

INITIAL SUBMITTAL

INITIAL SUBMITTAL

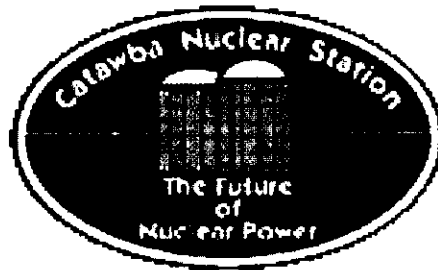
**OPERATING TEST
SIMULATOR SCENARIOS**

**CATAWBA EXAM
50-413, 414/2001-301**

APRIL 2 - 6 & 16 - 20, 2001



A Duke Energy Company



2001 NRC EXAM SIMULATOR SCENARIOS

Facility: CatawbaScenario No.: NRC 1

Op-Test No: _____

Examiners: _____

Applicants: _____

Objectives: To evaluate the applicants' ability to reduce power using NOPS while maintaining Tave matched to Tref, and to use AOPs to respond to a pressurizer level channel instrument failure, complicated by the loss of letdown with a turbine runback. The candidates will then be evaluated using the EOPs to respond to a small S/G tube leak that increases in size until a reactor trip is required. At this point the leak increases to a 330 GPM rupture. Mitigation will be complicated by the ruptured generator S/G PORV failing to reseal after opening and the loss of the A ND and NV pumps.

Initial Conditions: 100% Power 200 EFPD 807 [B] 100% CPL Equilibrium Xe (SNAP 153)
Prevent A NV pump from starting (auto and manual)
DG 1A inoperable
ND pump 1A inoperable
INV123B binding closed

Turnover: 100% Power 200 EFPD 807 [B] 100% CPL Equilibrium Xe (SNAP 153)
1A ND pump tagged out for an oil change. Back in 3 hours.
1A D/G in maintenance mode for gasket change. Back early next shift.

Thunder storm over the area.

Reduce load to 65% due to Chemistry concerns for a CFPT condenser tube leak.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	Boration for load decrease
2	N/A	R-RO	Decrease turbine load
(3)	XMT-NC013	I-BOP	Pressurizer Level Channel II fails LOW with Loss of Normal letdown.
(4)	N/A	C-BOP	Failure of excess RP, not a component failure! Just a consequence of instr. failure. But extra excess L/D is a <u>NORMAL</u> .
5	MAL-IRX004	C-RO	Turbine fails to runback in auto when required
6	OVR-EP006B OVR-EP006C	C-RO	Loss of generator Breaker
7	MAL-SG001B SV=190	M	1B Steam Generator Tube Leak followed by SGTR-increases from 0 to 190 GPM over 5 minutes.
8	MAL-NV006A	C-BOP	1A NV pump fails to start
9	MAL-SG001B SV=330	M	1B Steam Generator Tube Leak increases to 330 gpm
10	MAL-SM002B SV=100	C-RO	S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure)

Stop!
Condition
Add new event
#4 "extra excess
letdown"

Appendix D		Operator Actions	Form ES-D-2
Op-Test No.: NRC Scenario No.: 1 Event No.: 1			
Event Description: Boration for load decrease			
Time	Position	Applicant's Actions or Behavior	
	BOP	Refer to OP/1/A/6150/009, Boron Concentration Control	
	BOP	Ensure the following valve control switches in "AUTO": <ul style="list-style-type: none"> • INV-238A (B/A Xfer Pmp To Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) 	
	BOP	Adjust the boric acid batch counter to the desired volume of boric acid to be added.	
	BOP	Place the "NC MAKEUP MODE SELECT" switch in "BORATE".	
	BOP	Adjust the controller for 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller to the desired flow.	
	BOP	Ensure 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller in "AUTO".	
	BOP	Ensure at least one boric acid transfer pump in "AUTO" or "ON".	
	BOP	Place the "NC MAKEUP MODE SELECT" switch in "START" position.	
	BOP	Verify the following valves open: <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt) 	
	BOP	If in "AUTO", verify the boric acid transfer pump starts.	

Appendix D		Operator Actions	Form ES-D-2
Op-Test No.: NRC Scenario No.: 1 Event No.: 1			
Event Description: Boration for load decrease			
Time	Position	Applicant's Actions or Behavior	
	BOP	Verify proper flow by observing the boric acid flow totalizer. {PIP 96-0137}	
	BOP	<p><u>When</u> the desired volume of boric acid is reached on the boric acid batch counter, ensure the following valves close:</p> <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt) 	
	BOP	<p><u>IF</u> desired, flush the makeup line as follows:</p> <ul style="list-style-type: none"> • Open the following valves: <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • Ensure one reactor makeup water pump is in "ON". • <u>WHEN</u> ~20 gallons of makeup water have been flushed through the makeup line, close the following valves: <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • Place the following valve control switches in "AUTO": <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • <u>IF NOT</u> required for current plant operation, place the reactor makeup water pump started in earlier step in "AUTO". <p><u>IF</u> automatic makeup is desired, refer to Enclosure 4.1 (Automatic Makeup).</p>	

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

Event Description: Decrease turbine load

Time	Position	Applicant's Actions or Behavior
	RO	Refer to OP/1/B/6300/001, Turbine Generator, Enclosure 4.2, Section 2.4.
	RO	Depress the "Load Rate" pushbutton and verify it illuminates.
	RO	Input the desired load rate on the numeric keypad and verify the load rate appears on the Variable Display.
	RO	Depress the "Enter" pushbutton.
	RO	Depress the "Target" pushbutton and verify it illuminates.
	RO	Input the desired load target on the numeric keypad and verify the load target appears on the Target Display.
	RO	Depress the "Enter" pushbutton.
	RO	To start load decrease, depress the "Go" pushbutton and verify it illuminates.

Op-Test No.: NRC Scenario No.: 1 Event No.: 3

Event Description: Pressurizer Level Channel II fails LOW

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes Pressurizer Level Channel II has failed LOW and informs SRO. <ul style="list-style-type: none">• 1AD-6, D/9 (PZR LO LEVEL HTR OFF & LETDOWN SECURED annunciator• 1AD-6, A/10 (PZR HTR CONTROLLER TROUBLE) annunciator• Pressurizer level channel II 1NCP5153 off scale – LOW EXAMINER NOTE: Annunciator response is attached.
	BOP	Responds to event using the annunciator response.
	BOP	Recognizes that letdown has been lost due to this failure and informs SRO.

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 4			
Event Description: Loss of letdown – establish excess letdown			
Time	Position	Applicant's Actions or Behavior	
	SRO	Implements AP/1/A/5500/12 (Loss of Charging or Letdown) Case II (Loss of Letdown) and directs operators.	
	BOP	Verify all Pzr level channels – INDICATING THE SAME. Determines that channel II has failed low and informs SRO.	
	SRO	Transitions to Step 1 RNO and directs the operators.	
	BOP	IF the controlling channel is failed low, THEN place "PZR LEVEL CTRL SELECT" switch in any alternate operable position.	
	SRO	Transitions back to Step 2 A/ER column and directs operators.	
	RO	Stop any power changes.	
	BOP	Verify 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) 	
	BOP	Verify PZR level – GREATER THAN 17%	
	BOP	Control charging to stabilize Pzr level at program level while maintaining seal injection flow.	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 4			
Event Description: Loss of letdown – establish excess letdown			
Time	Position	Applicant's Actions or Behavior	
	BOP	Ensure "PZR HEATER GROUP 1C" – ON.	
	BOP	Control VCT level as follows: a. Verify VCT makeup – SET FOR DESIRED BORON CONCENTRATION <i>Makeup Setting</i> b. Verify VCT makeup – IN AUTOMATIC	
	SRO	Determine and correct cause of loss of letdown.	
	BOP	Ensure "PZR LEVEL TO REC SEL" is selected to an operable channel.	
	SRO	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) 	

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

Event Description: Loss of letdown – establish excess letdown

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Evaluate normal letdown restoration as follows:</p> <p>a. Verify at least one of the following valves – CLOSED:</p> <ul style="list-style-type: none">• 1NV-1A (NC Letdn To Regen Hx Isol) <p>OR</p> <ul style="list-style-type: none">• 1NV-2A (NC Letdn To Regen Hx Isol) <i>ID's this valve is closed & reports to SRO</i> <p>b. Perform the following:</p> <ol style="list-style-type: none">1) Establish excess letdown. REFER TO OP/1/A/6200/001 (Chemical and Volume Control System)2) Dispatch operator(s) to pressurize the normal letdown line. REFER TO Enclosure 1 (Pressurization Of Normal Letdown Line). <p>c. Do not continue in this procedure until one of the following is met:</p> <ul style="list-style-type: none">• Notified by dispatched operator that the letdown line is pressurized. <p>OR</p> <ul style="list-style-type: none">• Station management authorizes normal letdown restoration.
	SRO	Determine that normal letdown is currently not available due to 1NV-2A closing and directs excess letdown to be placed in service.
	SRO	REFERS TO OP/1/A/6200/001 (Chemical and Volume Control System) Enclosure 4.12 (Establishing/Securing Excess Letdown) and directs operators.
Time	Position	<p>Notify Primary Chemistry of the following: {PIP 96-3230}</p> <ul style="list-style-type: none">• Excess Letdown will be placed in service• VCT pressure will be reduced to ~ 20 psig

