	Applicant's Actions or Behavior
		<p>EXAMINER NOTE: This is a COMPONENT event using OP/1/B/6100/010E (Annunciator Response for Panel 1AD-04). A/3 - S/G C FLOW MISMATCH CF > STM B/3 - FCV OR BFCV DEVIATION</p> <p>EXAMINER NOTE: SRO may refer to AP/1/A/5500/006 (Loss of S/G Feedwater); however, this is not required.</p>
	RO	Using responses A/3 and/or B/5, candidate will take manual control of 1CF-48 and throttle to stabilize C S/G level.
		A/3 actions
		NOTE: SM flow channel 2 shares a reference tap with channel 1 of S/G narrow range level indication. SM flow channel 1 shares a reference tap with S/G wide range level indication. A failure on one of these level taps will affect the SM flow channel. Other indication of SM flow should be used to determine if it is an instrument failure.
		Immediate Actions
	RO	1. Compare steam and feed flow indications on S/G 1C with other S/Gs to verify condition.
	RO	2. IF automatic controls are NOT correcting, take manual control.
	RO	3. Check feed and steam pressures of affected S/G to determine if a feedwater line has ruptured.
	SRO	4. IF determined to be feedwater line break, refer to AP/1/A/5500/06 (Loss of S/G Feedwater).
		Supplemental Actions
	RO	1. WHEN malfunction is corrected OR bypassed, restore control to automatic.
		EXAMINER NOTE: No Tech Spec Conditions apply.
	SRO	2. Refer to Tech Specs for operable channel requirements (TS 3.3.1, 3.3.2, 3.3.3 and 3.3.4).
		END EVENT

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Op-Test No. _____ NRC Scenario No. 1 Event No. 5 3 Pages

Event Description: Loss of KC train, must swap to alternate train

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using AP/1/A/5500/021 (Loss of Component Cooling).
	ALL	CAUTION Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within 10 minutes will cause damage to the NC pump seals resulting in NC inventory loss. Monitor Enclosure 1 (Foldout Page).
	BOP	2 Verify at least one KC pump - ON.
		EXAMINER NOTE: 1B1 KC pump can not be started manually, however it will start automatically later.
	BOP	2 RNO Perform the following: a. Start at least one KC pump. b. IF no KC pump can be started, THEN...
	BOP	NOTE Uncooled letdown may result in loss of NV pumps within a matter of minutes. 4 Verify the following: • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK. AND • At least one KC pump - ON.
	BOP	5 IF AT ANY TIME 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" LIT, THEN perform Step 4 RNO.
	BOP	6 Verify both KC surge tank levels - 50% - 90% AND STABLE.
	BOP	7 Start additional KC pump(s) as necessary to supply any KC loads notify presently in service.
	BOP	8 CAUTION A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which will result in shaft seizure. Verify KC flow to NC pumps as follows: • 1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK • 1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK.
	BOP	9a. Verify the following Train A KC non-essential header isolation valves - OPEN: • 1KC-230A (Rx Bldg Non-Ess Hdr Isol) • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol).
	BOP	9b. Verify the following Train B KC non-essential header isolation valves - OPEN: • 1KC-228B (Rx Bldg Non-Ess Hdr Isol) • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-53B (Aux Bldg Non-Ess Hdr Isol) • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol).

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Op-Test No. _____		NRC Scenario No. <u>1</u>	Event No. <u>5</u>	3 Pages
Event Description: Loss of KC train, must swap to alternate train				
Time	Position	Applicant's Actions or Behavior		
	BOP	9c. Start additional KC pump(s) as necessary to supply any KC loads presently in service.		
	BOP	10. Verify KC surge tank levels normal as follows:		
	SRO	a. Verify both KC surge tank levels - 50% - 90% AND STABLE.		
	BOP	b. GO TO Step 14.		
	BOP	14 Ensure KC heat exchanger outlet mode switches - PROPERLY ALIGNED.		
	BOP	15 Determine and correct cause of loss of KC.		
EXAMINER NOTE: Tech Spec 3.7.7, Condition A applies.				
	SRO	16 Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:		
		<ul style="list-style-type: none"> • SLC 16.9-7 (Boration Systems Flow Path - Shutdown) • SLC 16.9-8 (Boration Systems Flow Path - Operating) • SLC 16.9-9 (Boration Systems Pumps - Shutdown) • SLC 16.9-10 (Boration Systems Charging Pumps - Operating) • 3.5.2 (ECCS - Operating) • 3.5.3 (ECCS - Shutdown) • 3.6.6 (Containment Spray System) • 3.7.5 (Auxiliary Feedwater (AFW) System) • 3.7.7 (Component Cooling Water (CCW) System). 		
EXAMINER NOTE: No notifications required.				
	SRO	17 Determine required notifications:		
		<ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements). 		
	BOP	18 IF KC Hx leak to RN is suspected, THEN...		
	BOP	19 Verify KC surge tanks level as follows:		
		<ul style="list-style-type: none"> • Greater than 50% • Stable or increasing. 		
	BOP	20 WHEN plant conditions permit, THEN:		
		<ul style="list-style-type: none"> • Return KC pumps to normal operation. REFER TO OP/1/A/6400/005 (Component Cooling Water System). • Return NV Pump 1A to normal cooling as applicable. REFER TO Enclosure 4 (Alternate Cooling To NV Pump 1A). 		
	BOP	21 Verify the following:		
		<ul style="list-style-type: none"> • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK • 1AD-7, H/3 "VCT HI TEMP" - DARK • Normal letdown - IN SERVICE. 		

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Op-Test No. _____ NRC Scenario No. <u>1</u> Event No. <u>5</u> 3 Pages		
Event Description: Loss of KC train, must swap to alternate train		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>22 Ensure VCT and letdown path aligned as follows:</p> <p>a. IF desired to align NV pump suction to VCT, then perform the following:</p> <p>1) Open the following valves:</p> <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). <p>2) Close the following valves:</p> <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). <p>b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to the "VCT" position and return to "AUTO".</p> <p>c. IF desired to restore letdown flow through the NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) to the "DEMIN" position and return to "AUTO".</p>
	SRO	23 Determine long term plant status. RETURN TO procedure in affect.
END EVENT		

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Op-Test No. _____ NRC Scenario No. 1 Event No. 6 2 Page

Event Description: 1D S/G PORV fails open

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using AP/1/A/5500/028 (Secondary Steam Leak) however; they may use OMP 1-7 guidance to isolate a known steam leak. AP/1/A/5500/028 entry is not "required".
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	RO	2. Verify turbine - ONLINE.
	RO	3. Verify the following: <ul style="list-style-type: none"> • Reactor power - LESS THAN OR EQUAL TO 100% POWER • T-Avg - WITHIN 1.5°F OF T-Ref.
	RO	4. Verify proper reactor response as follows: <ul style="list-style-type: none"> • Control rods - IN "AUTO" AND STEPPING IN • P/R neutron flux - DECREASING.
	RO	5. IF AT ANY TIME reactor power is greater than 100%, THEN perform Step 3 RNO.
	BOP	6. Verify Pzr level - STABLE OR INCREASING.
	BOP	7. IF AT ANY TIME while in this procedure Pzr level is decreasing in an uncontrolled manner, THEN RETURN TO Step 6.
	BOP	8. IF AT ANY TIME VCT level goes below 23%, THEN align NV pump suction to FWST as follows: <ul style="list-style-type: none"> a. Open the following valves: <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). b. Close the following valves: <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol).
	BOP	9. Attempt to identify and isolate leak as follows: <ul style="list-style-type: none"> a. Verify the following conditions - NORMAL: <ul style="list-style-type: none"> • Containment temperature • Containment pressure • Containment humidity • Containment floor & equipment sump level. b. Dispatch operators to locate and identify source of steam leak. c. Verify S/G PORVs - CLOSED.
	RO	9cRNO. c. IF S/G pressure is less than 1090 PSIG, THEN perform the following: <ul style="list-style-type: none"> 1) Close affected S/G PORV. 2) IF S/G PORV is still open, THEN: <ul style="list-style-type: none"> a) Close affected S/G PORV isolation valve. b) IF S/G PORV isolation valve still open, THEN ...
	RO	9d. Verify condenser dump valves - CLOSED. e. Verify atmospheric dump valves - CLOSED. f. Verify CA PMP #1 - OFF. g. IF leak is suspected to be in a doghouse, THEN...
		EXAMINER NOTE: No required notifications at this time.

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Appendix D, Rev. 9

Required Operator Actions

Form ES-D-2

Op-Test No. _____ NRC Scenario No. <u>1</u> Event No. <u>6</u> 2 Page		
Event Description: 1D S/G PORV fails open		
Time	Position	Applicant's Actions or Behavior
	SRO	10. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	BOP	11. Notify RP of leak.
	RO	12. Verify - LEAK ISOLATED.
	SRO	13. Determine long term plant status. RETURN TO procedure and step in effect.
		END EVENT

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Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is the MAJOR event entering EP/1/A/5000/E-0.
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	RO	2. Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights - LIT • All reactor trip and bypass breakers - • I/R amps - DECREASING.
	RO	3 Verify Turbine Trip: All turbine stop valves – CLOSED
	BOP	4 Verify 1ETA and 1ETB - ENERGIZED.
	BOP	5 Verify S/I is actuated: <ul style="list-style-type: none"> a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.
		5aRNO <ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> 1) Verify conditions requiring S/I: <ul style="list-style-type: none"> • Pzr pressure - LESS THAN 1845 PSIG OR • Containment pressure -GREATER THAN 1.2 PSIG. 2) IF S/I is required, THEN manually initiate S/I. 3) IF S/I is not required, THEN...
	BOP	b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.
	RO	6 Announce "Unit 1 Safety Injection".
		EXAMINER NOTE: Classification is 4.6.A.1 (Alert)
	SRO	7 Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	RO	8 Verify all Feedwater Isolation status lights (1SI-5) - LIT.
		EXAMINER NOTE: Automatic feedwater isolation is blocked and will require manual initiation.
	RO	8RNO Perform the following: <ul style="list-style-type: none"> a. Manually initiate Feedwater Isolation. b. IF proper status light indication is not obtained, THEN manually close valves.
	BOP	9 Verify Phase A Containment Isolation status as follows: <ul style="list-style-type: none"> a. Phase A "RESET" lights - DARK. b. Monitor Light Panel Group 5 St lights - LIT.
	BOP	10a Verify proper Phase B actuation as follows: <ul style="list-style-type: none"> a. Containment pressure - HAS REMAINED LESS THAN 3 PSIG.
	ALL	b. IF AT ANY TIME containment pressure exceeds 3 PSIG while in this procedure, THEN perform Step 10.a.
	BOP	11a Verify proper CA pump status as follows: Motor driven CA pumps - ON.

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Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
	BOP	11b 3 S/G N/R levels - GREATER THAN 11%.
	BOP	11b RNO Ensure CA Pump #1 - RUNNING.
	BOP	12 Verify all of the following S/I pumps - ON: <ul style="list-style-type: none"> • NV pumps • ND pumps • NI pumps.
	BOP	13 Verify all KC pumps - ON.
	BOP	13RNO Perform the following for affected train(s): <ol style="list-style-type: none"> a. Reset ECCS. b. Reset D/G load sequencer. c. Manually start affected pump. d. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
	BOP	14 Verify all Unit 1 and Unit 2 RN pumps - ON.
		EXAMINER NOTE: Enclosure 2 actions are listed after step 24
	BOP	15 Verify proper ventilation systems operation as follows: <ul style="list-style-type: none"> • REFER TO Enclosure 2 (Ventilation System Verification). • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification).
	RO	16 Verify all S/G pressures - GREATER THAN 775 PSIG.
		EXAMINER NOTE: 1A S/G MSIV is failed open. 1C S/G MSIV fails to close in automatic but can be closed manually.
	RO	16RNO Perform the following: <ol style="list-style-type: none"> a. Verify the following valves - CLOSED: <ul style="list-style-type: none"> • All MSIVs • All MSIV bypass valves • All S/G PORVs. b. IF any valve is open, THEN: <ol style="list-style-type: none"> 1) Manually initiate Main Steam Isolation. 2) IF any valve is still open, THEN manually close valve.
	BOP	17a Verify proper S/I flow as follows: <ul style="list-style-type: none"> • "NV S/I FLOW" - INDICATING FLOW.
	BOP	17b NC pressure - LESS THAN 1620 PSIG.
	BOP	17c NI pumps - INDICATING FLOW.
	BOP	17d NC pressure - LESS THAN 285 PSIG.
		EXAMINER NOTE: 1ND-59B is failed closed and the 1B ND pump will be secured per the RNO.

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Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
	BOP	17d RNO Perform the following: 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) IF the ND pump miniflow valve(s) cannot be opened, THEN perform 3) the following for affected train(s): a) Reset ECCS. b) Reset D/G load sequencer. c) Stop ND pump. d) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. e) IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart the ND pump. 4) GO TO Step 18.
	BOP	18a Control S/G levels as follows: a. Verify total CA flow - GREATER THAN 450 GPM.
	BOP	18b WHEN at least one S/G N/R level is greater than 11% (29% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.
	BOP	19 Verify all CA isolation valves - OPEN.
	BOP	20 Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT.
		EXAMINER NOTE: Enclosure 4 actions are listed after Enclosure 2 actions.
	RO	NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance. 21 Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).
	BOP	22 Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs - CLOSED.
	BOP	b. Normal Pzr spray valves - CLOSED.
	BOP	c. At least one Pzr PORV isolation valve - OPEN.
	RO	23 Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.
	RO	24 Verify main steamlines are intact as follows: • All S/G pressures - STABLE OR INCREASING • ALL S/Gs - PRESSURIZED.

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Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
	ALL	24RNO IF pressure in any S/G is decreasing in an uncontrolled manner OR any S/G is depressurized, THEN perform the following: <ul style="list-style-type: none"> a. IF both the following conditions exist, <ul style="list-style-type: none"> • Containment pressure – GREATER THAN 1 PSIG • Containment pressure – HAS REMAINED LESS THAN 3 PSIG THEN manually start one VX fan. REFER TO Enclosure 5 (VX Fan Manual Start) b. Concurrently: <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).
		<p style="text-align: center;">Enclosure 2 actions</p>
	BOP	1. Verify proper VC/YC operation as follows: <ul style="list-style-type: none"> a. Verify one train of the following equipment is in operation: <ul style="list-style-type: none"> • YC chiller • CR AHU-1 • CRA AHU-1 • CRA PFT-1. b. Verify the following alarms - DARK: <ul style="list-style-type: none"> • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B". c. Ensure the following VC dampers - OPEN: <ul style="list-style-type: none"> • 1VC-5B (CRA Filt Inlet) • 1VC-6A (CRA Filt Inlet) • 2VC-5B (CRA Filt Inlet) • 2VC-6A (CRA Filt Inlet). d. Repeat Step 1 of this enclosure until notified by station management as follows: <ul style="list-style-type: none"> • At least once every 8 hours OR • Any time VC/YC related annunciators on 1AD-18 actuate.
	BOP	2. Ensure proper VA System operation as follows: <ul style="list-style-type: none"> • Ensure the following fans - OFF: <ul style="list-style-type: none"> ○ ABUXF 1A ○ ABUXF 1B. • Ensure VA System filter is in service as follows: <ul style="list-style-type: none"> ○ 1ABF-D-12 (VA Filt A Bypass Damper) - CLOSED ○ 1ABF-D-5 (VA Filt B Bypass Damper) - CLOSED. • Ensure the following fans - ON: <ul style="list-style-type: none"> ○ ABFXF-1A ○ ABFXF 1B.

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Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
	BOP	3. Verify proper VE System operation as follows: a. VE fans - ON. b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC. c. Repeat Step 3.b every 30 minutes until notified by station management.
	BOP	4. Record time ventilation systems are verified on following table: Enclosure 4 actions
	RO	1. Verify at least one NC pump - ON.
	RO	2. Use NC T-Avg to determine NC temperature as required in subsequent steps.
	RO	3. IF AT ANY TIME NC pumps are tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.
	RO	4. Verify one of the following: • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.
	RO	4RNO GO TO Step 7.
	RO	7. Verify NC temperature - LESS THAN 557°F AND DECREASING.
	RO	8. Attempt to stop the NC cooldown as follows: a. Ensure all steam dumps - CLOSED. b. Ensure all S/G PORVs - CLOSED. c. Ensure S/G blowdown is isolated. d. Close the following valves: • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V). e. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: • 1SM-41 (Stop Vlv #1 Before Seat Drn) • 1SM-44 (Stop Vlv #2 Before Seat Drn) • 1SM-43 (Stop Vlv #3 Before Seat Drn) • 1SM-42 (Stop Vlv #4 Before Seat Drn). f. Verify NC cooldown - STOPPED.

CNS 2008 NRC Exam

Op-Test No. _____ NRC Scenario No. <u>1</u> Event No. <u>7</u> 8 Pages		
Event Description: Main Steam Line Break Outside Containment on 1A S/G		
Time	Position	Applicant's Actions or Behavior
	RO	8fRNO. f. IF cooldown continues, THEN throttle feed flow as follows: 1) IF S/G N/R level is less than 11% (29% ACC) in all S/G's, THEN throttle feed flow to achieve the following: <ul style="list-style-type: none"> Minimize cooldown Maintain total feed flow greater than 450 GPM. 2) WHEN N/R level is greater than 11% (29% ACC) in at least one S/G, THEN throttle feed flow further to achieve the following: <ul style="list-style-type: none"> Minimize cooldown Maintain at least one S/G N/R level greater than 11% (29% ACC). 3) IF cooldown continues, THEN close the following valves: <ul style="list-style-type: none"> All MSIVs All MSIV bypass valves.
	RO	9. Continue to perform the actions of this enclosure as required to ensure one of the following: <ul style="list-style-type: none"> NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR NC temperature - TRENDING TO 557°F.
	SRO	Transition to EP/1/A/5000/E-2
	ALL	1 Monitor Enclosure 1 (Foldout Page).
	ALL	2 Maintain any faulted S/G or secondary break isolated during subsequent recovery actions unless needed for NC System cooldown.
	RO	3 Verify the following valves - CLOSED: <ul style="list-style-type: none"> All MSIVs All MSIV bypass valves.
	RO	3RNO Manually close valve(s).
	RO	4 Verify at least one S/G pressure - STABLE OR INCREASING.
	RO	Identify faulted S/G(s) as follows: <ul style="list-style-type: none"> Verify any S/G pressure - DECREASING IN AN UNCONTROLLED MANNER OR Verify any S/G - DEPRESSURIZED.
	RO	Verify at least one intact S/G - AVAILABLE FOR NC SYSTEM COOLDOWN.

CNS 2008 NRC Exam

Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
	RO	7 Isolate all faulted S/G(s) as follows: <ul style="list-style-type: none"> • S/G 1A: <ol style="list-style-type: none"> a. Verify S/G 1A Feedwater Isolation status light (1SI-5) - LIT. b. Verify S/G 1A PORV - CLOSED. c. Close the following valves: <ol style="list-style-type: none"> 1) 1SM-77A (S/G 1A Otlt Hdr Bldwn CV). 2) 1CA-62A (CA Pmp A Disch To S/G 1A Isol). 3) 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol). d. Verify the following blowdown isolation valves - CLOSED: <ol style="list-style-type: none"> 1) 1BB-56A (S/G 1A Bldwn Cont Isol Insd). 2) 1BB-148B (S/G 1A Bldwn Cont Isol Byp). 3) 1BB-57B (S/G 1A Bldwn Cont Isol Otsd).
	RO	8 WHEN NC T-Hots start to increase, THEN dump steam from intact S/G PORVs to stabilize NC T-Hots.
	BOP	9 Verify the following annunciators – DARK <ul style="list-style-type: none"> • 1AD-5, H/4 "CACST LO LEVEL" • 1AD-8, B/1 "UST LO LEVEL".
	BOP	10. Verify secondary radiation is normal as follows: <ol style="list-style-type: none"> a. Ensure the following signals - RESET: <ol style="list-style-type: none"> 1) Phase A Containment Isolations 2) CA System valve control 3) KC NC NI NM St signals. b. Align all S/Gs for chemistry sampling. c. Perform at least one of the following: <ul style="list-style-type: none"> • Notify Chemistry to periodically sample all S/Gs for activity. OR • Notify RP to periodically frisk all cation columns for activity. d. Verify the following EMF trip 1 lights - DARK: <ul style="list-style-type: none"> • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). e. Verify the S/G(s) fault - INSIDE CONTAINMENT.
	BOP	e.RNO Request RP to perform the following: <ol style="list-style-type: none"> 1) Monitor the area of the steam fault for radiation. 2) Notify the control room of any abnormal radiation conditions.
	BOP	f. WHEN activity results reported, THEN verify all S/Gs indicate no activity.
		EXAMINER NOTE: Crew should be able to terminate safety injection at this point.