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 4			
Event Description: Loss of letdown – establish excess letdown			
Time	Position	Applicant's Actions or Behavior	
	BOP	CAUTION: At least 15 psig backpressure shall be maintained on the NCP #1 seals Reduce VCT pressure to ~ 20 psig per Enclosure 4.20 (Adjusting the Volume Control Tank (VCT) Hydrogen Pressure)	
	BOP	Open the following valves to establish KC flow to the Excess Letdown Heat Exchanger: <ul style="list-style-type: none"> • 1KC-305B (Exs Letdn Hx Supply Cont Isol) • 1KC-315B (Excess Letdn Hx Ret Cont Isol) 	
	BOP	Verify 1NV-125B (Excess Letdn Hx Otlt Ctrl) is in the "VCT" position.	
	BOP	IF either of the following conditions exist, place 1NV-125B (Excess Letdn Hx Otlt Ctrl) in the "NCDT" position: <ul style="list-style-type: none"> • VCT pressure greater than or equal to 45 psig as indicated on 1NVP5500 (VCT Vent Press) • VCT level greater than or equal to 50% as indicated on 1NVP5761 (VCT Level) 	
	BOP	Open the following valves: <ul style="list-style-type: none"> • 1NV-122B (Loop C To Exs Letdn Hx Isol) • 1NV-123B (Loop C To Exs Letdn Hx Isol) Determines that 1NV-123B will not open and informs SRO.	
		SRO determines that no letdown is available and stops in AP/12. EXAMINER NOTE: Letdown will not be restored.	

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	ALL	<p>Recognize indication of a generator breaker trip:</p> <ul style="list-style-type: none"> • 1AD-11, C/11 (Gen Bkr A Overcurrent) annunciator <p>Determines that a runback should be occurring but turbine is not automatically running back.</p> <p>Recognize conditions for AP/1/A/5500/03 (Load Rejection), inform SRO, and perform immediate actions from memory.</p>
	SRO	Implements AP/1/A/5500/03 (Load Rejection) and directs operators.
	RO	<p>Verify turbine load – DECREASING.</p> <p>Determines turbine load is not decreasing and informs SRO.</p>
	SRO	Transitions to Step 1 RNO and directs operators.
	RO	<p>Perform the following:</p> <ol style="list-style-type: none"> Select "MANUAL" on the turbine control panel. Depress "CONTROL VALVES LOWER" pushbutton and reduce turbine load as required.
	SRO	Transitions to Step 2 A/ER column and directs operators.
	RO	<p>Verify proper reactor response:</p> <ul style="list-style-type: none"> • Control rods - IN "AUTO" AND STEPPING IN • P/R neutron flux – DECREASING

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	RO	Verify proper steam dump operation as follows: <ol style="list-style-type: none"> "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) – LIT "C-7A LOSS OF LOAD INTLK COND DUMP" status light (1SI-18) – LIT Steam dump valves – MODULATING T-Avg – DECREASING TO T-REF
	BOP	Verify Pzr PORV and Pzr spray valve status as follows: <ol style="list-style-type: none"> All Pzr PORVs – CLOSED Normal Pzr spray valves – CLOSED
	BOP	Verify proper CM System operation as follows: <ol style="list-style-type: none"> <u>WHEN</u> reactor power is less than 75%, <u>THEN</u> secure both C-Htr drain pumps. <u>REFER TO</u> OP/1/B/6250/004 (Feedwater Heater, Vents, Drains And Bleed Systems) Verify reactor power – GREATER THAN 56% PRIOR TO THE EVENT Verify standby hotwell pump(s) – ON Verify standby condensate booster pump(s) – ON Determines that standby hotwell and booster pumps did not start and manually starts them if necessary per Step 5.c and 5.d RNO.
	BOP	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"

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: If alarm in at this point, SRO will go to RNO.
	SRO	EXAMINER NOTE: This is Step 6 RNO. Ensure turbine generator load – REDUCED TO APPROXIMATELY 50% AND THE ALARM CLEARS
	RO	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
		EXAMINER NOTE: If alarm in at this point, SRO will go to RNO.
	SRO	EXAMINER NOTE: This is Step 7 RNO. Perform the following: <ol style="list-style-type: none"> Ensure feedwater regulating valves – MODULATING TO CONTROL S/G LEVELS AT PROGRAM SETPOINT. <u>IF</u> any S/G(s) NR level is decreasing in and uncontrolled manner, <u>THEN</u>: Determines this step is N/A and continues.
	SRO	Transitions to Step 8 A/ER column and directs operators.
	BOP	Verify AS header pressure – GREATER THAN OR EQUAL TO 140 PSIG.
	BOP	Monitor Enclosure 3 (Rod Insertion Limit Boration). EXAMINER NOTE: AP/1/A/5500/03, Enclosure 3 is attached.

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	RO	Verify reactor power – LESS THAN 30% Determines that power is greater than 30% and informs SRO.
	SRO	Transitions to Step 10 RNO and directs operators.
	SRO	<p>a. <u>IF</u> the runback target load is less than 30%, <u>THEN</u>: Determines this step is N/A and continues.</p> <p>b. <u>WHEN</u> the appropriate runback target load is reached, <u>THEN</u>:</p> <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • Turbine load • Control rods • Boron Concentration <p>c. <u>GO TO</u> Step 12.</p>
	SRO	Transitions to Step 12 A/ER and directs operators.

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	RO/BOP	<p>Verify the following PCBs – CLOSED:</p> <ul style="list-style-type: none"> • Generator breaker 1A • Generator breaker 1B • PCB 14 • PCB 15 • PCB 17 • PCB 18 <p>Determines that Generator breaker 1B is not closed and informs SRO.</p>
	SRO	Transitions to Step 12 RNO and directs operators.
	SRO	<p>Perform the following:</p> <p>a. <u>IF</u> the turbine generator is separated from the grid, <u>THEN</u> Determines step is N/A and continues.</p> <p>b. <u>IF</u> load rejection caused by loss of main busline 1A or 1B, <u>THEN</u>: Determines step is N/A and continues.</p> <p>c. <u>IF</u> a full load rejection has occurred, <u>THEN</u>: Determines step is N/A and continues.</p>
	SRO	Transitions to Step 13 A/ER column and directs operators.
	RO	Adjust power factor as necessary. <u>REFER TO</u> Unit 1 Revised Data Book Figure 43.

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	ALL	<p><u>WHEN</u> the appropriate runback target load is reached, <u>THEN</u>:</p> <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/SRO	Notify System Operating Center (SOC) using the red dispatcher telephone of current unit status.
	ALL	Determine and correct cause of Load Rejection.
	BOP	<p>Shut down unnecessary plant equipment as follows:</p> <ul style="list-style-type: none"> • CF pump. <u>REFER TO</u> OP/1/A/6250/001 (Condensate and Feedwater) • RC pump(s) and cooling tower fans. <u>REFER TO</u> OP/1/B/6400/001A (Condenser Circulating Water) • Hotwell pump(s) • Condensate booster pump(s).

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	RO	Reset steam dump valves as follows: <ul style="list-style-type: none"> 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. <u>IF</u> "T AVG" mode of operation is available, <u>THEN</u> ensure steam dump valves in "T AVG" mode. g. Verify "STM DUMP CTRL" – IN AUTOMATIC.
	RO	Verify reactor power – GREATER THAN 15%.
	RO/BOP	Verify CA Pumps – OFF.
	RO	Verify reactor power change – GREATER THAN OR EQUAL TO 15% IN A 1 HOUR PERIOD.
	SRO/BOP/RO	Verify the following sections to take appropriate samples: <ul style="list-style-type: none"> • Radiation Protection to sample and analyze gaseous effluents. <u>REFER TO</u> Selected Licensee Commitments Manual, Section 16.11-6. • Primary Chemistry to sample for isotopic analysis of iodine. <u>REFER TO</u> 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).

Op-Test No.: NRC Scenario No.: 1 Event No.: 5 – 6

Event Description: Turbine runback

Time	Position	Applicant's Actions or Behavior
	SRO	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)
	SRO/BOP/RO	Notify Reactor Group Engineer of occurrence.
	ALL	Determine long term plant status. <u>RETURN TO</u> OP/1/A/6100/003 (Controlling Procedure for Unit Operation).