CNS 2008 NRC Exam

Op-Test No. _____ NRC Scenario No. 1 Event No. 7 8 Pages

Event Description: Main Steam Line Break Outside Containment on 1A S/G

Time	Position	Applicant's Actions or Behavior
	ALL	11 Verify S/I termination criteria as follows: a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F. b. Verify secondary heat sink as follows: • N/R level in at least one intact S/G - GREATER THAN 11% (29% ACC) OR • Total feed flow to all intact S/Gs - GREATER THAN 450 GPM. c. NC pressure - STABLE OR INCREASING. d. Pzr level - GREATER THAN 11% (20% ACC). e. GO TO EP/1/A/5000/ES-1.1 (Safety Injection Termination).
	SRO	Transition to EP/1/A/5000/ES-1.1
	ALL	1 Monitor Enclosure 1 (Foldout Page).
	BOP	2 Ensure S/I - RESET: a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
	BOP	3 Ensure the following containment isolation signals - RESET: • Phase A • Phase B.
	BOP	4 Establish VI to containment as follows: • Ensure 1VI-77B (VI Cont Isol) - OPEN. • Verify VI pressure - GREATER THAN 85 PSIG.
	BOP	5 Verify proper NS pump operation as follows: a. Containment pressure - HAS EXCEEDED 3 PSIG.
	BOP	5RNO a. GO TO Step 6.
	BOP	6 Ensure only one NV pump - ON.
	RO	7 Verify NC pressure - STABLE OR INCREASING.
	BOP	8 Verify VI pressure - GREATER THAN 50 PSIG.
	BOP	9 Isolate NV S/I flowpath as follows: a. Verify the following valves - OPEN: • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST).
	BOP	b. Verify the following valves - OPEN • 1NV-203A (NV Pumps A&B Recirc Isol) • 1NV-202B (NV Pmps A&B Recirc Isol).
	BOP	c. Close the following valves: • 1NI-9A (NV Pmp C/L Inj Isol) • 1NI-10B (NV Pmp C/L Inj Isol).
		END EVENT

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2008 NRC EXAMINATION

Facility:	<u>Catawba Nuclear Station</u>	Scenario No.:	<u>2</u>	Op-Test No.:	_____
Examiners:	_____	Operators:	_____	_____	_____
<p><u>Initial Conditions:</u></p> <ul style="list-style-type: none"> • 100% power • DFCS channel 3 out of service to repair a tubing leak (loop 5142 – CF Header Pressure) - functional in progress • 1A CA pump out of service for PMs - expected back in 2 hours • 1A NI pump out of service for PMs - expected back in 4 hours • Thunderstorms are in the area. 					
<p><u>Turnover:</u></p> <ul style="list-style-type: none"> • Maintain 100% 					
Event No.	Malf. No.	Event Type*	Event Description		
1	RO	I	NC Loop A Cold Leg Temperature fails high – auto rod motion		
2	BOP SRO	I TS	PZR level Ch2 fails low – loss of letdown		
3	BOP	C	B Train KC mini-flow valve fails open		
4	RO	R	Vacuum leak – manual turbine load decrease		
5	RO SRO	C TS	Rod H-8 drops partially into the core		
6	BOP	C	Loss of running RN pump		
7	ALL	M	Rod M-12 drops, ATWS, loss of heat sink <u>Additional failures</u> Complete loss of vacuum Auto and manual Rx trip fail CAPT O/S, B CA fails to start NV aux spray valve fails closed		
<p>*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>					

Op-Test No. _____ NRC Scenario No. 2 Event No. 1 2 Page(s)

Event Description: NC Loop A Cold Leg Temperature fails high – auto rod motion

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is an INSTRUMENT event using AP/1/A/5500/015 (Rod Control Malfunctions), Case 2 Continuous Rod Motion.
	RO	1. Ensure "CRD BANK SELECT" switch – IN MANUAL.
	RO	2. Verify all rod motion - STOPS.
	RO	NOTE For T-Ref failures, T-Ref will need to be determined for current power level. 3. Manually adjust control rods as necessary to maintain T-Avg within 1°F of T-Ref.
	RO	4. Verify the following parameters - NORMAL FOR EXISTING PLANT CONDITIONS: <ul style="list-style-type: none"> • Channel 1 Turbine Impulse Pressure • T-Ref.
	BOP	5. Verify the following channels - NORMAL FOR EXISTING PLANT CONDITIONS: <ul style="list-style-type: none"> • NC Loop A T-Avg • NC Loop B T-Avg • NC Loop C T-Avg • NC Loop D T-Avg.
	BOP	5RNO IF channel inoperable, THEN perform the FOR EXISTING PLANT CONDITIONS: following: a. Place "DTTEMP DEFEAT" switch to failed loop. b. Place "T-AVG DEFEAT" switch to failed loop. c. WHEN T-Avg is within ±1°F of T-Ref AND auto rod control is desired, THEN return rod control to "AUTO". d. Ensure P-12 interlock in required state for existing plant conditions. REFER TO Tech Spec 3.3.2. e. Have IAE trip bistables associated with the failed loop within 6 hours. REFER TO Model W/O #91002943: <ul style="list-style-type: none"> • OPDT (Tech Spec 3.3.1) • OTDT (Tech Spec 3.3.1) • Low T-Avg (Tech Spec 3.3.2).
	ALL	6. Determine and correct cause of continuous rod movement.
		EXAMINER NOTE: Tech Specs 3.3.1-1 #6 Condition E and 3.3.2 #8.c Condition O apply.
	SRO	7. Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.1.1 (Shutdown Margin (SDM)) • 3.1.4 (Rod Group Alignment Limits) • 3.1.5 (Shutdown Bank Insertion Limits) • 3.1.6 (Control Bank Insertion Limits) • 3.3.1 (Reactor Trip Instrumentation) • 3.3.2 (ESFAS Instrumentation) • 3.4.2 (RCS Minimum Temperature for Criticality).
		EXAMINER NOTE: No notifications at this time.

Op-Test No. _____ NRC Scenario No. <u> 2 </u> Event No. <u> 1 </u> 2 Page(s)		
Event Description: NC Loop A Cold Leg Temperature fails high – auto rod motion		
Time	Position	Applicant's Actions or Behavior
	SRO	9. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	RO	9. WHEN rod control problem is repaired, THEN perform the following: <ol style="list-style-type: none"> a. Ensure T-Avg – WITHIN 1°F OF T-REF. b. WHEN desired, THEN place control rods in "AUTO". c. Ensure steam dumps – IN DESIRED MODE FOR EXISTING PLANT CONDITIONS.
	SRO	10 Determine long term plant status. RETURN TO procedure in effect.
		END EVENT

Op-Test No. _____		NRC Scenario No. <u> 2 </u>	Event No. <u> 2 </u>	4 Pages
Event Description: PZR level Ch2 fails low – loss of letdown				
Time	Position	Applicant's Actions or Behavior		
		EXAMINER NOTE: This is an INSTRUMENT event using AP/1/A/5500/012 (Loss of Charging or Letdown), Case 2 (Loss of Letdown).		
	BOP	1 Verify all Pzr level channels - INDICATING THE SAME.		
	BOP	1RNO IF a controlling channel is failed low, THEN place "PZR LEVEL CTRL SELECT" switch in any alternate operable channel position.		
	RO	2 Stop any power changes.		
	BOP	3 Ensure the following letdown isolation valves - CLOSED: <ul style="list-style-type: none"> • 1NV-10A (Letdn Orif 1B Otlf Cont Isol) • 1NV-11A (Letdn Orif 1C Otlf Cont Isol) • 1NV-13A (Letdn Orif 1A Otlf Cont Isol). 		
	BOP	4 Verify Pzr level - GREATER THAN 17%.		
	BOP	5 Control charging to stabilize Pzr level at program level while maintaining seal injection flow.		
	BOP	6 Ensure "PZR HTR GROUP 1C" - ON.		
	BOP	7 Control VCT level as follows: <ol style="list-style-type: none"> a. Verify NC system makeup - SET FOR DESIRED BORON CONCENTRATION. b. Verify "NC MAKEUP MODE SELECT" - IN AUTOMATIC. 		
	BOP	8 Determine and correct cause of loss of letdown.		
	BOP	9 IF AT ANY TIME excess letdown is required, THEN establish excess letdown. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System).		
		EXAMINER NOTE: Enclosure 5 actions are listed after step 22.		
	BOP	10 Verify proper VC/YC system operation. REFER TO Enclosure 5 (Control Room Ventilation System Verification).		
	BOP	11 Ensure "PZR LEVEL TO REC SEL" is selected to an operable channel.		
		EXAMINER NOTE: Tech Spec 3.3.1 #9 Condition L applies.		
	SRO	12 Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.3.1 (Reactor Trip System (RTS) Instrumentation) • 3.3.3 (Post Accident Monitoring (PAM) Instrumentation) • 3.3.4 (Remote Shutdown System) • 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits) • 3.4.12 (Low Temperature Overpressure Protection (LTOP) System) • 3.6.3 (Containment Isolation Valves). 		
	BOP	13 Verify at least one of the following valves - CLOSED: <ul style="list-style-type: none"> • 1NV-1A (NC Letdn To Regen Hx Isol) OR <ul style="list-style-type: none"> • 1NV-2A (NC Letdn To Regen Hx Isol). 		

Op-Test No. _____		NRC Scenario No. <u> 2 </u>	Event No. <u> 2 </u>	4 Pages
Event Description: PZR level Ch2 fails low – loss of letdown				
Time	Position	Applicant's Actions or Behavior		
	BOP	14. Verify the following Letdn Orif Otlf Cont Isol valves - CLOSED: <ul style="list-style-type: none"> • 1NV-10A (Letdn Orif 1B Otlf Cont Isol) • 1NV-11A (Letdn Orif 1C Otlf Cont Isol) • 1NV-13A (Letdn Orif 1A Otlf Cont Isol). 		
	BOP	NOTE <ul style="list-style-type: none"> • If either NC loop letdown valve (1NV-1A or 1NV-2A) closed before all orifice isolation valves (1NV-10A, 1NV-11A and 1NV-13A), the letdown line will require local repressurization. • If all valves closed from automatic signal(s), it can be assumed the orifice valves reached the closed position first. 15. Verify all the following valves – CLOSED BY AUTOMATIC SIGNAL(s). <ul style="list-style-type: none"> • 1NV-1A (NC Letdn To Regen Hx Isol) • 1NV-2A (NC Letdn To Regen Hx Isol) • 1NV-10A (Letdn Orif 1B Otlf Cont Isol) • 1NV-11A (Letdn Orif 1C Otlf Cont Isol) • 1NV-13A (Letdn Orif 1A Otlf Cont Isol). 		
	RO	15RNO Perform the following: <ol style="list-style-type: none"> a. IF all orifice isolation valves are known to have been closed prior to either NC loop letdown valve closing, THEN GO TO Step 18. 		
	BOP	18 Establish letdown as follows: <ol style="list-style-type: none"> a. Verify ability to establish normal letdown - RESTORED. 		
	BOP	<ol style="list-style-type: none"> b. Ensure 1NV-849 (Letdn Flow Var OrifCtrl) valve demand position - 0%. 		
	BOP	<ol style="list-style-type: none"> c. Verify the following valves - OPEN: <ul style="list-style-type: none"> • 1NV-1A (NC Letdn To Regen Hx Isol) • 1NV-2A (NC Letdn To Regen Hx Isol). 		
	BOP	18cRNO <ol style="list-style-type: none"> c. Perform the following: <ol style="list-style-type: none"> 1) Manually open the affected valve(s). 2) IF the affected valve(s) will not open, THEN... 		
	BOP	NOTE If LTOP is in service, then 1NC-34A will be made inoperable when 1NV-10A is opened and returned operable when 1NV-11A or 1NV-13A is opened. (PIP #01-545) <ol style="list-style-type: none"> d. Open the following valves: <ul style="list-style-type: none"> • 1NV-15B (Letdn Cont Isol) • 1NV-10A (Letdn Orif 1B Otlf Cont Isol). 		
	BOP	<ol style="list-style-type: none"> e. Adjust 1NV-294 (NV Pmps A&B Disch Flow Ctrl) as necessary to maintain letdown subcooled in following steps. 		
	BOP	<ol style="list-style-type: none"> f. Throttle 1NV-148 (Letdn Press Control) to 45% demand. 		

Op-Test No. _____ NRC Scenario No. <u>2</u> Event No. <u>2</u> 4 Pages		
Event Description: PZR level Ch2 fails low – loss of letdown		
Time	Position	Applicant's Actions or Behavior
	BOP	g. Throttle open 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% to 5% increments until one of the following conditions is met: <ul style="list-style-type: none"> • Letdown flow and letdown pressure increases OR • Valve demand position is 60% open.
	BOP	h. Do not continue until one of the above conditions is met.
	BOP	i. Verify letdown flow and letdown pressure - HAS INCREASED.
	BOP	j. Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure between 150 - 200 PSIG.
	BOP	k. WHEN 5 minutes have elapsed, THEN perform the following: <ol style="list-style-type: none"> 1) IF AT ANY TIME letdown flow is increased to greater than 80 GPM, THEN ... 2) Adjust 1NV-849 (Letdn Flow Var Orif Ctrl) in 1% increments to desired letdown flow. 3) WHEN letdown at desired flow, THEN perform the following: <ol style="list-style-type: none"> a) Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG. b) Ensure 1NV-148 (Letdn Press Control) - IN "AUTO". 4) IF AT ANY TIME additional letdown flow desired, THEN establish letdown with the 45 or 75 GPM orifice. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System).
	BOP	l. WHEN PZR level is restored to programmed level, THEN ensure 1NV-294 (NV Pmps A&B Disch Flow Ctrl) is in "AUTO".
		EXAMINER NOTE: No notifications required.
	SRO	19 Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	BOP	20 Verify excess letdown - ISOLATED.
	SRO	21 Determine long term plant status. RETURN TO procedure in effect.
		Enclosure 5 actions
	BOP	1. Verify one train of the following equipment is in operation: <ul style="list-style-type: none"> • YC chiller • CR AHU-1 • CRA AHU-1 • CRA PFT-1.
	BOP	2. Verify the following annunciators - DARK: <ul style="list-style-type: none"> • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B".

Op-Test No. _____ NRC Scenario No. 2 Event No. 2 4 Pages

Event Description: PZR level Ch2 fails low – loss of letdown

Time	Position	Applicant's Actions or Behavior
	BOP	3. Ensure the following VC dampers - OPEN: <ul style="list-style-type: none"> • 1VC-5B (CRA Filt Inlet) • 1VC-6A (CRA Filt Inlet) • 2VC-5B (CRA Filt Inlet) • 2VC-6A (CRA Filt Inlet).
	BOP	4. Repeat this enclosure until notified by Station Management as follows: <ul style="list-style-type: none"> • At least once every 8 hours OR • Any time VC/YC related annunciators on 1AD-18 actuate.
		END EVENT

Op-Test No. _____ NRC Scenario No. 2 Event No. 3 3 Page(s)

Event Description: B Train KC mini-flow valve fails open

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is an COMPONENT event using AP/1/A/5500/021 (Loss of Component Cooling).
	ALL	CAUTION Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within 10 minutes will cause damage to the NC pump seals resulting in NC inventory loss.
	BOP	1. Monitor Enclosure 1 (Foldout Page).
	ALL	2. Verify at least one KC pump – ON.
	ALL	3. IF AT ANY TIME all KC pumps are lost, THEN RETURN TO STEP 2.
	BOP	NOTE Uncooled letdown may result in loss of NV pumps within a matter of minutes.
	BOP	4. Verify the following: <ul style="list-style-type: none"> • 1AD-7, F/3 “LETDN HX OUTLET HI TEMP” – DARK. AND At least one KC pump – ON.
	BOP	5. IF AT ANY TIME 1AD-7, F/3 “LETDN HX OUTLET HI TEMP” LIT, THEN perform Step 4 RNO.
	BOP	6. Verify both KC surge tank levels – 50% - 90% AND STABLE.
	BOP	7. Start additional KC pump(s) as necessary to supply any KC loads presently in service.
	BOP	CAUTION A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which will result in shaft seizure.
	BOP	8. Verify KC flow to NC pumps as follows: <ul style="list-style-type: none"> • 1AD-20, A/1 “KC SUPPLY HDR FLOW TO NCP BRGS LOW” – DARK • 1AD-21, A/1 “KC SUPPLY HDR FLOW TO NCP BRGS LOW” – DARK.
	BOP	9. Verify KC available as follows: <ol style="list-style-type: none"> a. Verify the following Train A KC non-essential header isolation valves – OPEN: <ul style="list-style-type: none"> • 1KC-230A (Rx Bldg Non-Ess Hdr Isol) • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol). b. Verify the following Train B KC non-essential header isolation valves – OPEN: <ul style="list-style-type: none"> • 1KC-228B (Rx Bldg Non-Ess Hdr Isol) • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-53B (Aux Bldg Non-Ess Hdr Isol) • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol). c. Start additional KC pump(s) as necessary to supply any KC loads presently in service.
	BOP	10. Verify KC surge tank levels normal as follows: <ol style="list-style-type: none"> a. Verify both KC surge tank levels – 50% - 90% AND STABLE. b. GO TO Step 14.

Op-Test No. _____	NRC Scenario No. <u> 2 </u>	Event No. <u> 3 </u>	3 Page(s)
Event Description: B Train KC mini-flow valve fails open			
Time	Position	Applicant's Actions or Behavior	
	BOP	14 Ensure KC heat exchanger outlet mode switches – PROPERLY ALIGNED.	
	ALL	15 Determine and correct cause of loss of KC.	
EXAMINER NOTE: Tech Spec 3.7.7. Condition A applies.			
	SRO	16 Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual: <ul style="list-style-type: none"> • SLC 16.9-7 (Boration Systems Flow Path - Shutdown) • SLC 16.9-8 (Boration Systems Flow Path - Operating) • SLC 16.9-9 (Boration Systems Pumps - Shutdown) • SLC 16.9-10 (Boration Systems Charging Pumps - Operating) • 3.5.2 (ECCS - Operating) • 3.5.3 (ECCS - Shutdown) • 3.6.6 (Containment Spray System) • 3.7.5 (Auxiliary Feedwater (AFW) System) • 3.7.7 (Component Cooling Water (CCW) System). 	
EXAMINER NOTE: No notifications at this time.			
	SRO	17 Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements). 	
	BOP	18 IF KC Hx leak to RN is suspected, THEN perform the following: <ul style="list-style-type: none"> • Notify Radiation Protection that a potential unmonitored release may have occurred. • Notify Station Management to evaluate a KC Hx to RN leak. 	
	BOP	19 Verify KC surge tanks level as follows: <ul style="list-style-type: none"> • Greater than 50% • Stable or increasing. 	
	BOP	20 WHEN plant conditions permit, THEN: <ul style="list-style-type: none"> • Return KC pumps to normal operation. REFER TO OP/1/A/6400/005 (Component Cooling Water System). • Return NV Pump 1A to normal cooling as applicable. REFER TO Enclosure 4 (Alternate Cooling To NV Pump 1A). 	
	BOP	21 Verify the following: <ul style="list-style-type: none"> • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK • 1AD-7, H/3 "VCT HI TEMP" - DARK • Normal letdown - IN SERVICE. 	

Op-Test No. _____ NRC Scenario No. <u> 2 </u> Event No. <u> 3 </u> 3 Page(s)		
Event Description: <u> B Train KC mini-flow valve fails open </u>		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>22 Ensure VCT and letdown path aligned as follows:</p> <p>a. IF desired to align NV pump suction to VCT, then perform the following:</p> <p>1) Open the following valves:</p> <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). <p>2) Close the following valves:</p> <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). <p>b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to the "VCT" position and return to "AUTO".</p> <p>c. IF desired to restore letdown flow through the NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) to the "DEMIN" position and return to "AUTO".</p>
	SRO	23 Determine long term plant status. RETURN TO procedure in affect.
		END EVENT

Op-Test No. _____ NRC Scenario No. 2 Event No. 4 2 Page(s)

Event Description: Vacuum leak – manual turbine load decrease

Time	Position	Applicant's Actions or Behavior
		<p>EXAMINER NOTE: This is an REACTIVITY event using AP/1/A/5500/023 (Loss of Condenser Vacuum).</p> <p>EXAMINER NOTE: When Megawatts have been reduced to approximately 1160 MW, the vacuum leak will be reduced so that vacuum begins to increase.</p>
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	RO	<p>2. Decrease turbine load as required to stabilize vacuum as follows:</p> <p>a. IF rapid power reduction required, THEN perform the following:</p> <p>NOTE In "MANUAL" mode, the control valves are capable of full travel within 3 minutes.</p> <p>1) Select "MANUAL" and "CONTROL VALVE LOWER" to reduce turbine load as required.</p> <p>2) REFER TO AP/1/A/5500/009 (Rapid Downpower).</p> <p>3) GO TO Step 3.</p>
	BOP	<p>3. Verify proper RC System operation as follows:</p> <p>a. Verify average condenser inlet temperature OAC point C1P1493 (Unit 1 C1 & C2 Average RC Inlet Temp) - LESS THAN 90°F.</p> <p>b. Verify 1AD-8, B/4 "COOLING TOWER BASIN HI/LO LEVEL" - DARK.</p>
	BOP	4. Verify "STM PRESS TO CSAE" - GREATER THAN 110 PSIG.
	RO	<p>5. Verify steam seal header conditions as follows:</p> <p>a. Ensure at least one of the following valves - OPEN:</p> <ul style="list-style-type: none"> • 1TL-2 (Main Stm To Stm Seal Reg) • 1TL-8 (Aux Stm To Stm Seal Reg). <p>b. Adjust 1TL-4 (Stm Seal Reg Byp) as required to obtain steam seal header pressure between 4 psig and 6 psig.</p> <p>c. Verify OAC - AVAILABLE.</p>
	BOP	<p>NOTE Most TL valve positions can be displayed by OAC turn on code "TL-TF".</p> <p>6. Verify supplemental steam flow into the Ensure 1TL-9 (Steam Seal Packing steam seal header by at least one of the Unloader Reg Valve) is partially open by at least one of the following:</p> <ul style="list-style-type: none"> • Verify 1TL-3 (Steam Seal Reg Valve) - NOT CLOSED OR • Verify both the following: <ul style="list-style-type: none"> ○ Unit 1 - ON LINE. ○ 1TL-10 (E Bleed Steam Seal Reg Valve) - NOT CLOSED.

Op-Test No. _____	NRC Scenario No. <u> 2 </u>	Event No. <u> 4 </u>	2 Page(s)
Event Description: Vacuum leak – manual turbine load decrease			
Time	Position	Applicant's Actions or Behavior	
	BOP	NOTE Starting additional air ejectors or vacuum pump will not restore vacuum when high RC temperature is the reason for loss of vacuum.	
		7. Verify condenser vacuum status as follows: a. Condenser vacuum - STABLE OR INCREASING. b. IF AT ANY TIME condenser vacuum decreases, THEN observe Note prior to Step 6 and perform Step 6.	
	BOP	8. Ensure proper operation of ZP System. REFER TO OP/0/B/6250/011 (Vacuum Priming System).	
	BOP	9. Dispatch operator(s) to verify proper seal trough flows. REFER TO Enclosure 2 (Verification Of Seal Flows).	
	BOP	10. Dispatch operator to ensure CFPT seal system and waterboxes operating properly. REFER TO Enclosure 3 (CFPT Stm Seal And Waterbox Vent Verification).	
	ALL	11. Determine and correct cause of loss of vacuum.	
		EXAMINER NOTE: No notifications at this time.	
	SRO	12. Determine required notifications: • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).	
	BOP	13. Verify Steam Seal System - IN NORMAL ALIGNMENT.	
	SRO	14. Determine long term plant status. RETURN TO procedure in affect.	
		END EVENT	

Op-Test No. _____ NRC Scenario No. 2 Event No. 5 1 Page(s)

Event Description: Rod H-8 drops partially into the core

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using AP/1/A/5500/014 (Control Rod Misalignment), Case 1 Control Rod Misalignment.
	RO	1. Verify only one rod - MISALIGNED
	RO	2. Ensure "CRD BANK SELECT" switch – IN MANUAL
	RO	3. Verify affected rod bottom light(s) – DARK.
	RO	4. Stop any turbine load changes in progress
	RO	5. Adjust turbine load to maintain T-Avg within 1°F of T-Ref.
	RO	NOTE If either "Data A Failure" or "Data B Failure" is indicated, and the "No Urgent Alarm" block is green, then the affected individual rod position indications will be in the "Half Accuracy" mode providing 12 step increment position indication instead of 6. Individual rod position indication may differ by as much as 10 steps from group step counter indication.
		6. Verify any of the following DRPI indications - IN ALARM: <ul style="list-style-type: none"> • Data A Failure OR • Data B Failure
	SRO	6RNO GO TO Step 11.
		EXAMINER NOTE: Tech Spec 3.1.4 Condition B applies.
	SRO	11. Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.1.1 (Shutdown Margin (SDM)) • 3.1.4 (Rod Group Alignment Limits) • 3.1.5 (Shutdown Bank Insertion Limit) • 3.1.6 (Control Bank Insertion Limits) • 3.1.7 (Rod Position Indication) • 3.2.3 (Axial Flux Difference (AFD)) • 3.2.4 (Quadrant Power Tilt Ratio (QPTR)) • SLC 16.7-11 (Position Indication System - Shutdown)
	BOP	12. Notify Reactor Group Engineer of occurrence.
	RO	13. Determine and correct cause of rod misalignment
	RO	14. Verify the affected rod(s) are operable as follows: <ol style="list-style-type: none"> a. Verify 1AD-2, A/10 "ROD CONTROL URGENT FAILURE" - DARK. b. Realign affected rod. REFER TO OP/1/A/6150/008 (Rod Control)
		EXAMINER NOTE: No notifications are required.
	SRO	15. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements)
	SRO	16. Determine long term plant status. RETURN TO procedure in effect
		END EVENT

Op-Test No.	_____	NRC Scenario No.	__ 2 __	Event No.	__ 6 __	2 Page(s)
Event Description: Loss of running RN pump						
Time	Position	Applicant's Actions or Behavior				
		EXAMINER NOTE: This is an COMPONENT event using AP/0/A/5500/020 (Loss of Nuclear Service Water), Case 1 Loss of RN Train.				
	BOP	1. Start idle RN pump(s) as required.				
	RO	2. Ensure Unit 1 and Unit 2 OATC monitors Enclosure 1 (Foldout Page).				
	BOP	3. Verify each operating RN pump discharge flow - GREATER THAN 8,600 GPM.				
	BOP	4. Verify each operating RN pump discharge flow - LESS THAN 23,000 GPM.				
	BOP	4RNO Perform the following: CAUTION Closing of the RN supply x-over isolation valves may result in the momentary isolation of an essential header. NOTE Isolating the Unit 1 or 2 non-essential header will result in loss of cooling supply to the following unit related equipment: <ul style="list-style-type: none"> • VA Supply Vent Units • VF Supply Vent Unit. <p>a. Ensure the following RN supply X-Over isolation valves - CLOSED:</p> <ul style="list-style-type: none"> • 1RN-47A (RN Supply X-Over Isol) • 1RN-48B (RN Supply X-Over Isol) • 2RN-47A (RN Supply X-Over Isol) • 2RN-48B (RN Supply X-Over Isol). <p>b. IF flow is returning to normal, THEN GO TO Step 5.</p>				
		EXAMINER NOTE: 2A RN pump will need to be started to supply cooling to A train equipment on both units since the crossovers are closed.				
	BOP	5. Ensure RN pumps - IN OPERATION AS NEEDED.				
	BOP	6. Ensure proper alignment of RN to KC Hxs as follows: <p>a. Verify RN - ALIGNED TO IN SERVICE KC HX(S).</p> <p>b. Ensure KC Hx OtIt Mode switches - PROPERLY ALIGNED.</p>				
	BOP	7. Verify each operating RN pump discharge flow - GREATER THAN 8,600 GPM.				
	BOP	8. Verify RN - AVAILABLE TO ALL UNIT 1 AND UNIT 2 D/G(S).				
	BOP	9. Determine VC/YC status as follows: <ul style="list-style-type: none"> • Verify VC/YC - ALIGNED TO OPERATING RN TRAIN. • Verify YC Chiller - RUNNING. 				
	ALL	10. Determine and correct cause of loss of RN train.				
		EXAMINER NOTE: Tech Spec 3.7.8 Condition A.1 applies.				

Op-Test No. _____ NRC Scenario No. <u> 2 </u> Event No. <u> 6 </u> 2 Page(s)		
Event Description: <u> Loss of running RN pump </u>		
Time	Position	Applicant's Actions or Behavior
	SRO	11. Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual: <ul style="list-style-type: none"> • SLC 16.7-6 (RN Discharge Instrumentation) • 3.6.5 (Containment Air Temperature) • 3.6.6 (Containment Spray System) • 3.6.17 (Containment Valve Injection Water System (CVIWS)) • 3.7.5 (Auxiliary Feedwater (AFW) System) • 3.7.7 (Component Cooling Water (CCW) System) • 3.7.8 (Nuclear Service Water System (NSWS)) • 3.7.10 (Control Room Area Ventilation System (CRAVS)) • 3.7.11 (Control Room Area Chilled Water System (CRACWS)) • 3.8.1 (A.C. Sources - Operating) 3.8.2 (A.C. Sources - Shutdown).
		EXAMINER NOTE: No notifications at this time.
	SRO	12. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	BOP	13. Notify Environmental Chemistry of any RN pump shifts that have occurred.
	SRO	14. Determine long term plant status. RETURN TO procedure in effect.
		END EVENT

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is the MAJOR event starting in AP/1/A/5500/14 (Control Rod Misalignment), Case 2 Dropped Control Rod.
		EXAMINER NOTE: A second rod will drop fully into the core and result in a need to trip the reactor manually.
		1. Verify only one rod - DROPPED OR MISALIGNED.
		1 RNO IF two or more rods are dropped OR misaligned by greater than 24 steps, THEN: a. Manually trip Reactor. b. GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection)
	SRO	Transition to EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	RO	2. Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights - LIT • All reactor trip and bypass breakers - • I/R amps - DECREASING.
	RO	3. Perform the following: <ol style="list-style-type: none"> a. Manually trip reactor. b. IF reactor will not trip, THEN c. OPEN concurrently: <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • GO TO EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS).
	SRO	Transition to EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS).
	RO	CAUTION NC pumps should NOT be tripped with reactor power greater than 5% to prevent fuel damage. 1. Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights - LIT • All reactor trip and bypass breakers - OPEN • I/R amps - DECREASING.
	RO	1RNO Perform the following: <ol style="list-style-type: none"> a. Manually trip the reactor. b. IF reactor will not trip, THEN manually insert rods.
	RO	2. Verify Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves - CLOSED
	BOP	3. Verify CA pumps are running as follows: <ol style="list-style-type: none"> a. Motor driven CA pumps - ON. b. 3 S/G N/R levels - GREATER THAN 11%.
	BOP	3a RNO a. Manually start motor driven CA pump(s).
	BOP	3b. 3 S/G N/R levels - GREATER THAN 11%.

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
	BOP	4. Initiate emergency boration of NC System as follows: a. Ensure at least one NV pump - ON. b. Open 1NV-236B (Boric Acid To NV Pumps Suct). c. Ensure both boric acid transfer pump switches - IN THE "ON" POSITION. d. Verify emergency boration flow - GREATER THAN OR EQUAL TO 30 GPM. e. Verify the following charging line isolation valves - OPEN: <ul style="list-style-type: none"> • 1NV-312A (Chrg Line Cont Isol) • 1NV-314B (Chrg Line Cont Isol). f. Verify Pzr pressure - LESS THAN 2335 PSIG.
	BOP	5. Verify the following Monitor Light Panel Group 5 St lights - LIT: <ul style="list-style-type: none"> • I/2 • I/3 • I/10 • H/11.
	BOP	6. Verify S/I status as follows: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT.
	BOP	6a RNO Perform the following: 1) IF AT ANY TIME an S/I signal exists OR occurs while in this procedure, THEN perform Step 6.b. 2) GO TO Step 7.
	ALL	7. Verify the following trips have occurred: a. Reactor Trip.
	BOP	a. Dispatch operator to open the following: <ul style="list-style-type: none"> • Reactor trip breakers • Reactor trip bypass breakers • The following breakers for CRD M/G sets: <ul style="list-style-type: none"> ○ "MOTOR" Breaker ○ "GENERATOR" Breaker.
	RO	7b. Turbine Trip.
	RO	8. Verify the reactor is subcritical as follows: a. All of the following conditions exist: <ul style="list-style-type: none"> • P/R channels - LESS THAN 5% • W/R NEUTRON POWER channels - LESS THAN 5% • I/R SUR - NEGATIVE. b. GO TO Step 17.
	BOP	17. Ensure all malfunctioning NC pumps - STOPPED.

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
	BOP	18. Ensure adequate shutdown margin as follows: a. Ensure the following signals - RESET: 1) Phase A Containment Isolations 2) KC NC NI NM St signals. b. Obtain current NC boron concentration from Primary Chemistry. c. WHEN current NC boron concentration is obtained, THEN perform shutdown margin calculation. REFER TO OP/0/A/6100/006 (Reactivity Balance Calculation). d. WHEN following conditions are satisfied, THEN stop NC System boration: <ul style="list-style-type: none"> • Adequate shutdown margin is obtained • Uncontrolled cooldown has been stopped.
		EXAMINER NOTE: If HEAT SINK CSF is RED, then 4.4.G.1 (General Emergency) is correct, otherwise 4.4.S.1 (Site Area Emergency) is correct.
	SRO	19. Determine required notifications: REFER TO RP/0/A/5000/001 (Classification Of Emergency) REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	SRO	20. RETURN TO procedure and step in effect.
	SRO	Transitions to EP/1/A/5000/E-0 and based on RED Path ON Heat Sink, immediately transitions to EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)
	BOP	1. IF total feed flow is less than 450 GPM due to operator action, THEN RETURN TO procedure and step in effect.
	BOP	CAUTION IF a non-faulted S/G is available, THEN feed flow should only be established to non-faulted S/G(s) in subsequent steps. 2. Verify secondary heat sink is required as follows: a. NC pressure - GREATER THAN ANY NON-FAULTED S/G PRESSURE. b. Any NC T-Hot - GREATER THAN 350°F.
	ALL	3. Monitor Enclosure 1 (Foldout Page).
	BOP	4. Verify at least one NV pump - AVAILABLE.
	BOP	5. Verify bleed and feed is required as follows: a. W/R level in at least 3 S/Gs - LESS THAN 24% (36% ACC).
	ALL	5aRNO Perform the following: 1) Monitor bleed and feed initiation criteria. REFER TO Enclosure 1 (Foldout Page). 2) WHEN criteria is satisfied, THEN GO TO Step 18. 3) GO TO Step 6.
	RO/BOP	6. Verify S/G inventory loss is minimized as follows: a. Verify the following blowdown isolation valves on all S/Gs - CLOSED: <ul style="list-style-type: none"> • Blowdown Containment Isolation Inside • Blowdown Containment Isolation Outside • Blowdown Containment Isolation Bypass. b. All S/G sample isolation valves - CLOSED.

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
	BOP	7. Attempt to establish CA flow to at least one S/G as follows: a. Verify the following annunciators - DARK. <ul style="list-style-type: none"> • 1AD-5, H/4 "CACST LO LEVEL" • 1AD-8, B/1 "UST LO LEVEL". b. Verify the following CA suction valves - OPEN: <ul style="list-style-type: none"> • 1CA-6 (CA Pmps Suct From CA CST) • 1CA-4 (CA Pmps Suct From UST). c. Verify proper CA pump status as follows: <ul style="list-style-type: none"> • 1) Power to both motor driven CA pumps - AVAILABLE.
		EXAMINER NOTE: Crew should acknowledge need to refer to AP/007, but continue in FR-H.1 at this time.
	BOP	7c1)RNO1) Perform the following: <ul style="list-style-type: none"> • IF the essential bus is de-energized, THEN restore power to the affected essential bus. REFER TO AP/1/A/5500/007 (Loss of Normal Power). • IF the essential bus is energized, THEN dispatch operator to determine cause of breaker failure.
	BOP	7c 2) 1AD-5, F/3 "CAPT MECH OS TRIP" - DARK.
	BOP	7c2) RNO 2) Perform the following: a) Dispatch operator to reset the CAPT trip and throttle valve. b) IF AT ANY TIME the CAPT trip and throttle valve is reset prior to reaching bleed and feed criteria, THEN perform Step 7. c) GO TO Step 7.d.
	BOP	7d. Ensure all CA isolation valves - OPEN. e. Verify all CA flow control valves - OPEN f. Start all available CA pumps. g. Verify total CA flow - GREATER THAN 450 GPM.
	BOP	7gRNO Perform the following: 1) IF any CA pump is on, THEN... 2) IF no CA pumps can be started, THEN perform the following: a) Dispatch operator and maintenance to CA pumps to attempt to restore one CA pump to service. REFER TO EM/1/A/5200/007 (Troubleshooting Cause For CA Pump(s) Failing to Start). b) IF AT ANY TIME a CA pump is restored prior to meeting bleed and feed initiation criteria, THEN perform Step 7. c) GO TO Step 8.
	BOP	8. Stop all NC pumps.
	BOP	9. Verify CM System is in service as follows: <ul style="list-style-type: none"> • Hotwell pump(s) - ON • Condensate Booster pump(s) - ON.

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
	RO	10. Reset Feedwater Isolation as follows: a. Verify the following annunciators - DARK: <ul style="list-style-type: none"> • 1AD-8, D/7 "INNER DOGHOUSE TRAIN A LEVEL HI" • 1AD-8, E/7 "INNER DOGHOUSE TRAIN B LEVEL HI" • 1AD-8, D/8 "OUTER DOGHOUSE TRAIN A LEVEL HI" • 1AD-8, E/8 "OUTER DOGHOUSE TRAIN B LEVEL HI". b. Verify S/I - HAS PREVIOUSLY ACTUATED.
	RO	10b RNO b. Perform the following: 1) Reset Feedwater Isolation. 2) IF Feedwater Isolation will not reset, THEN notify IAE to bypass Feedwater Isolation. REFER TO EM/1/A/5200/009 (Bypassing Feedwater Isolation). 3) GO TO Step 10.e.
		EXAMINER NOTE: Crew may return to this step to reset CF Isolation numerous times while in this procedure.
	ALL	10e. IF AT ANY TIME a subsequent Feedwater Isolation occurs, THEN RETURN TO Step 10.
	RO	11. Attempt to establish CF flow to at least one S/G as follows: a. Verify CM System is in service. a. RETURN TO Step 6. b. Place the following valves in manual and closed: <ul style="list-style-type: none"> • All CF control valves • All CF bypass control valves. c. Ensure at least one of the following valves - OPEN: <ul style="list-style-type: none"> • 1CF-10 (1A CF Pump Disch Isol) (TB-579, 1E-21) • 1CF-17 (1B CF Pump Disch Isol) (TB-579, 1E-20). d. Verify at least one CF pump - AVAILABLE TO BE STARTED
		EXAMINER NOTE: Due to loss of vacuum, they should assume the CF pumps are not capable of starting.
	BOP	11dRNO. IF both CF pumps are known to be incapable of starting, THEN GO TO Step 13.
		EXAMINER NOTE: 1NV-37A will not open and the RNO will be used to depressurize.

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
	BOP	13. Depressurize NC System as follows: a. Verify letdown - IN SERVICE. b. Verify power to 1NV-37A (NV Supply To Pzr Aux Spray) - AVAILABLE. c. Depressurize NC System to less than 1905 PSIG using NV aux spray as follows: 1) Open the following valves: • 1NV-312A (Chrg Line Cont Isol) • 1NV-314B (Chrg Line Cont Isol). 2) Ensure the following valves - CLOSED: • 1NC-27 (Pzr Spray Ctrl Frm Loop A) • 1NC-29 (Pzr Spray Ctrl Frm Loop B) • 1NV-39A (NV Supply To Loop D Isol) • 1NV-32B (NV Supply To Loop A Isol). 3) Maintain charging flow less than 180 GPM. 4) Throttle 1NV-37A (NV Supply To Pzr Aux Spray) and charging flow as required.
	BOP	13cRNO Depressurize NC System to less than 1905 PSIG using one Pzr PORV.
	BOP	13d. Maintain NC pressure less than 1905 PSIG. e. IF AT ANY TIME letdown is lost AND a Pzr PORV is available, THEN: 1) Close 1NV-37A (NV Supply To Pzr Aux Spray). 2) Open one of the following valves: • 1NV-39A (NV Supply To Loop D Isol) OR • 1NV-32B (NV Supply To Loop A Isol). 3) Depressurize NC System to less than 1905 PSIG using one Pzr PORV.
		EXAMINER NOTE: This permissive will likely not be lit at this time, however, this step will be performed later.
	BOP	14. Block S/I as follows: a. Verify "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) - LIT. b. Depress the "BLOCK" pushbuttons for the following signals: • ECCS steam pressure • ECCS Pzr pressure. c. Verify the following status lights (1SI-13) - LIT: • Main Steam Isol • Pzr low pressure S/I. d. IF AT ANY TIME conditions degrade while in this procedure, THEN manual S/I actuation will be required.
	BOP	14aRNO. Perform the following: 1) WHEN "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) is lit, THEN perform Steps 14 through 16. 2) GO TO Step 17.
	BOP	15. Attempt to establish feed flow from CM as follows: a. Verify Steps 19 through 32 - HAVE BEEN PREVIOUSLY PERFORMED.