Op-Test No.: NRC Scenario No.: 1 Event No.: 7 – 8		
Event Description: 1B Steam Generator Tube Leak, 1A NV pump fails to start.		
Time	Position	Applicant's Actions or Behavior
	ALL	Recognize <u>symptoms</u> of a Steam Generator Tube Leak: <ul style="list-style-type: none"> • Charging flow increasing • EMF 33, 72, 73, 27, 31 alarm
	SRO	Implements AP/1/A/5500/10 (Reactor Coolant Leak) Case I, Steam Generator Tube Leak, and directs operators
	ALL	Monitor Enclosure 1 (Foldout Page)
	RO/BOP	Verify Pzr level – STABLE OR INCREASING Determines Pzr level is decreasing and informs SRO.
	SRO	Transitions to Step 2 RNO and directs operators.

Op-Test No.: NRC Scenario No.: 1 Event No.: 7 – 8		
Event Description: 1B Steam Generator Tube Leak, 1A NV pump fails to start.		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Maintain charging flow less than 180 GPM b. Manually throttle 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to stabilize Pzr level c. <u>IF</u> Pzr level is stable <u>OR</u> increasing, <u>THEN GO TO</u> Step 3. Determines Pzr level is still decreasing and continues in RNO. d. <u>IF</u> Pzr level continues to decrease, <u>THEN</u>: <ul style="list-style-type: none"> 1) Reduce letdown flow to 45 GPM as follows: EXAMINER NOTE: The Crew recognizes all letdown is isolated and intent of this step is met. 2) <u>IF</u> Pzr level continues to decrease, <u>THEN</u> ensure the following valves closed: (1A Otlt Cont Isol) ? Determine step is N/A intent met and continues in RNO column. 3) <u>IF</u> Pzr level is stable <u>OR</u> increasing, <u>THEN GO TO</u> Step 3. Determines Pzr level is continuing to decrease and continues in RNO.

Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10

Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).

	SRO	<p>4) <u>IF</u> Pzr level continues to decrease, <u>THEN</u>:</p> <p>a) Start an additional NV pump as follows:</p> <ul style="list-style-type: none">(1) Open 1NV-252A (NV Pumps Suct From FWST)(2) Open 1NV-253B (NV Pumps Suct From FWST)(3) Close 1NV-188A (VCT Otlt Isol)(4) Close 1NV-189B (VCT Otlt Isol)(5) Start the desired NV Pump <p>Bob — Recognizes that 1A NV Pump fails to start and informs SRO.</p> <p>who? — Determines that no additional charging is available and determines that Pzr level is continuing to decrease.</p> <p>b) Adjust Control Rods and turbine load as required to maintain T-Avg within 1°F of T-Ref.</p>
	SRO	<p>REFER TO the following:</p> <ul style="list-style-type: none">• AP/1/A/5500/09 (Rapid Downpower) <p>(OR)</p> <ul style="list-style-type: none">• OP1/A/6100/003 (Controlling Procedure for Unit Operation)
	SRO	<p>c) <u>IF</u> Pzr level is stable <u>OR</u> increasing <u>THEN GO TO</u> Step 3.</p> <p>Determines that Pzr level is continuing to decrease and continues in RNO.</p> <p>d) <u>IF</u> Pzr level is stable <u>OR</u> increasing <u>THEN GO TO</u> Step 3.</p> <p>Determines that Pzr level is continuing to decrease and continues in RNO.</p>

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
	RO/BOP	<i>del</i> IF Pzr level continues to decrease OR Pzr level cannot be maintained greater than 11%, <u>THEN</u> : (1) Manually trip reactor (2) Manually initiate S/I 3) <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	SRO	Enters EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) and directs operators	
	ALL	Monitor Enclosure (1) (Foldout Page)	
	RO	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 OR <ul style="list-style-type: none"> • All turbine control valves - CLOSED 	
	BOP	Verify 1ETA and 1ETB – ENERGIZED.	
	BOP	Verify S/I is actuated: <ol style="list-style-type: none"> a. "SAFETY INJECTION ACTUATED" status light(1SI-13) – LIT b. E/S load sequencer actuated status lights (1SI-14) – LIT 	
	RO	Announce "Unit 1 Safety Injection"	
	SRO	Implement RP/0/A/5000/01 (Classification Of Emergency).	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO	Verify all Feedwater Isolation status lights (1SI-5) – LIT	
	BOP	Verify Phase A Containment Isolation status as follows: a. Phase A "RESET" lights – DARK b. Monitor Light Panel Group 5 St lights – LIT EXAMINER NOTE: 1KC-305 may be in wrong position due to attempt to put excess letdown in service earlier in the scenario. If so, BOP will close it in response to this step's RNO.	
	ALL	Verify proper Phase B actuation as follows: a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG b. <u>IF AN ANY TIME</u> containment pressure exceeds 3 PSIG while in this procedure, <u>THEN</u> perform Step 10.a.	
	RO	Verify proper CA pump status as follows: a. Motor driven CA pumps – ON b. 3 S/G N/R levels – GREATER THAN 11%	
	BOP	Verify all of the following S/I pumps – ON: <ul style="list-style-type: none"> • NV pumps • ND pumps • NI pumps Determines that 1A NV pump and 1A ND pump are off and informs SRO.	
	SRO	Transitions to Step 12 RNO and directs the operators	

Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10

Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).

Time	Position	Applicant's Actions or Behavior
	BOP	Perform the following for affected trains: a. Reset ECCS. (a) b. Reset D/G load sequencer. (a) c. Manually start affected pump (1/A NV Pump does not start). d. <u>IF AT ANY TIME</u> a B/O occurs, <u>THEN</u> restart S/I equipment previously on.
	BOP	Verify all KC pumps – ON.
	BOP	Verify all Unit 1 and Unit 2 RN pumps – ON
	BOP	Verify proper ventilation systems operations. <ul style="list-style-type: none">• <u>REFER TO</u> Enclosure 2 (Ventilation System Verification)• Notify Unit 2 operator to perform Enclosure 3 (Opposite unit Ventilation Verification) EXAMINER NOTE: Enclosure 2 of this procedure is attached.
	RO	Verify all S/G pressures – GREATER THAN 775 PSIG
	BOP	Verify proper S/I flow as follows: a. "NV S/I FLOW" – INDICATING FLOW b. NC Pressure – LESS THAN 1620 PSIG Determines NI pressure is greater than 1620 psig and informs SRO.

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	SRO	Transitions to Step 17.b RNO and directs operators	
	BOP	Perform the following: 1) Ensure ND pump miniflow valve on operating ND pump(s) – OPEN 2) <u>IF</u> the ND Pump miniflow valve(s) cannot be opened, <u>THEN</u> perform the following for the affected train(s): Determines that this step is N/A and continues in RNO column. 3) <u>GO TO</u> Step 18.	
	SRO	Transition to step 18 A/ER and directs operators.	
	RO	Control S/G levels as follows: a. Verify total CA flow – GREATER THAN 450 GPM b. <u>WHEN</u> at least one S/G N/R level is greater than 11% (29% ACC), <u>THEN</u> throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.	
	RO	Verify all CA isolation valves – OPEN	
	BOP	Verify S/I equipment status based on monitor light panel – IN PROPER ALIGNMENT Determines that 1A NV pump, 1A ND pump, and possibly 1KC-305 are not in proper alignment and informs SRO.	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	SRO	Transition to Step 20 RNO and directs operators.	
	BOP	Manually align equipment.	
	SRO	Transitions to Step 21 A/ER column and directs operators.	
	RO	<p>NOTE: Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.</p> <p>Control NC temperature. REFER TO Enclosure 4 (NC Temperature Control)</p> <p>EXAMINER NOTE: Enclosure 4 of this procedure is attached.</p>	
	BOP/RO	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	Verify NC subcooling based on core exit T/Cs – GREATER THAN 0°F	
	BOP	Verify main steamlines are intact as follows: <ul style="list-style-type: none"> • All S/G pressures – STABLE OR INCREASING • ALL S/GS – PRESSURIZED 	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO/BOP	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-34 (S/G Sample) • 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 Determines that 1EMF-33 and 1EMF-27 are in alarm, and 1B S/G level is increasing in an uncontrolled manner and informs SRO	
	SRO	Transitions to Step 25 RNO and directs operators.	
	SRO	<u>IF</u> any EMF trip 1 light is lit <u>OR</u> any S/G level is increasing in an uncontrolled manner, <u>THEN</u> concurrently: <ul style="list-style-type: none"> • Implements EP/1/A/5000/F-0 (Critical Safety Function Status Trees) • <u>GO TO</u> EP/1/A/5000/E-3 (Steam Generator Tube Rupture). 	
	SRO	Transitions to EP/1/A/5000/E-3 and directs operators. <i>Directs STA to monitor EP/1/A/5000/F-0.</i>	
	RO/BOP	Monitor Enclosure 1 (Foldout Page)	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO/BOP	<p>Identify ruptured S/Gs as follows:</p> <ul style="list-style-type: none"> • S/G level – INCREASING IN AN UNCONTROLLED MANNER OR • Chemistry or RP determines ruptured S/G by frisking the cation columns in the CT lab. OR • The following EMF trip 1 lights – LIT: <ul style="list-style-type: none"> • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D) • Chemistry determines ruptured S/G using 1EMF-34 (S/G Sample). OR • <u>IF</u> S/G Sampling is required to identify ruptured S/G(s), <u>THEN</u>: <ul style="list-style-type: none"> a. Ensure the following signals reset: <ul 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. Notify Chemistry to sample all S/Gs for activity. 	
	RO	Verify at least one intact S/G – AVAILABLE FOR NC SYSTEM COOLDOWN.	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO	Isolate steam flow from ruptured S/Gs as follows: a. Verify all ruptured S/Gs PORV – CLOSED b. Verify S/G(s) 1B and 1C – INTACT Determines 1B S/G is ruptured and informs SRO.	
	SRO	Transition to Step 4.b RNO and directs operators.	
	SRO	Perform the following: 1) <u>IF</u> CA Pump #`1 is the only source of feedwater, <u>THEN</u> maintain steam flow to the CAPT from at least one S/G Determines this step is N/A and continues in RNO column. 2) <u>IF</u> S/G 1B is ruptured, <u>THEN</u> : a) Dispatch two operators to unlock and close 1SA-1 (Main Steam 1B To CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock installed). b) <u>IF</u> 1SA-1 cannot be closed, <u>THEN</u> dispatch two operators to unlock and close 1SA-3 (S/G 1 B SM To CAPT Stop Check) (AM-551, DD-53, Rm 217) (Key #589 and #599). 3) <u>IF</u> S/G 1C is ruptured, <u>THEN</u> : Determines that step is N/A.	