Op-Test No. _____ NRC Scenario No. 2 Event No. 7 7 Page(s)

Event Description: Rod M-12 drops, ATWS, loss of heat sink

Time	Position	Applicant's Actions or Behavior
	RO	15aRNO. Perform the following: 1) Close MSIV on 2 S/Gs not to be depressurized. 2) GO TO Step 15.c.
	RO	c. Verify the condenser is available as follows: <ul style="list-style-type: none"> • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT • MSIV on S/G(s) to be depressurized - OPEN
	RO	15c RNO Perform the following: 1) Dump steam from S/G(s) selected to be depressurized using S/G PORVs at maximum rate. 2) IF no S/G PORV can be operated from the control room, THEN... 3) IF no S/G PORV can be opened, THEN... 4) GO TO Step 15.g.
	RO	15 g. WHEN S/G pressure is less than 505 PSIG, THEN stabilize S/G pressure less than 505 PSIG.
	BOP	15h. Verify Steps 19 through 32 - HAVE BEEN PREVIOUSLY PERFORMED.
	SRO	15hRNO. GO TO Step 15.j.
	RO	15j. Verify CF Isolation signal - RESET OR BYPASSED. k. Open the CF to CA valve on the S/G(s) to be fed: <ul style="list-style-type: none"> • 1CA-149 (S/G 1A CF Byp To CA Nozzle) • 1CA-150 (S/G 1B CF Byp To CA Nozzle) • 1CA-151 (S/G 1C CF Byp To CA Nozzle) • 1CA-152 (S/G 1D CF Byp To CA Nozzle). l. Throttle open CF control valve or CF bypass control valve for S/G(s) to be fed. m. Verify feedwater flow to depressurized S/G(s) - INDICATING FLOW.
	RO	15m RNO Perform the following: 1) IF depressurized S/G pressure is less than 505 PSIG, THEN GO TO Step 17. 2) RETURN TO Step 15.c.
		EXAMINER NOTE: This is a procedure loop until pressure is low enough to get flow to the S/Gs from the condensate booster pumps. Scenario should be stopped when flow is indicated to the S/Gs via the condensate system.
		END EVENT

2008 NRC EXAMINATION

Facility:	Catawba Nuclear Station	Scenario No.:	3	Op-Test No.:	
Examiners:	_____	Operators:	_____	_____	_____
	_____		_____	_____	_____
	_____		_____	_____	_____
<u>Initial Conditions:</u>					
<ul style="list-style-type: none"> • 75% power • EFPD = 450 days • Boron concentration is 215 ppm • DFCS channel 3 out of service to repair a tubing leak (loop 5142 – CF Header Pressure) - functional in progress • 1A CA pump out of service for PMs - expected back in 2 hours • 1A NI pump out of service for PMs - expected back in 4 hours • Thunderstorms are in the area. 					
<u>Turnover:</u>					
<ul style="list-style-type: none"> • Increase power to 90% at 10%/hr. 					
Event No.	Malf. No.	Event Type*	Event Description		
1	RO	R	Power increase to 90% at 10%/hr		
2	SRO	TS	FWST level channel 1 fails low		
3	RO BOP	C N	Generator breaker opens, auto runback fails Boration		
4	BOP SRO	C TS	Respond to EMF33 failed high		
5	BOP	C	1ETA normal feeder opens, restore charging		
6	RO	I	1B S/G level program fails low		
7	ALL	M	NC PORV fails open – medium break LOCA <u>Additional failures</u> NI pump 1B fails to start in auto VA Fans not aligned as required on S/I		
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Op-Test No. _____ NRC Scenario No. <u>3</u> Event No. <u>1</u> 1 Page(s)		
Event Description: Power increase to 90% at 10%/hr		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a REACTIVITY event using OP/1/B/6300/001 (Turbine Generator).
	RO	<p>CAUTION:</p> <p>1. Until it is recognized that the first stage shell metal temperature change rate stays below the allowable limit (150°F/hr), the following loading rate shall NOT be exceeded:</p> <ul style="list-style-type: none"> • 1/2%/min - First Stage Inner Shell Temperature (1MC3 or OAC point C1A1140 (Turbine Lower Inner Shell Temp)) < 350°F • 1%/min - First Stage Inner Shell Temperature (1MC3 or OAC point C1A1140 (Turbine Lower Inner Shell Temp)) > 350°F <p>2. Normal steady-state load changes shall be made without exceeding the limits shown on Enclosure 4.7 (Generator Operating Limits) and in the Unit One OAC Databook "Recommended Startup and Loading Curves".</p> <p>3. Unit One Reactor Operating Data, Section 2.4 shall be referred to for allowable ramp rates. A "LOAD RATE" > 6.2 MW/MIN shall NOT be used during normal load changes.</p>
	RO	<p>2.1.2 Increase turbine generator load by performing the following:</p> <p>2.1.2.1 Select "LOAD RATE" and verify it illuminates.</p> <p>2.1.2.2 Input the desired load rate.</p> <p>2.1.2.3 Select "ENTER" or "OK" and verify "LOAD RATE" goes dark.</p> <p>2.1.2.4 Select "TARGET" and verify it illuminates.</p> <p>2.1.2.5 Input the desired load target.</p> <p>2.1.2.6 Select "ENTER" and verify "TARGET" goes dark.</p> <p>2.1.2.7 Verify new load target appears on Target Display.</p> <p>2.1.2.8 Select "GO" and verify it illuminates to start load increase.</p> <p>2.1.2.9 S/G blowdown changes shall be coordinated with Secondary Chemistry.</p>
	RO	<p>CAUTION: The load, hydrogen pressure and power factor limits per the Unit One Revised Data Book Figure 43 shall NOT be exceeded.</p>
		END EVENT

Op-Test No. _____ NRC Scenario No. 3 Event No. 2 1 Page(s)

Event Description: FWST level channel 1 fails low (3.3.2)

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a SRO TECH SPEC event only.
		OP/1/B/6100/010J (Annunciator Response For Panel 1AD-09) B/8 - FWST AT MAKEUP LEVEL C/8 - FWST LO LEVEL E/8 - FWST LO-LO LEVEL
		EXAMINER NOTE: Actions are for C/8.
		Immediate Actions
	BOP	Verify low level by checking against the other channels.
		Supplemental Actions
	BOP	1. IF low level due to leak OR failure of related piping, isolate if possible.
	BOP	2. IF low level due to leak AND level CANNOT be maintained, refer to Catawba Tech 3.5.4, SLC 16.9-11 and SLC 16.9-12 for operability.
	BOP	3. Refer to OP/1/A/6200/014 (Refueling Water System) for makeup.
		EXAMINER NOTE: Tech Spec 3.3.2 (7.b), Condition N applies,
	SRO	4. IF a channel failure has occurred, perform the following: 4.1 Refer to Tech Spec 3.3.2 for minimum operable channel requirements. 4.2 Issue the appropriate Model W/Os to have IAE provide emergency repairs on the affected channel(s): <ul style="list-style-type: none"> • 98615487 - 1FW LT5000: Repair CH 1 FWST Level • 98615489 - 1FW LT5010: Repair CH 2 FWST Level • 98615490 - 1FW LT5120: Repair CH 3 FWST Level • 98615491 - 1FW LT5130: Repair CH 4 FWST Level 4.3 Initiate a work request to have the channel repaired.
		END EVENT

Op-Test No. _____ NRC Scenario No. 3 Event No. 3 6 Page(s)

Event Description: Generator breaker opens, auto runback fails, boration

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event for the RO using AP/1/A/5500/003 (Load Rejection) and a REACTIVITY event for the BOP using OP/1/A/6150/009 (Boron Concentration Control).
		AP/1/A/5000/003 (Load Rejection) Case I (Switchyard Available) steps
	RO	1. Verify turbine load - DECREASING IN AUTOMATIC.
	RO	1RNO Perform the following: <ul style="list-style-type: none"> a. Select "MANUAL" on turbine control panel. b. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load as required.
	RO	2. Verify proper reactor response: <ul style="list-style-type: none"> • Control rods - IN "AUTO" AND STEPPING IN • P/R neutron flux - DECREASING.
	RO	3. Verify proper steam dump operation as follows: <ul style="list-style-type: none"> a. Verify T-Ref instrumentation - AVAILABLE. b. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT. c. Verify the following: <ul style="list-style-type: none"> • "C-7A LOSS OF LOAD INTLK COND DUMP" status light (1SI-18) - LIT. • Steam dump valves - MODULATING. d. T-Avg - DECREASING TO T-REF.
	BOP	4. Verify Pzr PORV and Pzr spray valve status as follows: <ul style="list-style-type: none"> a. All Pzr PORVs - CLOSED. b. Normal Pzr spray valves - CLOSED.
	BOP	5. Verify proper CM System operation as follows: <ul style="list-style-type: none"> a. WHEN reactor power is less than 75% THEN ensure both C-htr drain pumps - OFF. b. Verify reactor power - GREATER THAN 56% PRIOR TO THE EVENT.
		EXAMINER NOTE: They may start hotwell and condensate booster pumps but it should be optional in this case and based on judgment.
	BOP	5c. Verify standby hotwell pump(s) - ON.
	BOP	5cRNO. Manually start standby hotwell pump(s) as necessary.
	BOP	5d. Verify standby condensate booster pump(s) - ON.
	BOP	5dRNO. Manually start standby condensate booster pump(s) as necessary.
	BOP	6. Verify the following generator alarms <ul style="list-style-type: none"> • 1AD-11, C/1 "GEN BKR A OVERCURRENT" • 1AD-11, F/1 "GEN BKR B OVERCURRENT".
	RO	7. Verify S/G levels are adequate as follows: <ul style="list-style-type: none"> • All S/G low level alert alarms (1AD-4) - DARK • All S/G low CF flow alarms (1AD-4) - DARK.

Op-Test No. _____ NRC Scenario No. 3 Event No. 3 6 Page(s)

Event Description: Generator breaker opens, auto runback fails, boration

Time	Position	Applicant's Actions or Behavior
	RO	7RNO Perform the following: a. Ensure feedwater regulating valves - MODULATING TO CONTROL S/G LEVELS AT PROGRAM SETPOINT. b. IF any S/G(s) N/R level is decreasing in an uncontrolled manner, THEN: 1) Trip reactor. 2) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
	RO	8. Verify reactor power - GREATER THAN 20%.
	RO	9. IF AT ANY TIME reactor power is less than or equal to 20%, THEN perform Step 8 RNO.
	BOP	10. Verify AS header pressure - GREATER THAN OR EQUAL TO 140 PSIG.
	RO	11. Adjust 1TL-4 (Stm Seal Reg Byp) as necessary to maintain steam seal pressure between 4 PSIG - 6 PSIG.
	RO	12. Monitor Enclosure 3 (Rod Insertion Limit Boration).
		EXAMINER NOTE: These steps are listed after step 28 of this AP.
	RO	13. Verify reactor power - LESS THAN 30%.
	RO	13RNO Perform the following: a. IF the runback target load is less than 30%, THEN: ... b. WHEN the appropriate runback target load is reached, THEN: 1) Stabilize unit at current power level. 2) Maintain control rods above insertion limits. 3) Adjust the following as required to maintain T-Avg within 1°F of T-Ref: • Turbine load • Control rods • Boron concentration. c. GO TO Step 15.
	BOP	15. Verify the following PCBs - CLOSED: • Generator breaker 1A • Generator breaker 1B • PCB 14 • PCB 15 • PCB 17 • PCB 18.
	BOP	NOTE When separated from the grid the turbine reverts to speed control. 15 RNO Perform the following: a. IF both generator PCBs are open, THEN... b. IF the turbine generator is separated from the grid, THEN... c. IF load rejection caused by loss of main busline 1A or 1B, THEN...
	RO	16. Adjust power factor as necessary. REFER TO Unit 1 Revised Data Book Figure 43.

Op-Test No. _____ NRC Scenario No. 3 Event No. 3 6 Page(s)

Event Description: Generator breaker opens, auto runback fails, boration

Time	Position	Applicant's Actions or Behavior
	RO	17. WHEN the appropriate runback target load is reached, THEN: <ul style="list-style-type: none"> • Stabilize unit at appropriate power level. • Maintain control rods above insertion limits. • Adjust the following as required to maintain T-Avg within 1°F of T-Ref: <ul style="list-style-type: none"> ○ Turbine load ○ Control rods ○ Boron concentration.
	RO	18. Notify System Operating Center (SOC) using the red dispatcher telephone of current unit status.
	ALL	19. Determine and correct cause of load rejection.
	BOP	20. Shut down unnecessary plant equipment as follows: a. Restore CM and CF as follows: 1) Verify C-htr drain pumps - ON.
	BOP	20a1)RNO 1) WHEN time and manpower permit, THEN complete the shutdown of the C-htr drain pumps. REFER TO OP/1/B/6250/004 (Feedwater Heater Vents, Drains and Bleed System).
	BOP	20a 2) Verify both CF Pumps - IN SERVICE. 3) Shutdown one CF pump as necessary. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System). 4) Shutdown excess Condensate Booster Pumps. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System). 5) Shutdown excess Hotwell Pumps. REFER TO OP/1/A/6250/001 (Condensate and Feedwater System). b. RC pump(s) and cooling tower fans. REFER TO OP/1/B/6400/001A (Condenser Circulating Water System).
	RO	21. Reset steam dump valves as follows: a. Verify reactor power - STABLE. b. Verify steam dump valves - IN "T-AVG" MODE. c. Verify steam dump valves - CLOSED. d. Reset steam dump valves. e. Verify the following status lights (1SI-18) - DARK: <ul style="list-style-type: none"> • "C-7A LOSS OF LOAD INTLK COND DUMP" • "C-7B LOSS OF LOAD INTLK ATMOS DUMP" f. IF "T-AVG" mode of operation is available, THEN ensure steam dump valves in "T-AVG" mode. g. Verify "STM DUMP CTRL" - IN AUTOMATIC.
	RO	22. Verify reactor power - GREATER THAN 15%.
	BOP	23. Verify CA pumps - OFF.
	RO	24. Verify reactor power change - GREATER THAN OR EQUAL TO 15% IN A 1 HOUR PERIOD.

Op-Test No. _____ NRC Scenario No. 3 Event No. 3 6 Page(s)

Event Description: Generator breaker opens, auto runback fails, boration

Time	Position	Applicant's Actions or Behavior
	BOP	25. Notify the following sections to take appropriate samples: <ul style="list-style-type: none"> • Radiation Protection to sample and analyze gaseous effluents. REFER TO Selected Licensee Commitments Manual, Section 16.11-6. • Primary Chemistry to sample for isotopic analysis of iodine. REFER TO Tech Specs 3.4.16 (Sample must be taken between 2 hours and 6 hours following last power change greater than or equal to 15% rated thermal power within a 1 hour period).
		EXAMINER NOTE: No Technical Specifications apply.
	SRO	26. Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.1.1 (Shutdown Margin (SDM)) • 3.1.6 (Control Bank Insertion Limits) • 3.8.1 (AC Sources - Operating).
	BOP	27. Notify Reactor Group Engineer of occurrence.
	SRO	28. Determine long term plant status. RETURN TO OP/1/A/6100/003 (Controlling Procedure For Unit Operation).
		AP/1/A/5500/003, Enclosure 3 steps
	BOP	1 IF the control rods cannot be maintained above the rod insertion limits, THEN: <p>a. Stop any dilutions in progress.</p> <p>CAUTION Failure to initiate boration within one hour of exceeding rod insertion limits may violate Tech Spec 3.1.6.</p> <p>NOTE OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) and R.O.D Book (Section 2.2) provide rod insertion limit indication.</p> <p>b. Borate NC system as required, to restore rods above insertion limits.</p> <p>c. Ensure compliance with Tech Spec 3.1.6 (Control Bank Insertion Limits).</p>
		EXAMINER NOTE: This is the BOP portion of the event.
		OP/1/A/6150/009 (Boron Concentration Control) Enclosure 4.2 (Boration) steps
	BOP	1.1 Review the Limits and Precautions.
	BOP	1.2 IF in Mode 1 or 2 AND boration is being performed for normal temperature control, ensure R3 reactivity management controls established per SOMP 01-02 (Reactivity Management). (R.M.)
	BOP	1.3 IF in Mode 1 or 2 AND boration is being performed as part of a power change, ensure R2 reactivity management controls established per SOMP 01-02 (Reactivity Management). (R.M.)
	BOP	1.4 Verify the NV System is in operation per OP/1/A/6200/001 (Chemical and Volume Control System).
	BOP	1.5 Verify sufficient RHT volume is available to receive the reactor coolant displaced during the planned boration operation.
	BOP	NOTE: This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of NSD 304 (Reactivity Management). (R.M.)

Op-Test No. _____ NRC Scenario No. 3 Event No. 3 6 Page(s)

Event Description: Generator breaker opens, auto runback fails, boration

Time	Position	Applicant's Actions or Behavior
	BOP	2.1 Ensure valves are aligned per Enclosure 4.8 (Valve Checklist).
	BOP	2.2 Ensure the following valve control switches in "AUTO": 1NV-238A (B/A Xfer Pmp To Blender Ctrl) 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	2.3 Ensure 1NV-238A (B/A Xfer Pmp To Blender Ctrl) controller in "AUTO".
	BOP	2.4 Ensure at least one boric acid transfer pump is in "AUTO" or "ON".
	BOP	2.5 Adjust the boric acid batch counter to the desired volume of boric acid to be added. (R.M.)
	BOP	2.6 IF the blender is set up for automatic makeup per Enclosure 4.1 (Automatic Makeup), record the setting of the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl).
	BOP	2.7 Place the "NC MAKEUP MODE SELECT" switch in "BORATE".
	BOP	NOTE: Boric Acid flow rates > 32 gpm (controller pot setting of 8) may result in a boric acid flow deviation annunciator.
	BOP	2.8 Adjust the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) to the desired flow.
	BOP	NOTE: If necessary, boration can be manually secured at any time by placing the "NC MAKEUP CONTROL" switch to the "STOP" position.
	BOP	2.9 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)
	BOP	2.10 Verify the following valves open: 1NV-238A (B/A Xfer Pmp To Blender Ctrl) 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	2.11 IF in "AUTO", verify the boric acid transfer pump starts.
	BOP	NOTE: The total makeup flow totalizer is inaccurate at low flow rates.
	BOP	2.12 Verify proper flow by observing the boric acid flow totalizer. {PIP 96-0137}
	BOP	2.13 WHEN the desired volume of boric acid is reached on the boric acid batch counter, ensure the following valves close: (R.M.) 1NV-238A (B/A Xfer Pmp To Blender Ctrl) 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	NOTE: If additional borations will be performed over the course of the shift, flushing the makeup line is NOT recommended. 2.14 IF desired, flush the makeup line as follows: ...
	BOP	2.15 IF automatic makeup is desired, perform one of the following: 2.15.1 IF it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup). OR 2.15.2 IF makeup at the previous concentration is acceptable AND the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following: 2.15.2.1 Ensure the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) is set to the value recorded in Step 2.6. (R.M.) 2.15.2.2 Place the "NC MAKEUP MODE SELECT" switch in "AUTO". 2.15.2.3 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

Op-Test No. _____ NRC Scenario No. 3 Event No. 3 6 Page(s)

Event Description: Generator breaker opens, auto runback fails, boration

Time	Position	Applicant's Actions or Behavior
		END EVENT

Op-Test No. _____ NRC Scenario No. <u>3</u> Event No. <u>4</u> 5 Page(s)		
Event Description: Respond to EMF33 failed high		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using OP/1/B/6100/010X (Annunciator Response for Radiation Monitoring Panel 1RAD-1 (B/1) and an SRO Tech Spec event.
		ARP IMMEDIATE ACTIONS
	BOP	1. Verify that automatic actions occur by checking computer points C1A0968 through A0971 (S/G 1A through 1D Blowdown Flow) The following valves close: <ul style="list-style-type: none"> • 1NM-267 (S/G Smpl Hdr Rad Monitor Inlet Isol) (SRVOP) • 1NM-269 (S/G A Smpl Hdr To Conv Smpl Sink) (CSP) • 1NM-270 (S/G B Smpl Hdr To Conv Smpl Sink) (CSP) • 1NM-271 (S/G C Smpl Hdr To Conv Smpl Sink) (CSP) • 1NM-272 (S/G D Smpl Hdr To Conv Smpl Sink) (CSP) • 1BB-27 (BB Tank Vent To Atmos) (1MC4) • 1BB-48 (BB Pumps Disch To TB Smp) (1MC4) • 1BB-69 (S/G A Blowdown Flow Ctrl) (1MC4) • 1BB-73 (S/G B Blowdown Flow Ctrl) (1MC4) • 1BB-24 (S/G C Blowdown Flow Ctrl) (1MC4) • 1BB-65 (S/G D Blowdown Flow Ctrl) (1MC4)
	BOP	2. Ensure blowdown flow controllers are set to 0 flow: “S/G A BLDWN FLOW CTRL” (1MC4) “S/G B BLDWN FLOW CTRL” (1MC4) “S/G C BLDWN FLOW CTRL” (1MC4) “S/G D BLDWN FLOW CTRL” (1MC4) EXAMINER NOTE: “S/G C BLDWN FLOW CTRL” must be manually closed.
	BOP	3. Contact Primary Chemistry to ensure the following valves are closed: <ul style="list-style-type: none"> • 1NM-267 (S/G Smpl Hdr Rad Monitor Inlet Isol) (Sample Room Valve Operating Panel, 1TBOX0132, located outside Unit 1 NM Lab) • 1NM-269 (S/G A Smpl Hdr To Conv Smpl Sink) (CSP) • 1NM-270 (S/G B Smpl Hdr To Conv Smpl Sink) (CSP) • 1NM-271 (S/G C Smpl Hdr To Conv Smpl Sink) (CSP) • 1NM-272 (S/G D Smpl Hdr To Conv Smpl Sink) (CSP)
	BOP	4. Select “AUTO” on “UNIT 1 CSAE EXH” switch (1MC13)
	BOP	5. Verify “VA” indicating light is lit (1MC13)
	BOP	6. IF “VA” indicating light is dark, verify one of the following: <ul style="list-style-type: none"> • ABFXF-1A on • 1ABF-D-11 (AB-594, KK-54) open OR • ABFXF-1B on • 1ABF-D-4 (AB-594, KK-54) open
		ARP SUPPLEMENTAL ACTIONS
	SRO	1. Refer to AP/1/A/5500/10 (Reactor Coolant Leak).

Op-Test No. _____ NRC Scenario No. 3 Event No. 4 5 Page(s)

Event Description: Respond to EMF33 failed high

Time	Position	Applicant's Actions or Behavior
	BOP	2. Notify Secondary Chemistry and Radiation Protection of this alarm.
	SRO	3. Refer to Tech Spec 3.4.13 for limitation on S/G tube leakage.
	SRO	4. Refer to Tech Spec 3.7.17 for limits on secondary system activity levels
	BOP	5. Refer to OP/1/A/6250/008 (Steam Generator Blowdown) for continued operation with high activity.
	BOP	NOTE: Operation with ZJ exhausting to the VA system filters should be minimized. 6. Notify RP to sample ZJ exhaust for Iodine.
	BOP	7. IF Iodine is NOT detected in the ZJ exhaust, perform the following: 7.1 Return "UNIT 1 CSAE EXH" switch to "UNIT VENT". 7.2 Verify "UNIT VENT" indicating light is lit.
	SRO	SRO REFERS to AP/1/A/5500/010 (Reactor Coolant Leak), Case 1 (Steam Generator Tube Leak).
		EXAMINER NOTE: AP/1/A/5500/010 is entered until it can be determined that EMF33 indications are false.
	ALL	1. Monitor Enclosure 1 (Case I Steam Generator Tube Leak Foldout Page).
	BOP	2. Verify Pzr level – STABLE OR INCREASING.
	ALL	3. IF AT ANY TIME Pzr level decreases in an uncontrolled manner or cannot be maintained greater than 4%, THEN perform Step 2.

Op-Test No. _____ NRC Scenario No. 3 Event No. 4 5 Page(s)

Event Description: Respond to EMF33 failed high

Time	Position	Applicant's Actions or Behavior
	ALL	<p>NOTE In subsequent steps the term "affected S/G" is a S/G with primary to secondary leakage.</p> <p>4. Identify the affected S/G(s) as follows:</p> <ul style="list-style-type: none"> • Notify RP to frisk all cation columns. OR • Any S/G N/R level – INCREASING IN AN UNCONTROLLED MANNER. OR <p>NOTE The S/G Leakage EMFs are highly sensitive which may cause the EMFs located on the adjacent steamline to be increasing or in alarm.</p> <ul style="list-style-type: none"> • Verify any of the following S/G leakage EMF indication(s) – INCREASING OR IN ALARM: <ul style="list-style-type: none"> ○ 1EMF-71 (S/G A Leakage) ○ 1EMF-72 (S/G B Leakage) ○ 1EMF-73 (S/G C Leakage) ○ 1EMF-74 (S/G D Leakage). OR • Verify any of the following S/G steamline EMF indication(s) – INCREASING OR IN ALARM: <ul style="list-style-type: none"> ○ 1EMF-26 (Steamline 1A) ○ 1EMF-27 (Steamline 1B) ○ 1EMF-28 (Steamline 1C) ○ 1EMF-29 (Steamline 1D). OR • Verify CF flow – LOWER TO ANY S/G AS COMPARED TO OTHERS. OR • Notify Secondary Chemistry to determine affected S/G by sampling.
	BOP	<p>5. Verify VCT level able to be maintained by normal makeup as follows:</p> <p>a. One of the following conditions exists:</p> <ul style="list-style-type: none"> • S/G tube leak is less than 90 gpm. OR • Automatic makeup stabilizes or increases VCT level. OR • Manual makeup stabilizes or increases VCT level. <p>b. IF AT ANY TIME the following conditions exist:</p> <ul style="list-style-type: none"> • 1AD-7, I/1 "VCT LO LVL" alarm is lit AND • Reactor trip breakers are closed. <p>THEN perform Step 5.a RNO.</p>

Op-Test No. _____ NRC Scenario No. 3 Event No. 4 5 Page(s)

Event Description: Respond to EMF33 failed high

Time	Position	Applicant's Actions or Behavior
	BOP	6. Minimize Secondary contamination as follows: a. Remove CM polishing demineralizers from service as follows: 1) Ensure "POLSH DEMIN BYP CTRL" – PLACED IN MANUAL. 2) Ensure "POLSH DEMIN BYP CTRL" – OPEN. 3) Notify Secondary Chemistry CM polishing demineralizers have been bypassed. b. Align auxiliary systems to minimize secondary side contamination as follows: 1) Transfer turbine steam supply to AS as follows: a) Open 1TL-8 (Aux Stm To Stm Seal Reg). b) Close 1TL-2 (Main Stm To Stm Seal Reg). 2) Dispatch operator(s) to align auxiliary systems. REFER TO Enclosure 5 (Auxiliary System Alignment). c. Stop any transfer of water between both Unit's CSTs.
		EXAMINER NOTE: At this time RP will call back and report no activity noted on any cation columns.
	ALL	7. Determine S/G leak rate by any of the following methods: • Monitor the following computer points: ○ C1P0187 (Estimated Total Pri To Sec Leakrate) ○ C1P0189 (Pri To Sec Leakrate 15 Min Running Avg) ○ EROSLEAK (Primary To Secondary Leakage). OR NOTE The S/G Leakage EMFs are highly sensitive which may cause the EMFs located on the adjacent steamline to be increasing or in alarm. • S/G leakage EMF indication(s): ○ 1EMF-71 (S/G A Leakage) ○ 1EMF-72 (S/G B Leakage) ○ 1EMF-73 (S/G C Leakage) ○ 1EMF-74 (S/G D Leakage). OR • Compare charging flow and letdown flow OR • Monitor OAC NV Graphic OR • Initiate OAC Program "NSNCLEAK" OR • Monitor OAC point C1P0976 (Gross NC System Leak Rate, Ten Min Run Avg). OR • Secondary Chemistry performance of PT/1/B/4600/028 (Determination of Steam Generator Tube Leak For Unit 1).

Op-Test No. _____ NRC Scenario No. <u> 3 </u> Event No. <u> 4 </u> 5 Page(s)		
Event Description: Respond to EMF33 failed high		
Time	Position	Applicant's Actions or Behavior
	SRO	8. Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual: <ul style="list-style-type: none"> • 3.4.13 (RCS Operational Leakage) • 3.4.14 (RCS Pressure Isolation Valve (PIV) Leakage) • 3.5.5 (Seal Injection Flow) • 3.7.17 (Secondary Specific Activity) • SLC 16.7-9 (Standby Shutdown System).
	SRO	Should note that SLC 16.11-7 #2 Condition A1k applies due to failed EMF33 once confirmation is received.
		END EVENT

Op-Test No. _____		NRC Scenario No. <u> 3 </u>	Event No. <u> 5 </u>	5 Page(s)
Event Description: 1ETA normal feeder opens, restore charging				
Time	Position	Applicant's Actions or Behavior		
		EXAMINER NOTE: This is a COMPONENT event for the BOP using AP/1/A/5500/007 (Loss of Normal Power) Case 1, Loss of All Power to an Essential Train.		
	ALL	1. Monitor Enclosure 1 (Foldout Page).		
	BOP	2. Verify affected bus - ENERGIZED.		
		EXAMINER NOTE: Bus will only be energized for 1 minute and then the D/G will trip resulting in a loss of all power to ETA.		
	SRO	2RNO GO TO Case II (Loss of All Power to an Essential Train).		
	SRO	Transition to Case 2.		
	ALL	1. Monitor Enclosure 1 (Foldout Page).		
	BOP	2. Verify the essential loads powered from energized train as follows: a. RN pump(s) - IN SERVICE AS NEEDED. b. KC pump(s) - IN SERVICE AS NEEDED. c. At least one NV pump - ON.		
		EXAMINER NOTE: SRO will refer to AP/1/A/5500/012 (Loss of Charging or Letdown) to restore charging at some point. The following steps are for AP/07 and the steps for AP/12 follow.		
	BOP	2 d. CA pump - ON.		
	BOP	2dRNO IF CA pump is required to maintain S/G levels, THEN manually start pump.		
	BOP	e. VC/YC chiller - ON.		
	BOP	3. Verify CA Pump #1 - ON.		
	RO	4. Maintain reactor power less than or equal to 100%.		
	BOP	5. Verify D/G on the affected bus - RUNNING.		
	SRO	5RNO GO TO Step 7.		
	BOP	7. Dispatch operator with a screwdriver to load shed the affected essential bus as follows: • REFER TO Enclosure 8 (Manual Load Shed Of 1ETA)		
	BOP	8. Verify operating RN pump(s) flow - LESS THAN 23,000 GPM.		
	BOP	9. Stop any dilutions in progress.		
	BOP	10. Verify S/I status as follows: a. S/I - HAS ACTUATED. b. GO TO Step 12.		
	BOP	12. Ensure CA System - RESET.		

Op-Test No. _____ NRC Scenario No. <u>3</u> Event No. <u>5</u> 5 Page(s)		
Event Description: 1ETA normal feeder opens, restore charging		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>13. Control S/G levels as follows: a. Verify CF flow - MAINTAINING STABLE S/G LEVELS. b. IF AT ANY TIME CF flow control to S/Gs is lost, THEN perform Step 13.</p> <p>CAUTION Battery depletion may occur as early as two hours. Battery depletion results in affected CA control valves failing full open. Failure to take local control of S/G level prior to battery depletion may result in S/G overflow.</p> <p>c. IF AT ANY TIME any vital or auxiliary control channel battery charger has been de-energized for greater than 1 hour, THEN dispatch operators to locally control affected CA flow path. REFER TO Enclosure 16 (S/G Level Control).</p>
	RO	14. Verify "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT.
	BOP	<p>15. Control charging as follows: a. Maintain charging flow less than 180 GPM. b. Adjust charging flow as necessary to maintain Pzr level in program band.</p>
	BOP	<p>16. Control letdown as follows: a. Verify normal letdown - IN SERVICE.</p>
	BOP	<p>16aRNO. Perform the following: 1) Attempt to restore letdown. REFER TO AP/1/A/5500/012 (Loss of Charging or Letdown). 2) WHEN normal letdown has been established, THEN place additional letdown orifice in service as necessary to control Pzr level. 3) GO TO Step 17.</p>
	BOP	17. Determine and correct cause of blackout.
	BOP	18. Verify VI pressure - GREATER THAN 85 PSIG AND STABLE.
	BOP	19. IF spent fuel pool instrumentation is failed low, THEN dispatch operator to monitor spent fuel pool conditions. REFER TO Enclosure 14 (Spent Fuel Pool Monitoring).
		EXAMINER NOTE: Tech Spec 3.8.1 Condition A, B and D, 3.8.9 Condition A and 3.4.9 Condition B apply.
	SRO	<p>20. Ensure compliance with appropriate Tech Specs:</p> <ul style="list-style-type: none"> • 3.4.9 (Pressurizer) • 3.8.1 (AC Sources - Operating) • 3.8.2 (AC Sources - Shutdown) • 3.8.4 (DC Sources - Operating) • 3.8.5 (DC Sources - Shutdown) • 3.8.7 (Inverters - Operating) • 3.8.8 (Inverters - Shutdown) • 3.8.9 (Distribution Systems - Operating) • 3.8.10 (Distribution Systems - Shutdown).
		EXAMINER NOTE: No notifications required at this time.

Op-Test No. _____ NRC Scenario No. 3 Event No. 5 5 Page(s)

Event Description: 1ETA normal feeder opens, restore charging

Time	Position	Applicant's Actions or Behavior
	SRO	21. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	BOP	22. Verify 6.9KV busses - ENERGIZED.
	SRO	23. Do not continue in this procedure until the following are satisfied: <ul style="list-style-type: none"> • The status of all lockout targets have been determined • Station management has approved power restoration to the affected bus.
		AP/1/A/5500/012 (Loss of Charging or Letdown), Case 1 Loss of Charging actions
	RO	1. Stop any power changes.
	BOP	2. Ensure the following letdown isolation valves - CLOSED: <ul style="list-style-type: none"> • 1NV-10A (Letdn Orif 1B Otlf Cont Isol) • 1NV-11A (Letdn Orif 1C Otlf Cont Isol) • 1NV-13A (Letdn Orif 1A Otlf Cont Isol).
	BOP	3. Monitor conditions for continued NC pump operation as follows: <ul style="list-style-type: none"> • NC pump #1 seal outlet temperature - LESS THAN 235°F • NC pump lower bearing temperature - LESS THAN 225°F.
	BOP	NOTE Gas entrainment in the NV pump suction can produce pump failure or degradation. Gas entrainment can result in a complete loss of charging, or in a reduction of charging capacity, without indication of cavitation. 4. Verify NV pump status as follows: <ul style="list-style-type: none"> • At least one NV pump - ON. • Charging flow - ADEQUATE FOR PLANT CONDITIONS.

Op-Test No. _____ NRC Scenario No. 3 Event No. 5 5 Page(s)

Event Description: 1ETA normal feeder opens, restore charging

Time	Position	Applicant's Actions or Behavior
	BOP	4RNO Perform the following: a. Ensure malfunctioning NV pump - SECURED. b. Ensure the following valves - OPEN: <ul style="list-style-type: none"> • 1NV-203A (NV Pumps A&B Recirc Isol) • 1NV-202B (NV Pmps A&B Recirc Isol). c. Ensure only one suction source as follows: <ul style="list-style-type: none"> • VCT <ul style="list-style-type: none"> ○ 1NV-188A (VCT Otlt Isol) - OPEN ○ 1NV-189B (VCT Otlt Isol) - OPEN ○ VCT level - GREATER THAN 23% ○ 1NV-252A (NV Pumps Suct From FWST) - CLOSED ○ 1NV-253B (NV Pumps Suct From FWST) – CLOSED OR • FWST <ul style="list-style-type: none"> ○ Either of the following valves - OPEN: <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). ○ Either of the following valves - CLOSED: <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). d. IF operating NV pump tripped due to loss of suction, THEN... e. Start the available NV pump as follows: <ol style="list-style-type: none"> 1) Manually open 1NV-309 (Seal Water Injection Flow) to full open. 2) Manually close 1NV-294 (NV Pmps A&B Disch Flow Ctrl). 3) Start NV pump aux oil pump. 4) Start available NV pump. 5) Stop NV pump aux oil pump. 6) IF suction is from the FWST, THEN... f. IF no NV pump(s) available, THEN...
	BOP	5. Verify charging header is aligned to NC loop as follows: a. 1NV-312A (Chrg Line Cont Isol) - OPEN. b. 1NV-314B (Chrg Line Cont Isol) - OPEN. c. Verify one of the following valves - OPEN: <ul style="list-style-type: none"> ○ 1NV-32B (NV Supply To Loop A Isol) OR <ul style="list-style-type: none"> ○ 1NV-39A (NV Supply To Loop D Isol). d. Verify 1NV-294 (NV Pmps A&B Disch Flow Ctrl) - OPEN.
	BOP	5dRNO d. Perform the following: <ol style="list-style-type: none"> 1) Manually open 1NV-309 (Seal Water Injection Flow). 2) Throttle 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to establish greater than 32 GPM "N/R CHR G LN FLOW".
	BOP	6. Verify the following: <ul style="list-style-type: none"> ○ "TOTAL SEAL WTR FLOW" - GREATER THAN 32 GPM ○ 1NV-309 (Seal Water Injection Flow) – IN "AUTO".

Op-Test No. _____ NRC Scenario No. 3 Event No. 5 5 Page(s)

Event Description: 1ETA normal feeder opens, restore charging

Time	Position	Applicant's Actions or Behavior
	BOP	6RNO Perform the following: a. Slowly throttle 1NV-309 (Seal Water Injection Flow) to establish 32 GPM "TOTAL SEAL WTR FLOW". b. Place 1NV-309 in "AUTO".
	BOP	7. Verify Pzr level - GREATER THAN 17%.
	BOP	8. Control charging to stabilize Pzr level greater than 17%.
	BOP	9. Ensure "PZR HTR GROUP 1C" - ON.
	BOP	10. Control VCT level as follows: a. Verify NC system makeup - SET DESIRED BORON CONCENTRATION. b. Verify "NC MAKEUP MODE SELECT" - IN AUTOMATIC
	BOP	11. Verify normal letdown - IN SERVICE.
	SRO	11RNO Restore normal letdown. REFER TO Case II (Loss of Letdown).
		EXAMINER NOTE: Restoration of letdown is part of another submitted scenario and should not be done per this scenario.
		END EVENT

Op-Test No. _____ NRC Scenario No. 3 Event No. 6 1 Page(s)

Event Description: 1B S/G level program fails low

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is an INSTRUMENT event for the BOP using OP/1/B/6100/010E (Annunciator Response for Panel 1AD-4) (C/2 – S/G B FLOW MISMATCH LO CF FLOW)
		NOTE: SM flow channel 2 shares a reference tap with channel 2 of S/G narrow range level indication. SM flow channel 1 shares a reference tap with S/G wide range level indication. A failure on one of these level taps will affect the SM flow channel. Other indication of SM flow should be used to determine if it is an instrument failure.
		IMMEDIATE ACTIONS
	RO	1. Compare all flow indication to verify condition.
	RO	2. IF automatic controls are NOT correcting, take manual control.
		SUPPLEMENTAL ACTIONS
	RO	1. WHEN malfunction is corrected OR bypassed, restore control to automatic.
		EXAMINER NOTE: No technical specification conditions.
	SRO	2. Refer to Tech Specs for operable channel requirements (TS 3.3.1, 3.3.2, 3.3.3 and 3.3.4).
		END EVENT

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is the MAJOR event starting with AP/1/A/5500/011 (Pressurizer Pressure Anomalies)
	BOP	1. Verify all Pzr pressure channels - INDICATING THE SAME.
	BOP	2. Verify all Pzr PORVs - CLOSED.
	RO/BOP	2RNO Perform the following: a. Manually close Pzr PORV(s). b. IF any Pzr PORV cannot be closed, THEN: 1) Close the affected PORV(s) isolation valve. 2) IF the Pzr PORV isolation valve cannot be closed, THEN perform the following: a) IF in Mode 3 or 4 AND CLAs isolated, THEN GO TO AP/1/A/5500/027 (Shutdown LOCA). b) Trip reactor. c) Manually initiate S/I. d) GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).
	SRO	Transition to E-0 (reactor Trip or Safety Injection)
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	RO	2. Verify Reactor Trip: • All rod bottom lights - LIT • All reactor trip and bypass breakers - • I/R amps - DECREASING.
	RO	3. Verify Turbine Trip: • All turbine stop valves – CLOSED
	BOP	4. Verify 1ETA and 1ETB - ENERGIZED.
	BOP	4RNO Perform the following: a. IF 1ETA AND 1ETB are de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss Of All AC Power). b. WHEN time allows, THEN attempt to restore power to de-energized switchgear while continuing with this procedure. REFER TO AP/1/A/5500/007 (Loss of Normal Power).
	BOP	5. Verify S/I is actuated: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT. b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.
	RO	6. Announce "Unit 1 Safety Injection".
		EXAMINER NOTE: This will be a 4.1.A.1 (Alert)
	SRO	7. Determine required notifications: • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	RO	8. Verify all Feedwater Isolation status lights (1SI-5) – LIT.
	BOP	9. Verify Phase A Containment Isolation status as follows: a. Phase A "RESET" lights – DARK. b. Monitor Light Panel Group 5 St lights – LIT.

Op-Test No. _____	NRC Scenario No. <u>3</u>	Event No. <u>7</u>	8 Page(s)
Event Description: NC PORV fails open – medium break LOCA			
Time	Position	Applicant's Actions or Behavior	
	BOP	10 Verify proper Phase B actuation as follows: a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG. b. IF AT ANY TIME containment pressure exceeds 3 PSIG while in this procedure, THEN perform Step 10.a.	
	BOP	11 Verify proper CA pump status as follows: a. Motor driven CA pumps – ON. b. 3 S/G N/R levels – GREATER THAN 11%.	
		EXAMINER NOTE: Since crew is aware that there is no power on A train, they should state that when checking A train equipment, but not transition to RNO based on A train equipment alone. However they will transition for B train NI pump since it has power.	
	BOP	12 Verify all of the following S/I pumps - ON: • NV pumps • ND pumps • NI pumps.	
	BOP	12RNO Perform the following for affected train(s): a. Reset ECCS. b. Reset D/G load sequencer. c. Manually start affected pump. d. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.	
	BOP	13 Verify all KC pumps - ON.	
	BOP	14 Verify all Unit 1 and Unit 2 RN pumps - ON.	
		EXAMINER NOTE: BOP will find VA not aligned properly per Enclosure 2. Enclosure 2 steps are after step 22 and before E-1 steps.	
	BOP	15 Verify proper ventilation systems operation as follows: • REFER TO Enclosure 2 (Ventilation System Verification). • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification).	
	BOP	16 Verify all S/G pressures - GREATER THAN 775 PSIG.	
	BOP	17 Verify proper S/I flow as follows: a. "NV S/I FLOW" - INDICATING FLOW. b. NC pressure - LESS THAN 1620 PSIG. c. NI pumps - INDICATING FLOW. d. NC pressure - LESS THAN 285 PSIG.	
	BOP	17dRNO d. Perform the following: 1) Ensure ND pump miniflow valve on operating ND pump(s) - OPEN. 2) IF the ND pump miniflow valve(s) cannot be opened, THEN... 3) GO TO Step 18.	
	BOP	18 Control S/G levels as follows: a. Verify total CA flow - GREATER THAN 450 GPM. b. WHEN at least one S/G N/R level is greater than 11% (29% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.	