*If valve w
close, then
this step is
N/A*

Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10

Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Step 4.c A/ER column and directs operators.
	RO	<p>c. Isolate blowdown and steam drain on all ruptured S/G(s) as follows:</p> <p>Determines this step is N/A for S/Gs 1A, 1C, and 1D.</p> <ul style="list-style-type: none">• S/G 1B<ol style="list-style-type: none">1) Close 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V)2) Verify the following blowdown isolation valves – CLOSED:<ol style="list-style-type: none">a) 1BB-19A (S/G 1B Bldwn Cont Isol Insd)b) 1BB-150B (S/G 1B Bldwn Cont Isol Byp)c) 1BB-21B (S/G 1B Bldwn Cont Isol Otsd)
	RO	<p>Close the following valves on all ruptured S/G(s):</p> <p>(CRITICAL TASK)</p> <ul style="list-style-type: none">• MSIV <i>close</i>• MSIV Bypass valve <p>EXAMINER NOTE: At some point after S/G 1B MSIVs are isolated, S/G pressure will increase to the PORV lift setpoint. When that occurs the PORV will stick open. Isolation of the steam release path is a CRITICAL TASK.</p>

Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10

Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).

Time	Position	Applicant's Actions or Behavior
	RO/BOP	<p>Control ruptured S/G(s) level as follows:</p> <ul style="list-style-type: none">a. Verify ruptured S/G(s) N/R level – GREATER THAN 16% (29% ACC).b. Isolate feed flow to all ruptured S/G(s) as follows: Determines this step is N/A for S/Gs 1A, 1C, and 1D.<ul style="list-style-type: none">• S/G 1B:<ul style="list-style-type: none">1) Close 1CA-58A (CA Pmp A Disch To S/G 1B Isol)2) Close 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol)c. IF AT ANY TIME ruptured S/G(s) N/R level is less than 16% (29% ACC), THEN perform step 6. <p><i>Examiner Note: This action should not be required.</i></p>
	BOP/RO	<p>Verify Pzr PORV and isolation valve status as follows:</p> <ul style="list-style-type: none">a. Power to all Pzr PORV isolation valves – AVAILABLEb. All Pzr PORVs – CLOSEDc. At least one Pzr PORV isolation valve – OPENd. IF AT ANY TIME Pzr PORV opens due to high pressure while in this procedure, THEN, after Pzr pressure decreases to less than 2315 PSIG, perform Step 7.b (All Pzr PORVs – CLOSED) <p><i>Examiner Note: This action should not be required.</i></p>
	RO	<p>Verify main steamlines are intact as follows:</p> <ul style="list-style-type: none">• All S/G pressures – STABLE OR INCREASING• All S/Gs – PRESSURIZED

Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10

Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Control intact S/G levels as follows: 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%. c. Ensure CA suction source switchover criterion is monitored. <u>REFER TO</u> Enclosure 1 (Foldout Page)
	BOP	Ensure S/I – RESET: a. ECCS <i>Phase B</i> b. D/G load sequencers <i>Phase B</i> c. <u>IF AT ANY TIME</u> a B/O occurs, <u>THEN</u> restart S/I equipment previously on <i>Examiner Note: This action should not be required.</i>
	BOP	Ensure the following containment isolation signals – RESET: <ul style="list-style-type: none">• Phase A• Phase B
	BOP	Establish VI to containment as follows: a. Ensures 1VI-77B (VI Cont Isol) – OPEN b. Verify VI pressure – GREATER THAN 85 PSIG

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	BOP	Verify all AC busses are energized by offsite power as follows: <ul style="list-style-type: none"> • A Train: <ul style="list-style-type: none"> • "FTA B/O NORM FDR FRM ATC" – CLOSED • "D/G 1A BKR TO ETA" – OPEN • 1ETA – ENERGIZED • B Train: <ul style="list-style-type: none"> • "FTB B/O NORM FDR FRM ATD" – CLOSED • "D/G 1B BKR TO ETB" – OPEN • 1ETB – ENERGIZED. 	
	BOP/RO	Verify criteria to stop operating ND pumps as follows: <ol style="list-style-type: none"> At least one ND pump – ON NC pressure – GREATER THAN 285 PSIG Ensure all ND pump(s) not supporting Cold Leg Recirc – STOPPED IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart ND pumps <i>Examiner Note: This action should not be required.</i>	
	SRO	Verify ruptured S/G(s) – IDENTIFIED. Determines 1B S/G is the ruptured S/G.	
	RO	Verify the following valves on all ruptured S/Gs – CLOSED: <ul style="list-style-type: none"> • MSIV (1B) • MSIV bypass valves (1B) 	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO	Verify all ruptured S/Gs pressure – GREATER THAN 325 PSIG	
	BOP	<p><u>WHEN</u> "P-11 PZR S/I BLOCK PERMISSIVE" status light (1SI-18) is lit, <u>THEN</u>:</p> <ul style="list-style-type: none"> a. Depress ECCS steam pressure "BLOCK" pushbuttons b. Verify main steam isolation blocked status lights (1SI-13) – LIT c. Maintain NC pressure less than 1955 PSIG using one of the following: <ul style="list-style-type: none"> • Pzr spray OR • Pzr PORV 	
	ALL	<p><u>NOTE:</u> NC Pump trip criteria based on NC subcooling does not apply after starting a controlled cooldown.</p> <p>After the low steamline pressure main steam isolation signal is blocked, Main Steam Isolation will occur if the high steam pressure rate setpoint is exceeded.</p>	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO <i>Critical Task</i>	<p>EXAMINER NOTE: Cooldown and depressurization to minimize break flow is a CRITICAL TASK. <i>or make separate line</i></p> <p>Initiate NC System cooldown as follows:</p> <p>a. Determine required core exit temperature from the table below:</p> <p>EXAMINER NOTE: Table is attached.</p> <p>b. Verify the condenser is available as follows:</p> <ul style="list-style-type: none"> • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) – LIT • MSIV on intact S/G(s) – OPEN <p>c. WHEN "P-12 LO-LO TAVG" status light (1SI-18) is lit, THEN place the steam dump interlock bypass switches in "BYP INTK."</p> <p>d. Verify steam dumps – IN PRESSURE MODE</p> <p>Determines steam dumps are in "T AVG" Mode and informs SRO.</p>	
	SRO	Transition to Step 19.d RNO and directs operators.	
	RO	<p>Place steam dumps in pressure mode as follows:</p> <ol style="list-style-type: none"> 1) Place "STM DUMP CTRL" in manual. 2) Manually adjust the "STM DUMP CTRL" to match "STM DUMP CTRL" demand and "% STM DUMP DEMAND". 3) <u>WHEN</u> demand on the "STM DUMP CTRL" is equal to the "% STM DUMP DEMAND", <u>THEN</u> place the steam dumps in pressure mode. 	
	SRO	Transition to Step 19.e A/ER column and direct operators.	