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	19 Verify all CA isolation valves - OPEN. EXAMINER NOTE: Some Equipment will not be in proper alignment but no action is available to place it in proper alignment due to loss of A train power.
	BOP	20 Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT. EXAMINER NOTE: A Train equipment will not be in proper alignment due to no power.
		20RNO Manually align equipment. EXAMINER NOTE: Enclosure 4 actions are after Enclosure 2 actions.
	RO	NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance. 21 Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).
	BOP	22 Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs - CLOSED.
	BOP	22aRNO a. IF Pzr pressure is less than 2315 PSIG, THEN: 1) Manually close Pzr PORV(s). 2) IF any Pzr PORV cannot be closed, THEN: a) Close its isolation valve. b) IF any Pzr PORV cannot be closed OR isolated, THEN perform the following: (1) IF both the following conditions exist, <ul style="list-style-type: none"> • Containment pressure - GREATER THAN 1 PSIG • Containment pressure - HAS REMAINED LESS THAN 3 PSIG THEN manually start one VX fan. REFER TO Enclosure 5 (VX Fan Manual Start). (2) Concurrently: <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).
E-0, Enclosure 2 steps		

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	1. Verify proper VC/YC operation as follows: a. Verify one train of the following equipment is in operation: <ul style="list-style-type: none"> • YC chiller • CR AHU-1 • CRA AHU-1 • CRA PFT-1. b. Verify the following alarms - DARK: <ul style="list-style-type: none"> • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B". c. Ensure the following VC dampers - OPEN: <ul style="list-style-type: none"> • 1VC-5B (CRA Filt Inlet) • 1VC-6A (CRA Filt Inlet) • 2VC-5B (CRA Filt Inlet) • 2VC-6A (CRA Filt Inlet). d. Repeat Step 1 of this enclosure until notified by station management as follows: <ul style="list-style-type: none"> • At least once every 8 hours OR • Any time VC/YC related annunciators on 1AD-18 actuate.
	BOP	2. Ensure proper VA System operation as follows: <ul style="list-style-type: none"> • Ensure the following fans - OFF: <ul style="list-style-type: none"> ○ ABUXF 1A ○ ABUXF 1B. • Ensure VA System filter is in service as follows: <ul style="list-style-type: none"> ○ 1ABF-D-12 (VA Filt A Bypass Damper) - CLOSED ○ 1ABF-D-5 (VA Filt B Bypass Damper) - CLOSED. • Ensure the following fans - ON: <ul style="list-style-type: none"> ○ ABFXF-1A ○ ABFXF 1B.
	BOP	3. Verify proper VE System operation as follows: a. VE fans - ON. b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC. c. Repeat Step 3.b every 30 minutes until notified by station management.
	BOP	4. Record time ventilation systems are verified on following table:
		Enclosure 4 actions
	RO	1. Verify at least one NC pump - ON.
	RO	2. Use NC T-Avg to determine NC temperature as required in subsequent steps.
	RO	3. IF AT ANY TIME NC pumps are tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
	RO	4. Verify one of the following: <ul style="list-style-type: none"> • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.
	RO	5. Continue to monitor NC temperature.
	SRO	Transition to EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant)
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	BOP	2. Verify main steamlines are intact as follows: <ul style="list-style-type: none"> • All S/G pressures - STABLE OR INCREASING • All S/Gs - PRESSURIZED.
	BOP	3. Control intact S/G levels as follows: <ol style="list-style-type: none"> a. Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC). b. Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%.
		EXAMINER NOTE: Crew should be aware that the EMF33 signal is false and not transition based on this indication with absence of any confirmatory indications.
	BOP	4. Verify secondary radiation is normal as follows: <ol style="list-style-type: none"> a. Ensure the following signals - RESET: <ol style="list-style-type: none"> 1) Phase A Containment Isolations 2) CA System valve control 3) KC NC NI NM St signals. b. Align all S/Gs for Chemistry sampling. c. Perform at least one of the following: <ul style="list-style-type: none"> • Notify Chemistry to sample all S/Gs for activity. OR • Notify RP to frisk all cation columns for activity. d. Verify the following EMF trip 1 lights - DARK: <ul style="list-style-type: none"> • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). e. WHEN activity results are reported, THEN verify all S/Gs indicate no activity.
	BOP	5. Verify Pzr PORV and isolation valve status as follows: <ol style="list-style-type: none"> a. Power to all Pzr PORV isolation valves AVAILABLE. b. All Pzr PORVs - CLOSED.
	BOP	5bRNO <ol style="list-style-type: none"> b. IF Pzr pressure is less than 2315 PSIG, THEN: <ol style="list-style-type: none"> 1) Manually close Pzr PORV(s). 2) IF any Pzr PORV cannot be closed, THEN close its isolation valve.

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	5c. At least one Pzr PORV isolation valve - OPEN. d. IF AT ANY TIME a Pzr PORV opens due to high pressure, THEN, after Pzr pressure decreases to less than 2315 PSIG, ensure the valve closes or is isolated.
	RO	6. Verify S/I termination criteria as follows: a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F.
	SRO	6aRNO. GO TO Step 6.f.
		EXAMINER NOTE: S/I termination criteria will not be met for this scenario.
	ALL	6f. Monitor S/I termination criteria. REFER TO Enclosure 2 (S/I Termination Criteria). g. IF AT ANY TIME S/I termination criteria is met while in this procedure, THEN RETURN TO Step 6.
	BOP	7. Verify proper NS pump operation as follows: a. At least one NS pump - ON.
	BOP	7aRNO a. Perform the following: 1) IF AT ANY TIME an NS pump(s) starts while in this procedure, THEN perform Step 7. 2) GO TO Step 8.
		EXAMINER NOTE: Power will already have been removed from the 1A sequencer per AP/07.
	BOP	8. Verify criteria to stop operating ND pumps as follows: a. NC pressure - GREATER THAN 285 PSIG. b. NC pressure - STABLE OR INCREASING. c. At least one ND pump - ON. d. ND pumps suction - ALIGNED TO FWST. e. Verify FWST level - GREATER THAN 45%. f. Ensure S/I - RESET: 1) ECCS. 2) D/G load sequencers. 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. g. Stop ND pumps. h. IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart ND pumps.
	RO	9. Verify NC and S/G pressures as follows: a. All S/G pressures - STABLE OR INCREASING. b. NC pressure - STABLE OR DECREASING.
	BOP	10. Verify conditions to stop operating D/Gs as follows: a. At least one D/G - ON. b. Verify 1ETA is energized by offsite power as follows: • "D/G 1A BKR TO ETA" - OPEN • 1ETA - ENERGIZED.

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	10bRNO b. Perform the following: 1) Attempt to restore offsite power to affected switchgear. REFER TO AP/1/A/5500/007 (Loss of Normal Power). 2) GO TO Step 10.d.
	BOP	d. Verify 1ETB is energized by offsite power as follows: <ul style="list-style-type: none"> • "D/G 1B BKR TO ETB" - OPEN • 1ETB - ENERGIZED. e. WHEN S/I is reset, THEN dispatch operator to stop 1B D/G and place in standby readiness. REFER TO OP/1/A/6350/002 (Diesel Generator Operation). f. Ensure S/I - RESET: <ol style="list-style-type: none"> 1) ECCS. 2) D/G load sequencers. 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
	BOP	11. Obtain containment H2 concentration as follows: <ol style="list-style-type: none"> a. Ensure operator has been dispatched to secure all ice condenser air handling units. REFER TO Enclosure 3 (Securing All Ice Condenser Air Handling Units). b. Verify containment H2 analyzers - IN SERVICE.
	BOP	11bRNO b. Perform the following: <ol style="list-style-type: none"> 1) Dispatch operator to place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control System). 2) WHEN H2 analyzers are in service, THEN perform Steps 11.c through 11.e. 3) GO TO Step 12.
		EXAMINER NOTE: Crew should determine that one train (B) is available for containment sump swapper and Cold Leg Recirc.

Op-Test No. _____ NRC Scenario No. 3 Event No. 7 8 Page(s)

Event Description: NC PORV fails open – medium break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	12. Initiate evaluation of plant status as follows: a. Verify S/I systems - ALIGNED FOR INJECTION MODE. b. Verify Cold Leg Recirc capability as follows: 1) At least one ND pump - AVAILABLE. 2) Verify power to all of the following valves - AVAILABLE: • 1FW-27A (ND Pump 1A Suct From FWST) • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1ND-28A (ND Supply To NV & 1A NI Pmps) • 1FW-55B (ND Pump 1B Suct From FWST) • 1NI-184B (ND Pump 1B Cont Sump Suct) • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND) • 1NI-334B (NI Pump Suct X-Over From ND) • 1NI-136B (ND Supply To NI Pump 1B). 3) Verify power to all of the following • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol) • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol). 4) Verify the "ENABLE" lights for the following switches - LIT: • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B". c. Verify auxiliary building radiation is normal as follows: • EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK • All area monitor EMF trip 1 lights - DARK. d. WHEN the TSC is activated AND staffed, THEN: 1) Notify the Reactor Engineer to assess core damage. REFER TO RP/0/A/5000/015 (Core Damage Assessment). 2) Notify Chemistry to obtain current NC boron concentration. 3) WHEN ND is aligned for Cold Leg Recirc, THEN notify Chemistry to obtain current containment sump boron concentration. 4) Notify Operating Engineer of the following: a) VA is required to be aligned to normal within 72 hours of the event. b) Evaluate aligning VA to normal mode. REFER TO OP/0/A/6450/003 (Auxiliary Building Ventilation System). e. Notify station management to evaluate starting additional plant equipment to assist in recovery.
	SRO	13. Verify NC System cooldown and depressurization is required as follows: a. NC pressure - GREATER THAN 285 PSIG. b. GO TO EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).
	SRO	Transition to EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization).
		END EVENT

2008 NRC EXAMINATION

Facility:	<u>Catawba Nuclear Station</u>	Scenario No.:	<u>4</u>	Op-Test No.:	
Examiners:	_____	Operators:	_____	_____	_____
	_____		_____	_____	_____
	_____		_____	_____	_____
<u>Initial Conditions:</u>					
<ul style="list-style-type: none"> • 100% power • EFPD = 450 days • Boron concentration is 112 ppm • DFCS channel 3 out of service to repair a tubing leak (loop 5142 – CF Header Pressure) - functional in progress • 1A CA pump out of service for PMs - expected back in 2 hours • 1A NI pump out of service for PMs - expected back in 4 hours • Thunderstorms are in the area. 					
<u>Turnover:</u>					
<ul style="list-style-type: none"> • Decrease power to 90% in preparation for performing PT/1/A/4250/002C (Turbine Control Valve Movement Test) on the next shift. 					
Event No.	Malf. No.	Event Type*	Event Description		
1	RO	R	Power decrease		
2	BOP SRO	C TS	PZR spray valve fails open, B heaters fail		
3	RO	C	Steam Dump valve fails open		
4	SRO	TS	NS pump 1A breaker fails		
5	BOP	I	KC surge tank level fails low		
6	BOP	C	1NV-148 fails full open in auto/manual control available		
7	RO	C	CFP trip/ T/G runback with rods fail to move		
8	ALL	M	Loss of all AC power/ Large Break LOCA <u>Additional failures</u> 1B CA pump fails to auto start 1NI10B and 1NI185B failed auto actions FWST Puncture		
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Op-Test No. _____ NRC Scenario No. 4 Event No. 1 2 Page(s)

Event Description: Power decrease

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a REACTIVITY event using OP/1/A/6100/003 (Controlling Procedure For Unit Operation) and OP/1/B/6300/01 (Turbine Generator).
		OP/1/A/6100/003 actions
	SRO	NOTE: 1. This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of NSD 304 (Reactivity Management) (R.M.) 2. If the desired power reduction rate is $\geq 15\%/hr$ (3.33 MW/Min), consider using AP/1/A/5500/009 (Rapid Downpower). 2.1 IF shutdown is due to Tech Spec, ensure the NRC has been notified per RP/0/B/5000/013 (NRC Notification Requirements).
	RO	2.2 IF this is a T-AVG Coastdown, maintain T-AVG > Limiting Curve for Phases 2 and 3 (Enclosure 4.4.1).
	RO	2.3 Notify the SOC prior to reducing load per OP/1/B/6300/001 (Turbine-Generator).
	RO	2.4 Begin load reduction to the desired power level.
		OP/1/B/6300/001 actions
	RO	2.2 IF decreasing turbine generator load, perform the following: 2.2.1 Decrease turbine generator load within the following limitations: 2.2.1.1 Rate of change of First-Stage Bowl Inner Surface Temperature shall NOT exceed 150°F/hr (OAC point C1P1283 (First Stage Metal Temp Rate)). 2.2.1.2 OAC point C1A1140 (Turbine Lower Inner Shell Temp) vs. Percent Steam Flow (OAC point C1P1588 (Design Total Main Steam Flow, Measured (%)) shall be maintained above and to the left of curve in the Unit One OAC Databook "Load-Changing Recommendations". 2.2.1.3 Control valve casing difference, OAC point C1A0961 (Turb Valve Chest Inner Surface Metal Temp) minus C1A0967 (Turb Valve Chest Outer Surface Metal Temp), shall NOT exceed curve "Allowable Temp Difference on Control Valve Casing" in the Unit 1 OAC Databook. 2.2.1.4 S/G blowdown flowrates shall be adjusted to obtain maximum blowdown for the appropriate load. 2.2.1.5 IF CV4 fully closes (92% of full load, 1109 MWE), verify 1SM-33 (Ctrl Vlv #4 Stm Lead Drn) opens. 2.2.1.6 IF CV3 fully closes (65% of full load, 783 MWE), verify 1SM-25 (Ctrl Vlv #3 Stm Lead Drn) opens.

Op-Test No. _____	NRC Scenario No. <u> 4 </u>	Event No. <u> 1 </u>	2 Page(s)
Event Description: Power decrease			
Time	Position	Applicant's Actions or Behavior	
	RO	<p>CAUTION:</p> <p>1. Normal steady-state load change shall be made without exceeding limits shown on Enclosure 4.7 (Generator Operating Limits) and in the Unit One OAC Databook "Recommended Starting and Loading Curves".</p> <p>2. Unit One Reactor Operating Data, Section 2.4 shall be referred to for allowable ramp rates.</p> <p>2.2.2 Decrease turbine generator load by performing the following:</p> <p>2.2.2.1 Select "LOAD RATE" and verify it illuminates.</p> <p>2.2.2.2 Input the desired load rate.</p> <p>2.2.2.3 Select "ENTER" and verify "LOAD RATE" goes dark</p> <p>2.2.2.4 Select "TARGET" and verify it illuminates.</p> <p>2.2.2.5 Input the desired load target.</p> <p>2.2.2.6 Select "ENTER" and verify "TARGET" goes dark.</p> <p>2.2.2.7 Verify new load target appears on Target Display.</p> <p>2.2.2.8 Select "GO" and verify it illuminates to start load decrease.</p> <p>2.2.2.9 S/G blowdown changes shall be coordinated with Secondary Chemistry.</p>	
		END EVENT	

Op-Test No. _____ NRC Scenario No. <u>4</u> Event No. <u>2</u> 2 Page(s)		
Event Description: PZR spray valve fails open, B heaters fail		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using AP/1/A/5500/011 (Pressurizer Pressure Anomalies).
	BOP	1. Verify all Pzr pressure channels - INDICATING THE SAME.
	BOP	2. Verify all Pzr PORVs - CLOSED
	BOP	NOTE Control rods may withdraw on decreasing NC pressure.
	BOP	3. Verify Pzr spray valve(s) - CLOSED
	BOP	3RNO Perform the following: a. Manually close affected spray valve(s). b. IF affected spray valve(s) will not close, THEN ...
	BOP	4. Verify all Pzr heaters - ENERGIZED
	BOP	4RNO IF Pzr pressure is less than 2220 PSIG, THEN ensure all Pzr heaters are energized.
	BOP	5. Ensure 1NV-37A (NV Supply To Pzr Aux Spray) - CLOSED
	BOP	NOTE Positive reactivity is inserted during an increase in NC pressure which may cause auto rod insertion.
	BOP	6. Verify NC pressure - STABLE OR INCREASING.
	RO	7. WHEN NC pressure is stable, THEN: <ul style="list-style-type: none"> • Stabilize unit at appropriate power level. • Adjust the following as required to maintain T-Avg within 1°F of T-Ref: <ul style="list-style-type: none"> ○ Turbine load ○ Control rods ○ Boron concentration
	BOP	8. IF a Pzr pressure channel failed high, THEN ...
		EXAMINER NOTE: SRO determines that 3.4.9 (Pressurizer), condition B applies.
	SRO	9. Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.3.1 (Reactor Trip System (RTS) Instrumentation) • 3.3.2 (Engineered Safety Features Actuation System (ESFAS) Instrumentation) • 3.3.3 (Post Accident Monitoring (PAM) Instrumentation) • 3.3.4 (Remote Shutdown System) • 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits) • 3.4.4 (RCS Loops - MODES 1 and 2) • 3.4.5 (RCS Loops - MODE 3) • 3.4.6 (RCS Loops - MODE 4) • 3.4.9 (Pressurizer) • 3.4.10 (Pressurizer Safety Valves) • 3.4.11 (Pressurizer Power Operated Relief Valves (PORVs)) • 3.4.13 (RCS Operational Leakage)
	BOP	10. Ensure "PZR PRESS TO REC SELECT" is selected to an operable channel.
	SRO	11. Determine long term plant status. RETURN TO procedure in effect.

Op-Test No. _____ NRC Scenario No. <u> 4 </u> Event No. <u> 2 </u> 2 Page(s)		
Event Description: PZR spray valve fails open, B heaters fail		
Time	Position	Applicant's Actions or Behavior
		END EVENT

Op-Test No. _____ NRC Scenario No. 4 Event No. 3 2 Page(s)

Event Description: Steam Dump valve fails open

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using AP/1/A/5500/028 (Secondary Steam Leak) however; they may use OMP 1-7 guidance to isolate a known steam leak. AP/1/A/5500/028 entry is not "required".
	ALL	1. Monitor Enclosure 1 (Foldout Page).
	RO	2. Verify turbine - ONLINE.
	RO	3. Verify the following: <ul style="list-style-type: none"> • Reactor power - LESS THAN OR EQUAL TO 100% POWER • T-Avg - WITHIN 1.5°F OF T-Ref.
	RO	4. Verify proper reactor response as follows: <ul style="list-style-type: none"> • Control rods - IN "AUTO" AND STEPPING IN • P/R neutron flux - DECREASING.
	RO	5. IF AT ANY TIME reactor power is greater than 100%, THEN perform Step 3 RNO.
	BOP	6. Verify Pzr level - STABLE OR INCREASING.
	ALL	7. IF AT ANY TIME while in this procedure Pzr level is decreasing in an uncontrolled manner, THEN RETURN TO Step 6.
	BOP	8. IF AT ANY TIME VCT level goes below 23%, THEN align NV pump suction to FWST as follows: <ol style="list-style-type: none"> a. Open the following valves: <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). b. Close the following valves: <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol).
	ALL	9. Attempt to identify and isolate leak as follows: <ol style="list-style-type: none"> a. Verify the following conditions - NORMAL: <ul style="list-style-type: none"> • Containment temperature • Containment pressure • Containment humidity • Containment floor & equipment sump level. b. Dispatch operators to locate and identify source of steam leak. c. Verify S/G PORVs - CLOSED. d. Verify condenser dump valves - CLOSED.
	RO	9dRNO <ol style="list-style-type: none"> d. Perform the following: <ol style="list-style-type: none"> 1) Select "OFF RESET" on the following switches: <ul style="list-style-type: none"> • "STEAM DUMP INTLTK BYP TRN A" • "STEAM DUMP INTLTK BYP TRN B". 2) IF valve will not close, THEN dispatch operator to close affected condenser dump valve isolation valve.
	RO	9 e. Verify atmospheric dump valves - CLOSED. f. Verify CA PMP #1 - OFF. g. IF leak is suspected to be in a doghouse, THEN...
		EXAMINER NOTE: No required notifications at this time.

Op-Test No. _____	NRC Scenario No. <u>4</u>	Event No. <u>3</u>	2 Page(s)
Event Description: Steam Dump valve fails open			
Time	Position	Applicant's Actions or Behavior	
	SRO	10. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements). 	
	BOP	11. Notify RP of leak.	
		EXAMINER NOTE: Leak will not yet be isolated at this time so additional steps are provided. The crew will skip to step 14 per the RNO of step 12. When leak is isolated the event can be ended.	
	RO	12. Verify - LEAK ISOLATED.	
	SRO	13. Determine long term plant status. RETURN TO procedure and step in effect.	
	BOP	14. Verify UST level - STABLE OR INCREASING.	
	RO	15. Verify - REACTOR CRITICAL.	
	RO	16. Determine approximate steam leak size as follows: <ol style="list-style-type: none"> a. Verify - TURBINE ONLINE. b. Ensure stable plant conditions: <ul style="list-style-type: none"> • Stable T-Avg • Condenser dump valves closed. <p>NOTE Secondary plant configuration can affect Thermal Power Best Estimate. Diverse reactor power indications should be used to determine reactor power.</p> <ol style="list-style-type: none"> c. Determine percent turbine power as follows: <ol style="list-style-type: none"> 1) Divide turbine impulse pressure by 100% power value for turbine impulse pressure. REFER TO OAC Data Book for 100 % power value for turbine impulse pressure. 2) Multiply result by 100. d. Verify difference between reactor power and turbine power - LESS THAN 5%. e. Notify RP of leak size. 	
	RO	17. Verify reactor power - GREATER THAN 1%.	
	SRO	18. Evaluate unit shutdown as follows: <ol style="list-style-type: none"> a. Verify unit shutdown required based on either of the following: <ul style="list-style-type: none"> • Steam leak cannot be isolated or until leak can be isolated or repaired at power OR • OSM judgement. b. Initiate unit shutdown. REFER TO one of the following: <ul style="list-style-type: none"> • OP/1/A/6100/003 (Controlling Procedure For Unit Operation) OR • OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown) OR • AP/1/A/5500/009 (Rapid Downpower). c. GO TO Step 20. 	
		END EVENT	

Op-Test No. _____ NRC Scenario No. 4 Event No. 4 1 Page(s)

Event Description: NS pump 1A breaker fails

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a SRO Tech Spec event only.
		OP/1/B/6100/010L (Annunciator Response For Panel 1AD-11) A/1 - 4KV ESS PWR TRAIN A TROUBLE
		Immediate actions
	BOP	Dispatch an operator to 1RFM-48 located on 1RFMP3 (AB-560, BB-49) to determine the cause of alarm.
		Supplemental Actions
	BOP	1. IF alarm is due to loss of control power, dispatch an operator to 1EDE-F01C (SWGR 1ETA Control Power) and 1ETA to determine cause.
	BOP	2. Ensure proper operation per OP/1/A/6350/008 (125 VDC/120VAC Vital Instrument and Control Power System).
	BOP	3. Verify proper operation of 125VDC Diesel Auxiliary Power System per OP/1/A/6350/006 (125 VDC Diesel Auxiliary System).
	BOP	4. IF due to a breaker being out of the CONNECT position, ensure this condition is desirable and return to normal as soon as possible.
		EXAMINER NOTE: Tech Spec 3.6.6 Condition A applies.
	SRO	5. Refer to Tech Specs 3.8.9 and 3.8.10.
		END EVENT

Op-Test No. _____ NRC Scenario No. 4 Event No. 5 4 Page(s)

Event Description: KC surge tank level fails low

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is an INSTRUMENT event using AP/1/A/5500/021 (Loss of Component Cooling).
	ALL	CAUTION Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within 10 minutes will cause damage to the NC pump seals resulting in NC inventory loss. 1. Monitor Enclosure 1 (Foldout Page).
	BOP	2. Verify at least one KC pump - ON.
	BOP	3. IF AT ANY TIME all KC pumps are lost, THEN RETURN TO STEP 2.
	BOP	NOTE Uncooled letdown may result in loss of NV pumps within a matter of minutes. 4. Verify the following: <ul style="list-style-type: none"> • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK. AND • At least one KC pump - ON.
	BOP	5. IF AT ANY TIME 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" LIT, THEN perform Step 4 RNO.
	BOP	6. Verify both KC surge tank levels - 50% - 90% AND STABLE.
		EXAMINER NOTE: Level transmitters are working properly, however the relay that controls the valves on low level is actuated. This will separate the KC trains and another pump on the opposite train will need to be started to support opposite train equipment.
	BOP	7. Start additional KC pump(s) as necessary to supply any KC loads presently in service.
	BOP	CAUTION A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which will result in shaft seizure. 8. Verify KC flow to NC pumps as follows: <ul style="list-style-type: none"> • 1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK • 1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK.

Op-Test No. _____ NRC Scenario No. 4 Event No. 5 4 Page(s)

Event Description: KC surge tank level fails low

Time	Position	Applicant's Actions or Behavior
	BOP	<p>8 RNO Perform the following:</p> <ul style="list-style-type: none"> a. Ensure the following valves - OPEN: <ul style="list-style-type: none"> • 1KC-425A (NC Pumps Ret Hdr Cont Isol) • 1KC-338B (NC Pumps Sup Hdr Cont Isol) • 1KC-424B (NC Pumps Ret Hdr Cont Isol). b. IF AT ANY TIME any of the following conditions are met: <ul style="list-style-type: none"> • Time since loss of KC – GREATER THAN 10 MINUTES OR • Any NC pump trip criteria from Enclosure 1 (Foldout Page) is met THEN perform the following: <ul style="list-style-type: none"> 1) IF letdown is isolated, THEN: <ul style="list-style-type: none"> a) Ensure NV pump suction aligned to FWST as follows: <ul style="list-style-type: none"> (1) 1NV-252A (NV Pumps Suct From FWST) - OPEN (2) 1NV-253B (NV Pumps Suct From FWST) - OPEN (3) 1NV-188A (VCT Otlt Isol) - CLOSED (4) 1NV-189B (VCT Otlt Isol) - CLOSED. b) WHEN Reactor is tripped, THEN attempt to establish and maintain a slow cooldown as required to maintain PZR level. 2) Ensure steam dumps – IN PRESSURE MODE. 3) Ensure the Reactor - TRIPPED. 4) WHEN reactor power less than 5%, THEN perform the following: <ul style="list-style-type: none"> a) Trip all NC pumps. b) Ensure the normal spray valve associated with the tripped NC pump(s) - IN MANUAL AND CLOSED. 5) Secure any dilutions in progress. 6) IF the reactor trip breakers were closed, THEN perform one of the following while continuing with this procedure as time and conditions allow: <ul style="list-style-type: none"> • IF above P-11, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection). OR • IF below P-11, THEN GO TO AP/1/A/5500/005 (Reactor Trip Or Inadvertent S/I Below P-11).

Op-Test No. _____ NRC Scenario No. 4 Event No. 5 4 Page(s)

Event Description: KC surge tank level fails low

Time	Position	Applicant's Actions or Behavior
	BOP	9a. Verify the following Train A KC non-essential header isolation valves - OPEN: <ul style="list-style-type: none"> • 1KC-230A (Rx Bldg Non-Ess Hdr Isol) • 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol). b. Verify the following Train B KC non-essential header isolation valves - OPEN: <ul style="list-style-type: none"> • 1KC-228B (Rx Bldg Non-Ess Hdr Isol) • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) • 1KC-53B (Aux Bldg Non-Ess Hdr Isol) • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol).
	BOP	9b RNO NOTE The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level. b. WHEN OAC alarm C1D2214 (KC Train B Low-Low Level Surge Tank Isol) is "NOT ACTUATED", THEN ensure the affected valve(s) are open.
		EXAMINER NOTE: The level switch will not reset so an additional KC pump (opposite train) must be started.
	BOP	9c. Start additional KC pump(s) as necessary to supply any KC loads presently in service.
	BOP	10 Verify KC surge tank levels normal as follows: <ul style="list-style-type: none"> a. Verify both KC surge tank levels - 50% - 90% AND STABLE. b. GO TO Step 14.
	BOP	14 Ensure KC heat exchanger outlet mode switches - PROPERLY ALIGNED.
	BOP	15 Determine and correct cause of loss of KC.
		EXAMINER NOTE: SRO determines that no Technical Specifications apply. The valves are in their safety position and all supported components have cooling available.
	SRO	16 Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual: <ul style="list-style-type: none"> • SLC 16.9-7 (Boration Systems Flow Path - Shutdown) • SLC 16.9-8 (Boration Systems Flow Path - Operating) • SLC 16.9-9 (Boration Systems Pumps - Shutdown) • SLC 16.9-10 (Boration Systems Charging Pumps - Operating) • 3.5.2 (ECCS - Operating) • 3.5.3 (ECCS - Shutdown) • 3.6.6 (Containment Spray System) • 3.7.5 (Auxiliary Feedwater (AFW) System) • 3.7.7 (Component Cooling Water (CCW) System).
		EXAMINER NOTE: No notifications required at this time.
	SRO	17 Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).

Op-Test No.	_____	NRC Scenario No.	<u>4</u>	Event No.	<u>5</u>	4 Page(s)
Event Description: KC surge tank level fails low						
Time	Position	Applicant's Actions or Behavior				
	BOP	18 IF KC Hx leak to RN is suspected, THEN...				
	BOP	19 Verify KC surge tanks level as follows: <ul style="list-style-type: none"> • Greater than 50% • Stable or increasing. 				
	BOP	20 WHEN plant conditions permit, THEN: <ul style="list-style-type: none"> • Return KC pumps to normal operation. REFER TO OP/1/A/6400/005 (Component Cooling Water System). • Return NV Pump 1A to normal cooling as applicable. REFER TO Enclosure 4 (Alternate Cooling To NV Pump 1A). 				
	BOP	21 Verify the following: <ul style="list-style-type: none"> • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK • 1AD-7, H/3 "VCT HI TEMP" - DARK • Normal letdown - IN SERVICE. 				
	BOP	22 Ensure VCT and letdown path aligned as follows: <ol style="list-style-type: none"> a. IF desired to align NV pump suction to VCT, then perform the following: <ol style="list-style-type: none"> 1) Open the following valves: <ul style="list-style-type: none"> • 1NV-188A (VCT Otlt Isol) • 1NV-189B (VCT Otlt Isol). 2) Close the following valves: <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to the "VCT" position and return to "AUTO". c. IF desired to restore letdown flow through the NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Otlt 3-Way Vlv) to the "DEMIN" position and return to "AUTO". 				
	SRO	23 Determine long term plant status. RETURN TO procedure in affect.				
END EVENT						

Op-Test No. _____ NRC Scenario No. <u>4</u> Event No. <u>6</u> 1 Page(s)		
Event Description: 1NV-148 fails to 20% open in auto/manual control available		
Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using OP/1/B/6100/010H (Annunciator Response For Panel 1AD-7). (F/1 - LETDN HX OUTLET HI PRESS).
		IMMEDIATE ACTIONS
	BOP	1. Verify alarm using 1NVP5570 (Letdn Press) (1MC5).
	BOP	2. Take manual control of 1NV-148 (Letdn Press Control) and attempt to restore pressure to normal.
	BOP	3. Verify proper orifice selection and letdown line valve alignment.
		SUPPLEMENTAL ACTIONS
	BOP	1. IF necessary, place excess letdown in service per OP/1/A/6200/001 (Chemical & Volume Control System).
	BOP	2. Determine and correct cause of alarm.
		END EVENT

Op-Test No. _____ NRC Scenario No. 4 Event No. 7 2 Page(s)

Event Description: CFP trip/ T/G runback with rods fail to move

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is a COMPONENT event using AP/1/A/5500/003 (Load Rejection), Case I – Switchyard Available.
	RO	1. Verify turbine load - DECREASING IN AUTOMATIC
	RO	2. Verify proper reactor response: <ul style="list-style-type: none"> • Control rods - IN "AUTO" AND STEPPING • P/R neutron flux - DECREASING
	RO	2RNO IF T-Avg is greater than 1.5°F higher than T-Ref, THEN manually insert control rods as required to maintain T-Avg within IN 1°F of T-Ref.
	RO	3. Verify proper steam dump operation as follows: <ol style="list-style-type: none"> a. Verify T-Ref instrumentation – AVAILABLE b. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) – LIT c. Verify the following: <ul style="list-style-type: none"> • "C-7A LOSS OF LOAD INTLK COND DUMP" status light (1SI-18) – LIT • Steam dump valves – MODULATING d. T-Avg - DECREASING TO T-REF.
	BOP	4. Verify Pzr PORV and Pzr spray valve status as follows: <ol style="list-style-type: none"> a. All Pzr PORVs – CLOSED b. Normal Pzr spray valves – CLOSED
	BOP	5. Verify proper CM System operation as follows: <ol style="list-style-type: none"> a. WHEN reactor power is less than 75%, THEN ensure both C-htr drain pumps - OFF. b. Verify reactor power - GREATER THAN 56% PRIOR TO THE EVENT. c. Verify standby hotwell pump(s) - ON
	BOP	5cRNO c. Manually start standby hotwell pump(s) as necessary
	BOP	5d. Verify standby condensate booster pump(s) - ON
	BOP	5dRNO. Manually start standby condensate booster pump(s) as necessary.
	BOP	6. Verify the following generator alarms – DARK <ul style="list-style-type: none"> • 1AD-11, C/1 "GEN BKR A OVER CURRENT" • 1AD-11, F/1 "GEN BKR B OVER CURRENT"
	RO	7. Verify S/G levels are adequate as follows: <ul style="list-style-type: none"> • All S/G low level alert alarms (1AD-4) - DARK • All S/G low CF flow alarms (1AD-4) - DARK
	RO	8. Verify reactor power - GREATER THAN 20%.
	RO	9. IF AT ANY TIME reactor power is less than or equal to 20%, THEN perform Step 8 RNO.
	BOP	10. Verify AS header pressure - GREATER THAN OR EQUAL TO 140 PSIG
	BOP	11. Adjust 1TL-4 (Stm Seal Reg Byp) as necessary to maintain steam seal pressure between 4 PSIG - 6 PSIG.
	RO	12. Monitor Enclosure 3 (Rod Insertion Limit Boration)
	RO	13. Verify reactor power - LESS THAN 30%

Op-Test No. _____	NRC Scenario No. <u>4</u>	Event No. <u>7</u>	2 Page(s)
Event Description: CFP trip/ T/G runback with rods fail to move			
Time	Position	Applicant's Actions or Behavior	
	RO	13RNO Perform the following: a. IF the runback target load is less than 30%, THEN: ... b. WHEN the appropriate runback target load is reached, THEN: 1) Stabilize unit at current power level. 2) Maintain control rods above insertion limits. 3) Adjust the following as required to maintain T-Avg within 1°F of T-Ref: • Turbine load • Control rods • Boron concentration. c. GO TO Step 15.	
	BOP	15. Verify the following PCBs - CLOSED: • Generator breaker 1A • Generator breaker 1B • PCB 14 • PCB 15 • PCB 17 • PCB 18	
	RO	16. Adjust power factor as necessary. REFER TO Unit 1 Revised Data Book Figure 43	
	RO	17. WHEN the appropriate runback target load is reached, THEN: • Stabilize unit at appropriate power level. • Maintain control rods above insertion limits. • Adjust the following as required to maintain T-Avg within 1°F of T-Ref: ○ Turbine load ○ Control rods ○ Boron concentration	
	RO	18. Notify System Operating Center (SOC) using the red dispatcher telephone of current unit status	
	ALL	19. Determine and correct cause of load rejection	
		EXAMINER NOTE: This is where the next event is scheduled to begin.	
		END EVENT	

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: This is the MAJOR event and starts in EP/1/A/5000/E-0 (reactor Trip or Safety Injection)
	ALL	1. Monitor Enclosure 1 (Foldout Page)
	RO	2. Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights - LIT • All reactor trip and bypass breakers - OPEN • I/R amps - DECREASING
	RO	Verify Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves - CLOSED
	BOP	4. Verify 1ETA and 1ETB – ENERGIZED.
	BOP	4RNO Perform the following: a. IF 1ETA AND 1ETB are de-energized, THEN GO TO EP/1/A/5000/ECA-0.0 (Loss Of All AC Power).
	SRO	Transition to ECA-0.0 (Loss Of All AC Power).
	ALL	1. CSF Status trees should be monitored for information only. Do not exit this procedure to implement any of the CSF procedures.
	RO	2. Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights - LIT • Reactor trip and bypass breakers - OPEN • I/R amps - DECREASING.
	RO	3. Verify Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves - CLOSED
	BOP	4. Establish NC pump seal injection from the SSF: <ul style="list-style-type: none"> • Notify Security Officer at SSF (Ext. 5251 or 5212) to perform EP/1/A/5000/ECA-0.0 (Loss Of All AC Power), Enclosure 2 (Establishing NC Makeup/Seal Injection From The SSF) • Dispatch operator to 1ETA switchgear room to align alternate power supply to 1EMXS. REFER TO Enclosure 1 (Align Alternate Power Supply To 1EMXS) • Dispatch operator to SSF to establish NC pump seal injection. REFER TO Enclosure 2 (Establishing NC Makeup/Seal Injection From The SSF).

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	5. Verify NC System is isolated as follows: a. All Pzr PORVs - CLOSED. b. All the following letdown isolation valves - CLOSED: <ul style="list-style-type: none"> • 1NV-10A (Letdn Orif 1B Otlt Cont Isol) • 1NV-11A (Letdn Orif 1C Otlt Cont Isol) • 1NV-13A (Letdn Orif 1A Otlt Cont Isol) • 1NV-1A (NC Letdn To Regen Hx Isol) • 1NV-2A (NC Letdn To Regen Hx Isol) • 1NV-135 (ND Flow To Letdn Hx). c. All the following excess letdown isolation valves - CLOSED: <ul style="list-style-type: none"> • 1NV-122B (Loop C To Exs Letdn Hx Isol) • 1NV-123B (Loop C To Exs Letdn Hx Isol) • 1NV-124B (Excess Letdn Press Ctrl).
	BOP	6. Verify total CA flow - GREATER THAN 450 GPM.
	BOP	7. Attempt to restore power to 1ETA or 1ETB as follows: a. Manually start D/Gs from control room.
	BOP	7a.RNO Perform the following: 1) Manually initiate S/I to emergency start D/G(s). 2) IF no D/G can be started, THEN GO TO Step 8.
	BOP	7b. Verify at least one D/G load sequencer - AUTOMATICALLY LOADING BUS. c. Verify 1ETA or 1ETB - ENERGIZED. d. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). e. RETURN TO procedure and step in effect.
	SRO	Transition back to E-0 Step 5.
	BOP	5a. "SAFETY INJECTION ACTUATED" status light (1SI-13) - LIT. b. Both E/S load sequencer actuated status lights (1SI-14) - LIT.
	BOP	5bRNO b. Manually initiate S/I.
		EXAMINER NOTE: By approximately this point a Large Break LOCA will occur.
	RO	6. Announce "Unit 1 Safety Injection".
		EXAMINER NOTE: Notifications are 4.5.A.2 or 4.1.A.1 (ALERTS)
	SRO	7. Determine required notifications: <ul style="list-style-type: none"> • REFER TO RP/0/A/5000/001 (Classification Of Emergency) • REFER TO RP/0/B/5000/013 (NRC Notification Requirements).
	RO	8. Verify all Feedwater Isolation status lights (1SI-5) - LIT.
	BOP	9. Verify Phase A Containment Isolation status as follows: a. Phase A "RESET" lights - DARK. b. Monitor Light Panel Group 5 St lights - LIT.
	BOP	10. Verify proper Phase B actuation as follows: a. Containment pressure - HAS REMAINED LESS THAN 3 PSIG.

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	10aRNO a. Perform the following: NOTE This time may be used later to determine when to align ND Aux spray. 1) Record approximate time of reactor trip. 2) Verify NS pumps - INDICATINGFLOW. 3) IF flow is not indicated, THEN manually initiate Phase B Isolation for affected train(s). 4) Verify Phase B Isolation has actuated as follows: a) Phase B Isolation "RESET" lights - DARK. b) IF Phase B Isolation "RESET" lights are lit, THEN manually initiate Phase B Isolation. c) Verify following monitor light panel lights - LIT: • Group 1 Sp lights • Group 5 Sp lights • Group 5 St lights L/11 and L/12. d) IF monitor light panel not in correct alignment, THEN ensure correct alignment. e) IF NS pump(s) did not start, THEN perform the following for the affected train(s): (1) Reset ECCS. (2) Reset D/G load sequencer. (3) Manually start affected NS pump. (4) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. (5) Stop all NC pumps. (6) Maintain seal injection flow. (7) WHEN 9 minutes has elapsed, THEN verify proper VX system operation. REFER TO Enclosure 7 (VX System Operation). (8) GO TO Step 11.
	BOP	11 Verify proper CA pump status as follows: a. Motor driven CA pumps - ON.
	BOP	11aRNO a. Perform the following for the affected train(s): 1) Reset ECCS. 2) Reset D/G load sequencer. 3) Manually start affected motor driven CA pump. 4) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
	RO	11b. 3 S/G N/R levels – GREATER THAN 11%.
	BOP	12 Verify all of the following S/I pumps - ON: • NV pumps • ND pumps • NI pumps.