What aspects of this task are important?

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	RO	EXAMINER NOTE: If Main Steam Isolation occurs during the cooldown, the SRO will direct steam to be dumped from intact S/G PORVs per step 19.e RNO.	
	RO	e. Dump steam to condenser from intact S/G(s) at maximum rate while attempting to avoid a Main Steam Isolation. f. Verify main steam isolation blocked status lights (1SI-13) – LIT. g. Verify core exit T/Cs – LESS THAN REQUIRED TEMPERATURE. EXAMINER NOTE: Procedure will loop in Step 19 until the required temperature is reached per Step 19.g RNO. h. Stabilize core exit T/Cs – LESS THAN REQUIRED TEMPERATURE.	
	SRO	Verify NC System cooldown in Step 19 – COMPLETED.	
	RO	Verify ruptured S/G(s) pressure is under operator control as follows: a. All ruptured S/G(s) pressure – STABLE <u>OR</u> INCREASING. b. <u>IF AT ANY TIME</u> ruptured S/G(s) pressure is decreasing while in this procedure, <u>THEN</u> perform Step 21.	
	RO	Verify NC subcooling based on core exit T/Cs – GREATER THAN 20°F.	

Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10

Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Depressurize NC System using PZR Spray as follows:</p> <ol style="list-style-type: none">Verify normal Pzr spray flow – AVAILABLE.Verify Pzr level – LESS THAN 76% (73% ACC).Depressurize NC System with maximum available spray.Verify subcooling based on core exit T/Cs – GREATER THAN 0° F.Verify Pzr level – LESS THAN 76% (73% ACC).Verify NC pressure – LESS THAN RUPTURED S/G(s) PRESSURE.Verify Pzr level – GREATER THAN 11% (20% ACC). <p>EXAMINER NOTE: SRO will loop back through this step until one of the conditions is met. At that time, the depressurization will be stopped. The SRO may determine that sprays are not effectively depressurizing the NCS and transition to Step 23.f RNO or Step 23.g RNO which transitions to Step 24 A/ER and use Pzr PORVs instead.</p> <p>Close the following valve(s):</p> <ol style="list-style-type: none">Pzr spray valves1NV-37A (NV Supply To Pzr Aux Spray) <p>Observe Caution prior to step 26 and <u>GO TO</u> Step 26.</p>
	BOP	<p>EXAMINER NOTE: This is Step 24.</p> <p>Depressurize NC System using PZR PORV.</p> <ol style="list-style-type: none">Verify at least one Pzr PORV – AVAILABLEVerify Pzr level – LESS THAN 76% (73% ACC)Open one Pzr PORV.Verify subcooling based on core exit T/Cs – GREATER THAN 0°F

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	BOP	e. Verify Pzr level – LESS THAN 76% (73% ACC) f. Verify NC pressure – LESS THAN RUPTURED S/G(s) PRESSURE g. Verify Pzr level – GREATER THAN 11% (20% ACC) h. Close Pzr PORV. i. Close Pzr spray valve(s). EXAMINER NOTE: SRO will loop back through this step until one of the conditions is met. At that time, the depressurization will be stopped.	
	RO	Verify NC Pressure - INCREASING.	
	ALL	CAUTION: S/I must be terminated when termination criteria are satisfied to prevent overfilling the ruptured S/G(s).	
	RO/BOP	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: <ul style="list-style-type: none"> N/R level in at least one intact S/G – GREATER THAN 11% (29% ACC). OR <ul style="list-style-type: none"> Total feed flow available to S/G(s) – GREATER THAN 450 GPM. c. NC pressure – STABLE OR INCREASING. d. Pzr level – GREATER THAN 11% (20% ACC).	

Appendix D D-2		Operator Actions	Form ES-
Op-Test No.: NRC Scenario No.: 1 Event No.: 9 – 10			
Event Description: Steam Generator Tube Rupture coincident with manual reactor trip, S/G PORV on B S/G leaks by seat – just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure).			
Time	Position	Applicant's Actions or Behavior	
	BOP	Stop S/I pumps as follows: a. Stop NI pumps. b. Ensure only one NV pump – ON	
	BOP	Verify VI pressure – GREATER THAN 50 PSIG	
	BOP	Isolate NV S/I flowpath as follows: a. Verify the following valve – OPEN: <ul style="list-style-type: none"> • 1NV-252A (NV Pumps Suct From FWST) • 1NV-253B (NV Pumps Suct From FWST) b. Verify the following valves – OPEN <ul style="list-style-type: none"> • 1NV-203A (NV Pumps A&B Recirc Isol) • 1NV-202B (NV Pumps A&B Recirc Isol) c. Close the following valves: <ul style="list-style-type: none"> • 1NI-9A (NV Pmp C/L Inj Isol) • 1NI-10B (NV Pmp C/L Inj Isol) 	

TERMINATE SCENARIO WHEN S/I FLOWED VERIFIED NOT REQUIRED

Classification: Site Area Emergency per 4.1.S.3 – Potential Loss of Either Nuclear Coolant System or Fuel Clad and Loss of Any Other Barrier. This EAL poses no threat to the safety of plant personnel or the general public.

EMERGENCY NOTIFICATION FORM

1.	<input checked="" type="checkbox"/> THIS IS A DRILL	<input type="checkbox"/> ACTUAL EMERGENCY	<input type="checkbox"/> INITIAL	<input type="checkbox"/> FOLLOW-UP	MESSAGE NUMBER _____
2.	SITE: <u>Catawba Nuclear Site</u>	UNIT: _____	REPORTED BY: _____		
3.	TRANSMITTAL TIME/DATE: _____ / _____ / _____ (Eastern) mm dd yy		CONFIRMATION PHONE NUMBER: <u>(803) 831-3807 (Simulator)</u>		
4.	AUTHENTICATION (If Required): _____ (Number)		_____ (Codeword)		
5. EMERGENCY CLASSIFICATION:					
<input checked="" type="checkbox"/> NOTIFICATION OF UNUSUAL EVENT <input type="checkbox"/> ALERT <input checked="" type="checkbox"/> SITE AREA EMERGENCY <input type="checkbox"/> GENERAL EMERGENCY					
6.	<input checked="" type="checkbox"/> Emergency Declaration At: _____		<input type="checkbox"/> Termination At: TIME/DATE: _____ / _____ / _____ (If B, go to item 16.) (Eastern) mm dd yy		
7.	EMERGENCY DESCRIPTION/REMARKS: <u>EAL # 4.1.S.3 - Potential Loss of Either Nuclear Coolant System or Fuel Clad and Loss of Any Other Barrier. This EAL poses no threat to the safety of plant personnel or the general public.</u>				
8.	PLANT CONDITION: <input type="checkbox"/> IMPROVING <input type="checkbox"/> STABLE <input type="checkbox"/> DEGRADING				
9.	REACTOR STATUS: <input type="checkbox"/> SHUTDOWN		TIME/DATE: _____ / _____ / _____ (Eastern) mm dd yy		<input type="checkbox"/> % POWER
10.	EMERGENCY RELEASE(S):				
<input type="checkbox"/> NONE (Go to item 14.) <input type="checkbox"/> POTENTIAL (Go to item 14.) <input type="checkbox"/> IS OCCURRING <input type="checkbox"/> HAS OCCURRED					
**11. TYPE OF RELEASE: <input type="checkbox"/> ELEVATED <input type="checkbox"/> GROUND LEVEL					
<input type="checkbox"/> AIRBORNE: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____ Time(Eastern) Date Time(Eastern) Date					
<input checked="" type="checkbox"/> LIQUID: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____ Time(Eastern) Date Time(Eastern) Date					
**12. RELEASE MAGNITUDE: <input type="checkbox"/> CURIES PER SEC. <input type="checkbox"/> CURIES NORMAL OPERATING LIMITS: <input type="checkbox"/> BELOW <input type="checkbox"/> ABOVE					
<input type="checkbox"/> NOBLE GASES _____ <input type="checkbox"/> IODINES _____					
<input type="checkbox"/> PARTICULATES _____ <input type="checkbox"/> OTHER _____					
**13. ESTIMATE OF PROJECTED OFFSITE DOSE: <input type="checkbox"/> NEW <input type="checkbox"/> UNCHANGED PROJECTION TIME: _____ (Eastern)					
TEDE mrem Thyroid CDE mrem ESTIMATED DURATION: _____ HRS.					
SITE BOUNDARY					
2 MILES _____					
5 MILES _____					
10 MILES _____					
**14. METEOROLOGICAL DATA: <input type="checkbox"/> WIND DIRECTION (from) _____ ° <input type="checkbox"/> SPEED (mph) _____					
<input type="checkbox"/> STABILITY CLASS _____ <input type="checkbox"/> PRECIPITATION (type) _____					
15. RECOMMENDED PROTECTIVE ACTIONS:					
<input checked="" type="checkbox"/> NO RECOMMENDED PROTECTIVE ACTIONS					
<input type="checkbox"/> EVACUATE _____					
<input type="checkbox"/> SHELTER IN-PLACE _____					
<input type="checkbox"/> OTHER _____					
16. APPROVED BY: _____ Emergency Coordinator _____ TIME/DATE: _____ / _____ / _____ (Name) (Title) (Eastern) mm dd yy					

* If items 8-14 have not changed, only items 1-7 and 15-16 are required to be completed.