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	13 Verify all KC pumps - ON.
	BOP	14 Verify all Unit 1 and Unit 2 RN pumps - ON.
		EXAMINER NOTE: Enclosure 2 actions are after step 26.
	BOP	15 Verify proper ventilation systems operation as follows: <ul style="list-style-type: none"> • REFER TO Enclosure 2 (Ventilation System Verification). • Notify Unit 2 operator to perform Enclosure 3 (Opposite Unit Ventilation Verification).
	RO	16 Verify all S/G pressures - GREATER THAN 775 PSIG.
	BOP	17 Verify proper S/I flow as follows: <ul style="list-style-type: none"> a. "NV S/I FLOW" - INDICATING FLOW. b. NC pressure - LESS THAN 1620 PSIG. c. NI pumps - INDICATING FLOW. d. NC pressure - LESS THAN 285 PSIG. e. ND pumps - INDICATING FLOW TO C-LEGS.
	BOP	18 Control S/G levels as follows: <ul style="list-style-type: none"> a. Verify total CA flow - GREATER THAN 450 GPM. b. WHEN at least one S/G N/R level is greater than 11% (29% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.
	BOP	19 Verify all CA isolation valves - OPEN.
		EXAMINER NOTE: If not already addressed, the BOP should note that 1NI-10B is closed and open it manually.
	BOP	20 Verify S/I equipment status based on monitor light panel - IN PROPER ALIGNMENT.
	BOP	20RNO Manually align equipment.
		EXAMINER NOTE: Enclosure 4 actions are listed after Enclosure 2 actions.
	RO	NOTE Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.
		21 Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control).
	BOP	22 Verify Pzr PORV and Pzr spray valve status as follows: <ul style="list-style-type: none"> a. All Pzr PORVs - CLOSED. b. Normal Pzr spray valves - CLOSED. c. At least one Pzr PORV isolation valve - OPEN.
	RO	23 Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F.
	BOP	23RNO IF any NV OR NI pump is on, THEN: <ul style="list-style-type: none"> a. Ensure all NC pumps - OFF. b. Maintain seal injection flow.
	RO	24 Verify main steamlines are intact as follows: <ul style="list-style-type: none"> • All S/G pressures - STABLE OR INCREASING • ALL S/Gs - PRESSURIZED.

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	25 Verify S/G tubes are intact as follows: <ul style="list-style-type: none"> • Verify the following EMF trip 1 lights - DARK: <ul style="list-style-type: none"> • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). • All S/G levels - STABLE OR INCREASING IN A CONTROLLED MANNER.
	BOP	26 Verify NC System is intact as follows: <ul style="list-style-type: none"> • Containment pressure - LESS THAN 1 PSIG. • IF normal off-site power is available, THEN verify containment pressure less than 0.3 PSIG. • Containment high range EMFs – LESS THAN 3 R/HR: <ul style="list-style-type: none"> • 1EMF-53A (Containment Trn A) • 1EMF-53B (Containment Trn B). • Containment EMF trip 1 lights - DARK: <ul style="list-style-type: none"> • 1EMF-38 (Containment Particulate) • 1EMF-39 (Containment Gas). • Containment sump level - STABLE.
	BOP	26RNO Perform the following: <ol style="list-style-type: none"> a. IF both the following conditions exist, <ul style="list-style-type: none"> • Containment pressure - GREATER THAN 1 PSIG • Containment pressure – HAS REMAINED LESS THAN 3 PSIG THEN manually start one VX fan. REFER TO Enclosure 5 (VX Fan Manual start). b. Concurrently: <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • GO TO EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant).
E-0, Enclosure 2 steps		

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	1. Verify proper VC/YC operation as follows: a. Verify one train of the following equipment is in operation: <ul style="list-style-type: none"> • YC chiller • CR AHU-1 • CRA AHU-1 • CRA PFT-1. b. Verify the following alarms - DARK: <ul style="list-style-type: none"> • 1AD-18, A/8 "UNIT 1 INTAKE HI CHLORINE 1A" • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE 1B" • 1AD-18, D/8 "UNIT 2 INTAKE HI CHLORINE 2A" • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE 2B". c. Ensure the following VC dampers - OPEN: <ul style="list-style-type: none"> • 1VC-5B (CRA Filt Inlet) • 1VC-6A (CRA Filt Inlet) • 2VC-5B (CRA Filt Inlet) • 2VC-6A (CRA Filt Inlet). d. Repeat Step 1 of this enclosure until notified by station management as follows: <ul style="list-style-type: none"> • At least once every 8 hours OR • Any time VC/YC related annunciators on 1AD-18 actuate.
	BOP	2. Ensure proper VA System operation as follows: <ul style="list-style-type: none"> • Ensure the following fans - OFF: <ul style="list-style-type: none"> ○ ABUXF 1A ○ ABUXF 1B. • Ensure VA System filter is in service as follows: <ul style="list-style-type: none"> ○ 1ABF-D-12 (VA Filt A Bypass Damper) - CLOSED ○ 1ABF-D-5 (VA Filt B Bypass Damper) - CLOSED. • Ensure the following fans - ON: <ul style="list-style-type: none"> ○ ABFXF-1A ○ ABFXF 1B.
	BOP	3. Verify proper VE System operation as follows: a. VE fans - ON. b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC. c. Repeat Step 3.b every 30 minutes until notified by station management.
	BOP	4. Record time ventilation systems are verified on following table:
		E-0 Enclosure 4 actions
	RO	1. Verify at least one NC pump - ON.
	RO	1RNO. Perform the following: a. Use NC T-Colds to determine NC temperature as required in subsequent steps. b. GO TO Step 4.

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	RO	4. Verify one of the following: <ul style="list-style-type: none"> • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.
	SRO	4RNO GO TO Step 7.
	RO	7. Verify NC temperature - LESS THAN 557°F AND DECREASING.
	RO	8. Attempt to stop the NC cooldown as follows: <ol style="list-style-type: none"> a. Ensure all steam dumps - CLOSED. b. Ensure all S/G PORVs - CLOSED. c. Ensure S/G blowdown is isolated. d. Close the following valves: <ul style="list-style-type: none"> • 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) • 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) • 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V). e. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: <ul style="list-style-type: none"> • 1SM-41 (Stop Vlv #1 Before Seat Drn) • 1SM-44 (Stop Vlv #2 Before Seat Drn) • 1SM-43 (Stop Vlv #3 Before Seat Drn) • 1SM-42 (Stop Vlv #4 Before Seat Drn). f. Verify NC cooldown - STOPPED.
	RO	8fRNO. f. IF cooldown continues, THEN throttle feed flow as follows: <ol style="list-style-type: none"> 1) IF S/G N/R level is less than 11% (29% ACC) in all S/G's, THEN throttle feed flow to achieve the following: <ul style="list-style-type: none"> • Minimize cooldown • Maintain total feed flow greater than 450 GPM. 2) WHEN N/R level is greater than 11% (29% ACC) in at least one S/G, THEN throttle feed flow further to achieve the following: <ul style="list-style-type: none"> • Minimize cooldown • Maintain at least one S/G N/R level greater than 11% (29% ACC). 3) IF cooldown continues, THEN close the following valves: <ul style="list-style-type: none"> • All MSIVs • All MSIV bypass valves.
	RO	9. Continue to perform the actions of this enclosure as required to ensure one of the following: <ul style="list-style-type: none"> • NC temperature - STABLE AT LESS THAN OR EQUAL TO 557°F. OR • NC temperature - TRENDING TO 557°F.
	SRO	Transition to EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).
	ALL	1. Monitor Enclosure 1 (Foldout Page).

Op-Test No. _____	NRC Scenario No. <u>4</u>	Event No. <u>8</u>	14 Page(s)
Event Description: Loss of all AC power/ Large Break LOCA			
Time	Position	Applicant's Actions or Behavior	
	RO	2. Verify main steamlines are intact as follows: <ul style="list-style-type: none"> • All S/G pressures - STABLE OR INCREASING OR • All S/Gs - PRESSURIZED. 	
	BOP	3. Control intact S/G levels as follows: <ol style="list-style-type: none"> a. Verify N/R level in all intact S/Gs - GREATER THAN 11% (29% ACC). b. Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%. 	
	BOP	4. Verify secondary radiation is normal as follows: <ol style="list-style-type: none"> a. Ensure the following signals - RESET: <ol style="list-style-type: none"> 1) Phase A Containment Isolations 2) CA System valve control 3) KC NC NI NM St signals. b. Align all S/Gs for Chemistry sampling. c. Perform at least one of the following: <ul style="list-style-type: none"> • Notify Chemistry to sample all S/Gs for activity. OR • Notify RP to frisk all cation columns for activity. d. Verify the following EMF trip 1 lights - DARK: <ul style="list-style-type: none"> • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D). e. WHEN activity results are reported, THEN verify all S/Gs indicate no activity. 	
	BOP	5. Verify Pzr PORV and isolation valve status as follows: <ol style="list-style-type: none"> a. Power to all Pzr PORV isolation valves - AVAILABLE. b. All Pzr PORVs - CLOSED. c. At least one Pzr PORV isolation valve - OPEN. d. IF AT ANY TIME a Pzr PORV opens due to high pressure, THEN, after Pzr pressure decreases to less than 2315 PSIG, ensure the valve closes or is isolated. 	
	RO	6. Verify S/I termination criteria as follows: <ol style="list-style-type: none"> a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F. 	
	SRO	6aRNO GO TO Step 6.f.	
	ALL	6f. Monitor S/I termination criteria. REFER TO Enclosure 2 (S/I Termination Criteria). <ol style="list-style-type: none"> g. IF AT ANY TIME S/I termination criteria is met while in this procedure, THEN RETURN TO Step 6. 	

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	7. Verify proper NS pump operation as follows: a. At least one NS pump - ON. b. Verify the following valves - OPEN: <ul style="list-style-type: none"> • 1FW-27A (ND Pump 1A Suct From FWST). • 1FW-55B (ND Pump 1B Suct From FWST). c. Containment pressure - LESS THAN 2.4 PSIG.
		EXAMINER NOTE: Pressure may be less than 2.4 psig and 7cRNO will not be required.
	BOP	7cRNO Perform the following: 1) WHEN containment pressure is less than 2.4 PSIG, THEN perform Step 7. 2) GO TO Step 8.
	BOP	7d. Verify operating NS pump(s) - HAVE REMAINED RUNNING SINCE INITIAL PHASE B SIGNAL. e. Ensure S/I - RESET: 1) ECCS. 2) D/G load sequencers. 3) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. f. Reset NS. g. Stop NS pumps. h. Close the following valves: <ul style="list-style-type: none"> • 1NS-29A (NS Spray Hdr 1A Cont Isol) • 1NS-32A (NS Spray Hdr 1A Cont Isol) • 1NS-15B (NS Spray Hdr 1B Cont Isol) • 1NS-12B (NS Spray Hdr 1B Cont Isol).
	BOP	8. Verify criteria to stop operating ND pumps as follows: a. NC pressure - GREATER THAN 285 PSIG.
	SRO	8a.RNO a. GO TO Step 10.
	BOP	10. Verify conditions to stop operating D/Gs as follows: a. At least one D/G - ON. b. Verify 1ETA is energized by offsite power as follows: <ul style="list-style-type: none"> • "D/G 1A BKR TO ETA" - OPEN • 1ETA - ENERGIZED.
	BOP	10bRNO b. Perform the following: 1) Attempt to restore offsite power to affected switchgear. REFER TO AP/1/A/5500/007 (Loss of Normal Power). 2) GO TO Step 10.d.
	BOP	10d. Verify 1ETB is energized by offsite power as follows: <ul style="list-style-type: none"> • "D/G 1B BKR TO ETB" - OPEN • 1ETB - ENERGIZED.

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	10dRNO d. Perform the following: 1) Attempt to restore offsite power to affected switchgear. REFER TO AP/1/A/5500/007 (Loss of Normal Power). 2) IF 1ETA is energized from offsite power, THEN GO TO Step 10.f. 3) GO TO Step 11.
	BOP	11. Obtain containment H2 concentration as follows: a. Ensure operator has been dispatched to secure all ice condenser air handling units. REFER TO Enclosure 3 (Securing All Ice Condenser Air Handling Units). b. Verify containment H2 analyzers - IN SERVICE.
	BOP	11bRNO b. Perform the following: 1) Dispatch operator to place containment H2 analyzers in service. REFER TO OP/1/A/6450/010 (Containment Hydrogen Control System). 2) WHEN H2 analyzers are in service, THEN perform Steps 11.c through 11.e. 3) GO TO Step 12.
	BOP	12. Initiate evaluation of plant status as follows: a. Verify S/I systems - ALIGNED FOR INJECTION MODE. b. Verify Cold Leg Recirc capability as follows: 1) At least one ND pump - AVAILABLE. 2) Verify power to all of the following valves - AVAILABLE: <ul style="list-style-type: none"> • 1FW-27A (ND Pump 1A Suct From FWST) • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1ND-28A (ND Supply To NV & NI Pmps) • 1FW-55B (ND Pump 1B Suct) • 1NI-184B (ND Pump 1B Cont Sump Suct) • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND) • 1NI-334B (NI Pump Suct X-Over From ND) • 1NI-136B (ND Supply To NI Pump 1B).
	BOP	12b2)RNO 2) Perform the following: IF power cannot be verified to minimum number of valves required to perform the following: <ul style="list-style-type: none"> • Transfer one train of ND to the containment sump • Establish ND flow from containment sump to one train of NV and NI pumps. THEN GO TO EP/1/A/5000/ECA-1.1 (Loss Of Emergency Coolant ND)
	BOP	12b3) Verify power to all of the following valves - AVAILABLE: <ul style="list-style-type: none"> • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol) • 1NI-147B (NI Pump Miniflow Hdr To FWST Isol).

Op-Test No. _____	NRC Scenario No. <u>4</u>	Event No. <u>8</u>	14 Page(s)
Event Description: Loss of all AC power/ Large Break LOCA			
Time	Position	Applicant's Actions or Behavior	
	BOP	12b3)RNO IF power cannot be verified to valves minimum number of valves required to isolate NI pump miniflow, THEN perform the following: <ul style="list-style-type: none"> • Attempt to restore power to miniflow isolation valve(s) • Have operator standing by to locally close the required valve: <ul style="list-style-type: none"> • 1NI-147B (NI Miniflow Hdr To FWST Isol) (AB-548, HH-JJ, 53-54, Rm 234) • 1NI-115A (NI Pump 1A Miniflow Isol) (AB-549, GG-HH, 53-54, Rm 235) • 1NI-144A (NI Pump 1B Miniflow Isol) (AB-548, HH-JJ, 53-54, Rm 234). 	
	BOP	12b4) Verify the "ENABLE" lights for the following switches – LIT <ul style="list-style-type: none"> • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B". 	
	BOP	c. Verify auxiliary building radiation is normal as follows: <ul style="list-style-type: none"> • EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK • All area monitor EMF trip 1 lights - DARK. d. WHEN the TSC is activated AND staffed, THEN: <ol style="list-style-type: none"> 1) Notify the Reactor Engineer to assess core damage. REFER TO RP/0/A/5000/015 (Core Damage Assessment). 2) Notify Chemistry to obtain current NC boron concentration. 3) WHEN ND is aligned for Cold Leg Recirc, THEN notify Chemistry to obtain current containment sump boron concentration. 4) Notify Operating Engineer of the following: <ol style="list-style-type: none"> a) VA is required to be aligned to normal within 72 hours of the event. b) Evaluate aligning VA to normal mode. REFER TO OP/0/A/6450/003 (Auxiliary Building Ventilation System). e. Notify station management to evaluate starting additional plant equipment to assist in recovery.	
	BOP	13. Verify NC System cooldown and depressurization is required as follows: <ol style="list-style-type: none"> a. NC pressure - GREATER THAN 285 PSIG 	
	BOP	13a.RNO IF ND flow to C-Legs is greater than 675 GPM, THEN GO TO Step 14.	
	BOP	14. Verify transfer to Cold Leg Recirc as follows: <ol style="list-style-type: none"> a. FWST level - LESS THAN 37% (1AD-9, D/8 "FWST 2/4 LO LEVEL" - LIT). 	
		EXAMINER NOTE: FWST will likely not be at 37% at this time, but transition will occur at 37% based on Enclosure 1 actions. The procedure loops until that time.	
	SRO	14a RNO. RETURN TO Step 11.	
		Transition to EP/1/A/5500/ES-1.3	
	ALL	1. Monitor Enclosure 1 (Foldout Page).	
	ALL	CAUTION S/I recirculation flow to NC System must be maintained at all times. NOTE <ul style="list-style-type: none"> • Steps 2 through 8 should be performed without delay. • CSF should not be implemented until directed by this procedure. 	

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	2. Verify at least one of the following annunciators - LIT: <ul style="list-style-type: none"> • 1AD-20, B/3 "CONT. SUMP LEVEL >3.3 ft" • 1AD-21, B/3 "CONT. SUMP LEVEL >3.3 ft".
	BOP	3. Verify KC flow to ND heat exchangers - GREATER THAN 5000 GPM.
	BOP	3RNO Establish KC flow to affected ND Hx(s).
	BOP	4. Ensure S/I - RESET: <ol style="list-style-type: none"> a. ECCS. b. D/G load sequencers. c. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
		EXAMINER NOTE: Only B train valves can be aligned due to lack of A train power. The crew will evaluate the RNOs but no actions will be taken based solely on lack of power.
	BOP	5. Align S/I system for recirc as follows: <ol style="list-style-type: none"> a. Verify following valves - OPEN: <ul style="list-style-type: none"> • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1NI-184B (ND Pump 1B Cont Sump Suct).
	BOP	5aRNOa. Perform the following: <ol style="list-style-type: none"> 1) Manually open affected valve(s). 2) IF valve(s) will not open, THEN... 3) IF both containment sump suction valves are closed, THEN:

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	5b. Verify following valves - CLOSED: <ul style="list-style-type: none"> • 1FW-27A (ND Pump 1A Suct From FWST) • 1FW-55B (ND Pump 1B Suct From FWST). c. Verify ND pumps - ON. d. Isolate NI pump miniflow as follows: <ol style="list-style-type: none"> 1) Verify NC pressure - LESS THAN 1620 PSIG. 2) Close the following valves: <ul style="list-style-type: none"> • 1NI-115A (NI Pump 1A Miniflow Isol) • 1NI-144A (NI Pump 1B Miniflow Isol). 3) Place "PWR DISCON FOR 1NI-147B" switch in "ENABLE". 4) Close 1NI-147B (NI Pump Miniflow Hdr To FWST Isol). e. Close the following valves: <ul style="list-style-type: none"> • 1ND-32A (ND Train 1A Hot Leg Inj Isol) • 1ND-65B (ND Train 1B Hot Leg Inj Isol). f. Verify at least one of the following NV pumps miniflow valves - CLOSED: <ul style="list-style-type: none"> • 1NV-203A (NV Pumps A&B Recirc Isol) OR • 1NV-202B (NV Pmps A&B Recirc Isol). g. Align ND train discharges to NI and NV pump suction as follows: <ol style="list-style-type: none"> 1) Open the following valves: <ul style="list-style-type: none"> • 1NI-332A (NI Pump Suct X-Over From ND) • 1NI-333B (NI Pump Suct From ND). 2) Ensure 1NI-334B (NI Pump Suct X-Over From ND) - OPEN. 3) Open the following valves: <ul style="list-style-type: none"> • 1ND-28A (ND Supply To NV & 1A NI Pmps) • 1NI-136B (ND Supply To NI Pump 1B). h. Isolate FWST from NV and NI pumps as follows: <ol style="list-style-type: none"> 1) Place "PWR DISCON FOR 1NI-100B" switch in "ENABLE". 2) Close 1NI-100B (NI Pmps Suct From FWST). 3) Close the following valves: <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST). i. Verify proper recirc flow as follows: <ul style="list-style-type: none"> • "NV S/I FLOW" - INDICATING FLOW • NI pumps - INDICATING FLOW • ND pumps - INDICATING FLOW.
	BOP	6. WHEN FWST level decreases to 11% (1AD-9, E/8 "FWST LO-LO LEVEL" alarm lit), THEN perform the following: <ol style="list-style-type: none"> a. Stop NS Pumps. b. Align NS for recirc. REFER TO Enclosure 2 (Aligning NS for Recirculation).

Op-Test No. _____ NRC Scenario No. 4 Event No. 8 14 Page(s)

Event Description: Loss of all AC power/ Large Break LOCA

Time	Position	Applicant's Actions or Behavior
	BOP	7. IF any NS pump in service with suction aligned to FWST, THEN perform the following: a. Ensure appropriate operator is in possession of Enclosure 2 (Aligning NS for Recirculation). b. Designate operator to ensure NS pumps immediately secured when FWST level decreases to 11% OR 1AD-9, E/8 "FWST LO-LO LEVEL" alarm lit. c. IF time and manpower permit, THEN notify designated operator to review Enclosure 2 (Aligning NS for Recirculation) for current plant conditions.
	BOP	8. Verify criteria for initiation of ND aux containment spray: a. Containment pressure - GREATER THAN 3 PSIG.
	BOP	8ARNO a. Perform the following: 1) IF AT ANY TIME containment pressure exceeds 3 PSIG, THEN perform Step 8. 2) Observe Caution prior to Step 9 and GO TO Step 9.
	ALL	CAUTION If a B/O occurs, NV/NI pump(s) may sequence on or be left in service without adequate suction, It is critical to ensure ECCS pumps are not operated without adequate pump suction. 9. IF AT ANY TIME a B/O occurs, THEN perform the following: a. Ensure NV/NI pumps taking suction from de-energized ND pump(s) - OFF. b. Restart S/I equipment previously on.
	ALL	10. EP/1/A/5000/F-0 (Critical Safety Function Status Trees) may now be implemented.
	BOP	Verify proper recirc flow as follows: <ul style="list-style-type: none"> • "NV S/I FLOW" - INDICATING FLOW • NI pumps - INDICATING FLOW • ND pumps - INDICATING FLOW.
		END EVENT