** Information may not be available on initial notifications.

D/9

PZR LO LEVEL HTR OFF & LETDN SECURED

SETPOINT: 17% level

ORIGIN: PZR level Channel 1, 2, or 3 depending on position of "PZR LEVEL CTRL SELECT" switch:

- 1NCLT5160 (Pressurizer Level Ch. 1)
- 1NCLT5150 (Pressurizer Level Ch. 2)
- 1NCLT5170 (Pressurizer Level Ch. 3)

**PROBABLE
CAUSE:**

NOTE: PZR press and level channels have common reference legs. PZR press Ch. 3 and 4 share a reference leg with PZR level Ch. 3 and PZR level cold cal. PZR press Ch. 1 shares a reference leg with PZR level Ch. 1 and PZR press Ch. 2 shares a reference leg with PZR level Ch. 2.

1. Charging and/or letdown flow mismatch.
2. Leakage.
3. Load transient.
4. Instrument malfunction.

THE RESPONSE FOR THIS ALARM IS LISTED IN

AP/1/A/5500/12 (LOSS OF CHARGING OR LETDOWN)

A/10**PZR HTR CONTROLLER TROUBLE**

- SETPOINT:**
1. Phase loss or reversal.
 2. Loss of a cooling fan controller cabinet.
- ORIGIN:** 1SCR1C
- PROBABLE CAUSE:**
1. Loss of fan power.
 2. Failure in cabinet.
 3. Phase reversal.
 4. Heaters secured due to Pzr low level.
- AUTOMATIC ACTIONS:** None
- IMMEDIATE ACTIONS:**
1. Take "PZR HTR GROUP 1C" to "OFF".
 2. Manually use other heater groups to control pressure.
- SUPPLEMENTARY ACTIONS:**
1. Monitor and manually control PZR press until Group 1C can be returned to "ON".
 2. **IF** C heaters secured due to a Pzr low level, manually reset breaker by depressing "ON" for "PZR HTR GROUP C" when the low level clears.
 3. Refer to TS 3.4.9 for Pzr Htr operability requirements.
- REFERENCES:**
1. PZR Heaters Electrical System Description (ILE)
 2. CNEE-0111-01.74 (Elementary Diagram 600V Load Center 1LXC Alarm Circuits)
 3. TS 3.4.9

1. **IF** the control rods cannot be maintained above the rod insertion limits, **THEN**:

- ___ a. **IF** OAC is available, **THEN** verify OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) - IN ALARM.
- ___ b. Ensure one NV pump - ON.

NOTE A boration rate significantly higher than 30 GPM may have an undesired effect on power reduction.

c. Establish boric acid flow of greater than or equal to 30 GPM from the BAT as follows:

- ___ 1) Ensure at least one boric acid transfer pump - ON.
- ___ 2) Open the following valves:
 - ___ • 1NV-238A (B/A To Blendr Ctrl Vlv)
 - ___ • 1NV-186A (B/A Blender Otlt To VCT Otlt).
- ___ 3) Maintain boration flow greater than or equal to 30 GPM as indicated on 1NVCR5450.
- d. **WHEN** OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) alarm clears **OR** control rods are above insertion limits, **THEN**:
 - 1) Close the following valves:
 - ___ • 1NV-238A (B/A To Blendr Ctrl Vlv)
 - ___ • 1NV-186A (B/A Blender Otlt To VCT Otlt).
 - ___ 2) Stop the boric acid transfer pump(s) previously on and place in "AUTO".

1. **NC Pump Trip Criteria:**

- IF the following conditions are satisfied, THEN trip all NC pumps while maintaining seal injection flow:
 - At least one NV or NI pump - ON
 - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.

2. **CA Suction Source Switchover Criteria:**

- IF either of the following annunciators are lit, THEN REFER TO AP/1/A/5500/06 (Loss Of S/G Feedwater).
 - 1AD-5, H/4 "CACST LO LEVEL"
- OR
- 1AD-8, B/1 "UST LO LEVEL"

3. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**

- IF NC pressure is less than 1500 PSIG AND NV S/I flowpath is aligned, THEN close 1NV-202B and 1NV-203A.
- IF NC pressure is greater than 2000 PSIG, THEN open 1NV-202B and 1NV-203A.

4. **Cold Leg Recirc Switchover Criterion:**

- IF FWST level decreases to 37% (1AD-9, D/8 "FWST 2/4 LO LEVEL" lit), AND an S/I has occurred, THEN GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Verify proper VC/YC operation as follows:

a. Verify one train of the following equipment is in operation:

- ___ • YC chiller
- ___ • CR AHU
- ___ • CRA AHU
- ___ • CRA PFT.

b. Verify the following alarms - DARK:

- ___ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE"
- ___ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE".

a. **IF** any train is not properly aligned, **THEN** dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. **REFER TO** the following:

- ___ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System)
- ___ • EM/0/A/5200/001 (Troubleshooting Cause for Improper Operation of VC/YC System).

b. Perform the following based on the status of given alarms:

- 1) **IF** 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE" **AND** 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE" are lit, **THEN**:

a) Ensure the following VC intake dampers - CLOSED:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet)
- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

- ___ b) **GO TO** Step 1.d.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. (Continued)

2) IF 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE" is lit, **THEN**:

a) Ensure the following VC dampers - CLOSED:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet).

b) Ensure the following dampers - OPEN:

- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ c) **GO TO** Step 1.d.

3) IF 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE" is lit, **THEN**:

a) Ensure the following VC dampers - CLOSED:

- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

b) Ensure the following dampers - OPEN:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet).

___ c) **GO TO** Step 1.d.

c. Ensure the following VC dampers - OPEN:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet)
- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ d. Repeat Step 1.b every 8 hours until notified by station management.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. **Ensure proper VA System operation as follows:**

- Ensure the following fans - OFF:

___ • ABUXF-1A
___ • ABUXF-1B

- Ensure VA System filter is in service as follows:

___ • 1ABF-D-12 (VA Filt A Bypass Damper)
- CLOSED

___ • 1ABF-D-5 (VA Filt B Bypass Damper) -
CLOSED.

- Ensure the following fans - ON:

___ • ABFXF-1A
___ • ABFXF-1B

3. **Verify proper VE System operation as follows:**

___ a. VE fans - ON.

___ a. Manually start fan(s).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

3. (Continued)

- ___ b. Annulus pressure - BETWEEN
-1.4 IN. WC AND -1.8 IN. WC.

- b. Perform the following:

- 1) IF annulus pressure is more positive
than -1.4 in. WC, THEN:

- a) Verify flow indicated on the
following indications:

- ___ • "VE 1A FLOW TO STACK"
___ • "VE 1B FLOW TO STACK".

- b) IF flow is not indicated, THEN
dispatch operator to verify status
of the following dampers based
on their local indication or their
operating piston rods being
extended 4" to 6":

- ___ • 1AVS-D-2 (VE A Trn Recirc
Damp) (AB-603, JJ-51, Rm
500) - CLOSED

- ___ • 1AVS-D-7 (VE B Trn Recirc
Damp) (AB-603, HH-52, Rm
500) - CLOSED

- ___ • 1AVS-D-3 (VE A Trn Exh
Damp) (AB-603, JJ-52, Rm
500) - OPEN

- ___ • 1AVS-D-8 (VE B Trn Exh
Damp) (AB-603, HH-52, Rm
500) - OPEN.

- ___ c) Consult plant engineering staff
and notify IAE/Maintenance to
troubleshoot and repair. REFER
TO EM/1/A/5200/002
(Troubleshooting Cause For VE
System Hi/Lo Pressure.

- ___ d) GO TO Step 3.c.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

3. (Continued)

2) IF annulus pressure is more negative than -1.8 in. WC, THEN:

- ___ a) Determine which VE train indicates highest discharge flow to stack.
- ___ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack is secured.
- ___ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. REFER TO EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure.

- ___ c. Repeat Step 3.b every 30 minutes until notified by station management.

RESPONSE NOT OBTAINED

- [illegible]

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Verify at least one NC pump - ON.

Perform the following:

- a. Use NC T-Colds to determine NC temperature as required in subsequent steps.
- b. GO TO Step 4.

2. Use NC T-Avg to determine NC temperature as required in subsequent steps.

3. IF AT ANY TIME NC pumps are tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.

4. Verify one of the following:

GO TO Step 7.

- NC temperature - STABLE

OR

- NC temperature - TRENDING TO 557°F.

5. Continue to monitor NC temperature.

6. Do not continue in this enclosure until one of the following occurs:

- NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER.

OR

- NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. Verify NC temperature - LESS THAN 557°F AND DECREASING.

Perform the following:

- a. IF NC temperature is greater than 557°F AND increasing, THEN stabilize NC temperature at 557°F as follows:
- 1) IF steam dumps are available, THEN use steam dumps.
 - 2) IF steam dumps are not available, THEN use S/G PORVs.
- b. GO TO Step 9.

8. Attempt to stop the NC cooldown as follows:

- a. Ensure all steam dumps - CLOSED.
- b. Verify all S/G PORVs - CLOSED.

- b. IF any S/G PORV cannot be closed, THEN close its isolation valve.

- c. 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).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8. (Continued)

d. 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).

e. Verify NC cooldown - STOPPED.

e. 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:

- 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:

- 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:

- All MSIVs
- All MSIV bypass valves.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9. Continue to perform the actions of this enclosure as required to ensure one of the following:

- NC temperature - STABLE

OR

- NC temperature - TRENDING TO 557°F.

1. NC Pump Trip Criteria:

- IF the following conditions are satisfied, THEN trip all NC pumps while maintaining seal injection flow:
 - At least one NV or NI pump - ON
 - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.

2. Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):

- IF NC pressure is less than 1500 PSIG AND NV S/I flowpath is aligned, THEN close 1NV-202B and 1NV-203A.
- IF NC pressure is greater than 2000 PSIG, THEN open 1NV-202B and 1NV-203A.

3. S/I Reinitiation Criteria:

NOTE The following criteria is not applicable until after Step 27 is completed.

- IF NC subcooling based on core exit T/Cs is less than 0°F OR Pzr level cannot be maintained greater than 11% (20% ACC), THEN:
 - a. Manually start S/I pumps and align valves as necessary to restore subcooling and Pzr level.
 - b. GO TO EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired).

4. Secondary Integrity Criteria:

- IF pressure in any unisolated S/G is decreasing in an uncontrolled manner OR any unisolated S/G has completely depressurized, THEN GO TO EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) unless needed for NC System cooldown.

5. Cold Leg Recirc Switchover Criterion:

- IF FWST level decreases to 37% (1AD-9, D/8 "FWST 2/4 LO LEVEL" lit), THEN GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).

6. CA Suction Source Switchover Criteria:

- IF either of the following annunciators are lit, THEN REFER TO AP/1/A/5500/06 (Loss Of S/G Feedwater).

- 1AD-5, H/4 "CACST LO LEVEL"

OR

- 1AD-8, B/1 "UST LO LEVEL"

7. Multiple Tube Rupture Criteria:

- IF level in any intact S/G increases in an uncontrolled manner OR any intact S/G indicates abnormal radiation, THEN:

a. Stop any operator controlled cooldown and depressurization in progress.

b. RETURN TO EP/1/A/5000/E-3 (Steam Generator Tube Rupture), Step 1.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE

- NC pump trip criteria based on NC subcooling does not apply after starting a controlled cooldown.
- After the low steamline pressure main steam isolation signal is blocked, Main Steam Isolation will occur if the high steam pressure rate setpoint is exceeded.

19. Initiate NC System cooldown as follows:

- ☐ a. Determine required core exit temperature from the table below:

LOWEST RUPTURED S/G PRESSURE (PSIG)	CORE EXIT T/Cs (°F)
EQUAL TO OR GREATER THAN 1200	532 (512 ACC)
1100 - 1199	520 (501 ACC)
1000 - 1099	507 (489 ACC)
900 - 999	494 (476 ACC)
800 - 899	479 (461 ACC)
700 - 799	462 (445 ACC)
600 - 699	442 (426 ACC)
500 - 599	420 (405 ACC)
400 - 499	392 (379 ACC)
320 - 399	364 (352 ACC)

- ☐ b. Verify the condenser is available as follows:

- ☐ b. **GO TO** Step 19.e RNO.

- ☐ • "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT
- ☐ • MSIV on intact S/G(s) - OPEN.

Simulation Facility: CatawbaScenario No.: NRC-2

Op-Test No: _____

Examiners: _____ Operators: _____

Objectives: To evaluate the applicants' ability to increase power using NOPs while maintaining Tave matched to Tref, and to use AOPs to respond to a failure of a feed water flow transmitter, a VCT level transmitter, loss of the running RN Pump and a spurious opening of a S/G PORV. The applicants will be evaluated using EOPs to respond to a loss of all AC power caused by a loss of offsite power and a failure of the DGs to power the safety busses.

Initial Conditions: Snap 160)

1A D/G is in Maintenance mode.

1A ND Pump is tagged out.

S/G 1D feed water flow, Channel I is OOS

Unit 2 is in Mode 5.

Turnover: 50% power 8 EFPD 991ppm [B] 100% CPL Equilibrium Xe

IAE technicians are calibrating the Channel I S/G 1D feed water flow transmitter.

D/G 1A has been tagged out since the last shift for a routine Diesel Day.

ND Pump 1A is tagged for motor oil change. All work is to be completed by the end of this shift.

Unit 2 is in a forced outage and has just entered Mode 5.

Enclosure 1 of OP/1/A/6100/03 has been completed through 2.34.

Thunderstorms are in the area and the load dispatcher has directed that Unit 1 increase power to 100% as quickly as possible due to grid supply problems.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	Dilute for power increase
2	N/A	R-RO	Increase power to 100%
3	XMT-CF008 SV=120	I-RO	S/G 1D feed water flow transmitter channel II fails high
4	XMT-NV014 SV=100	I-BOP	VCT level transmitter fails high
5	OVR-RN011C OFF OVR-RN011D ON	C-BOP	Loss of operating RN pump
6	MAL-SM002D SV=40	C-RO	S/G 1D PORV fails open
7	MAL-EP002 ALL BKRS MAL-EGB001 SV=0	M	Loss of all AC power, station blackout
8	MAL-DG005B	C-BOP	1B D/G field fails to flash

SAC Procedure & Instructions to BOP & NO 7 about Para 91

Appendix D

Operator Actions

Form ES-D-2

Op-Test No.: NRC Scenario No.: 2 Event No.: 1		
Event Description: Increase power to 100%		
Time	Position	Applicant's Actions or Behavior
g/c	BOP	Refer to OP/1/A/6150/009 (Boron Concentration Control) Enclosure 4.3 (Dilution). <i>Make sure total set H₂O & Batch Size & column. Monitoring Note.</i>
	BOP	Ensure the following valve control switches in "AUTO": <ul style="list-style-type: none"> INV-242A (RMWST To B/A Blender Ctrl) 1NV-181A (B/A Blender Otlt To VCT) ✓
	BOP	Adjust the total makeup batch counter to the desired volume of reactor makeup water to be added. <i>200</i>
	BOP	Place the "NC MAKEUP MODE SELECT" switch to the "DILUTE" position.
<i>5/11/87</i>	<i>5/11/87</i> BOP	Adjust the controller for 1NV-242A (RMWST To B/A Blender Ctrl) to the desired flow. <i>How is determined for setting 238</i> <i>Boron C X 22.5 / 730</i>
	BOP	Ensure 1NV-242A (RMWST To B/A Blender Ctrl) controller in "AUTO".
	BOP	Ensure at least one reactor makeup water pump is in "AUTO" or "ON".
	BOP	NOTE: If necessary, dilution can be manually secured at any time by placing the "NC MAKEUP CONTROL" switch to the "STOP" position.
	BOP	Place the "NC MAKEUP CONTROL" switch in the "START" position.

Op-Test No.: NRC Scenario No.: 2 Event No.: 1		
Event Description: Increase power to 100%		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify the following valves open: <ul style="list-style-type: none">• 1NV-242A (RMWST To B/A Blender Ctrl) ✓• 1NV-181A (B/A Blender Otlt To VCT) ✓
	BOP	If in "AUTO", verify the reactor makeup water pump starts.
	BOP	When the desired volume of reactor makeup water is reached on the total makeup batch counter, ensure the following valves close: <ul style="list-style-type: none">• 1NV-242A (RMWST To B/A Blender Ctrl)• 1NV-181A (B/A Blender Otlt To VCT)
	BOP	If automatic makeup is desired, refer to Enclosure 4.1 (Automatic Makeup).

Op-Test No.: NRC Scenario No.: 2 Event No.: 2		
Event Description: Dilute for power increase		
Time	Position	Applicant's Actions or Behavior
	RO	Refer to OP/1/B/6300/001, Turbine Generator, Enclosure 4.2, Section 2.2
	RO	Depress the "Load Rate" pushbutton and verify it illuminates.
	RO	Input the desired load rate on the numeric keypad and verify the load rate appears on the Variable Display. <i>Value %/min.</i>
	RO	Depress the "Enter" pushbutton.
	RO	Depress the "Target" pushbutton and verify it illuminates.
	RO	Input the desired load target on the numeric keypad and verify the load target appears on the Target Display. <i>100% Value 100%?</i>
	RO	Depress the "Enter" pushbutton.
	RO	To start load increase, depress the "Go" pushbutton and verify it illuminates.
	ALL	S/G blowdown changes should be coordinated with Secondary Chemistry.

Op-Test No.: NRC Scenario No.: 2 Event No.: 3		
Event Description: S/G 1D feed water flow transmitter channel II fails high <i>can we fail low, we design fail high</i>		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Recognize indications that S/G 1D feed water flow transmitter channel II failed high based on the following indications and informs the SRO:</p> <ul style="list-style-type: none"> • 1AD-4, D/5 (DFCS NOT IN AUTO) annunciator – LIT • 1CFP 5070 failed to off-scale – HIGH • S/G 1D feed water controllers swapped to manual
	RO	<p>Refer to OP/1/B/6100/010E (Annunciator Response For Panel 1AD-4) Section D/5 and perform actions.</p> <p>EXAMINER NOTE: Annunciator response is attached.</p>
	RO	<p>Control S/G level and CF flow by manual operation of controllers.</p> <p><i>CF flow which one (S/G) or all?</i></p>
	BOP	<p>Notify IAE to determine and correct cause of DFCS malfunction.</p>
		<p>EXAMINER NOTE: This will not be repaired for the remainder of the scenario and manual control will be required.</p>

SPC Review 1.3.3.1, 2.3, #4

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

Event Description: VCT level transmitter fails high

X million #

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Recognize indications that VCT level transmitter INVP5760 failed high based on the following indications and informs SRO:</p> <ul style="list-style-type: none"> • 1AD-7, H/1 (VCT HI LVL) annunciator – LIT • Computer alarm screen indicates INVP5760 at 100% • Computer alarm screen for 1NV-172A (3 Way Divert To VCT-RHT) in alarm
	BOP	<p>Refer to OP/1/B/6100/010H (Annunciator Response For Panel 1AD-7) Section H/1 (VCT HI LVL) and performs actions.</p> <p>EXAMINER NOTE: Annunciator response is attached.</p>
		<p>EXAMINER NOTE: This will not be repaired for the remainder of the scenario.</p>

*(ie.) 4-5 A varying Lvl of Ch₁ & Lvl
Manual control 1NV172A &
control Lvl VCT (3 way, VLV)*

actions

Op-Test No.: NRC Scenario No.: 2 Event No.: 5		
Event Description: Loss of operating RN Pump <i>which one (IA)</i>		
Time	Position	Applicant's Actions or Behavior <i>A/B?</i>
	BOP	<p>Recognize indication for loss of operating RN Pump and informs SRO.</p> <ul style="list-style-type: none"> 1AD-12, A/2 (RN ESSENTIAL HDR A PRESSURE – LO) annunciator LIT 1AD-12, A/5 (RN ESSENTIAL HDR B PRESSURE – LO) annunciator LIT <p>EXAMINER NOTE: Annunciator Response is attached.</p> <p>EXAMINER NOTE: BOP may start an idle RN pump per the annunciator response procedure.</p> <p>EXAMINER NOTE: Starting an idle RN pump is a <u>CRITICAL STEP</u>.</p>
	SRO	<p>Implements AP/0/A/5500/20 (Loss of Nuclear Service Water) and directs operators. <i>cause 1</i></p>
	BOP	Start idle RN Pumps as required.
	RO	Ensure Unit 1 and Unit 2 OATC monitors Enclosure 1 (Foldout Page).
	BOP	Verify each operating RN pump discharge flow – GREATER THAN 8,600 GPM.
	BOP	Verify each operating RN pump discharge flow – LESS THAN 23,000 GPM.
	BOP	Ensure RN pumps – IN OPERATION AS NEEDED.

Op-Test No.: NRC Scenario No.: 2 Event No.: 5

Event Description: Loss of operating RN Pump

which cost A

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure proper alignment of RN to KC Hxs as follows: <ul style="list-style-type: none"> a. Verify RN – ALIGNED TO IN SERVICE KC HX(S). <i>1 RN 347 B</i> b. Ensure KC Hx Oilt Mode switches – PROPERLY <i>what is proper?</i> <i>ALIGNED.</i>
	BOP	Verify each operating RN pump discharge flow – GREATER THAN 8,600 GPM.
	BOP	Verify RN available to all Unit 1 and Unit 2 D/G(s). <i>Valve #s</i> <i>1 RN 47A - 48B - 67A - 69B</i>
	BOP	Determine VC/YC status as follows: <ul style="list-style-type: none"> • Verify VC/YC – ALIGNED TO OPERATING RN TRAIN. • Verify YC Chiller – RUNNING. <i>Valve # & position</i>
	ALL	Determine and correct loss of RN train.
	SRO	Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.6.5 (Containment Air Temperature) • 3.6.6 (Containment Spray System) • 3.6.17 (Containment Valve Injection Water System) • 3.7.5 (Auxiliary Feedwater System) • 3.7.7 (Component Cooling Water System) • 3.7.8 (Nuclear Service Water System) • 3.7.10 (Control Room Area Ventilation System) • 3.7.11 (Control Room Area Chilled Water System) • 3.8.1 (A.C. Sources – Operating) • 3.8.2 (A.C. Sources – Shutdown)

Op-Test No.: NRC Scenario No.: 2 Event No.: 5

Event Description: Loss of operating RN Pump

Time	Position	Applicant's Actions or Behavior
	SRO	Determine required notifications: <ul style="list-style-type: none">• <u>REFER TO</u> RP/0/A/5000/001 (Classification of Emergency)• <u>REFER TO</u> RP/0/B/5000/013 (NRC Notification Requirements)
	BOP	Notify Environmental Chemistry of any RN pump shifts that have occurred.
	ALL	Determine long term plant status. <u>RETURN TO</u> procedure in effect.

Op-Test No.: NRC Scenario No.: 2 Event No.: 6

Event Description: S/G 1D PORV fails to intermediate position

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indication that S/G 1D PORV failed open and informs SRO. <ul style="list-style-type: none"> 1SV-1 (S/G 1D PORV) indicates OPEN <i>intermediate</i>
		EXAMINER NOTE: OMP 1-7 allows RO to isolate a known leak without SRO permission and inform SRO of isolation actions performed.
	SRO	Directs RO to close 1SV-1 (S/G 1D PORV)
	RO	Attempts to close PORV by: <ul style="list-style-type: none"> Places "SG 1D PORV CTRL MODE" switch in "MANUAL" position. Positions 1SV-1 (S/G 1D PORV) controller to zero output. <p>Informs SRO S/G 1D PORV will not go CLOSED.</p>
	SRO	Directs RO to close 1SV-25B (S/G 1D PORV ISOL).
	RO	Places 1SV-25B (S/G 1D PORV ISOL) in the "CLOSE" position. Informs SRO that S/G 1D PORV isolation valve is CLOSED.
	SRO	Refers to Tech Specs: <ul style="list-style-type: none"> TS 3.6.3 (Containment Isolation Valves) TS 3.7.4 (Steam Generator Power Operated Relief Valves (SG PORVs))
		EXAMINER NOTE: SRO may implement AP/1/A/5500/28 (Secondary Steam Leak) at this point but it is not required. Required actions are on the subsequent pages of this section.

Op-Test No.: NRC Scenario No.: 2 Event No.: 6

Event Description: S/G 1D PORV fails to intermediate position

SHADE Topor
Page 11 → 14

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: The following actions are provided in case the SRO enters AP/1/A/5500/28 (Secondary Steam Leak).
	SRO	Implements AP/1/A/5500/28 (Secondary Steam Leak) and directs operators.
	OATC	Monitor Enclosure 1 (Foldout Page). <i>Enclosure 1 of WHA1 (AP/ECOP?)</i>
	RO	Verify turbine – ONLINE.
	RO	Verify the following: <ul style="list-style-type: none"> Reactor power - LESS THAN OR EQUAL TO 100% POWER. <i>1.0%?</i> T-avg – WITHIN 1.5°F OF T-Ref <i>SH 1 TIME TO DEVIATE MAX DEVIATION</i> <i>SEE Scenario 3 Pg 4</i>
	RO	Verify proper reactor response as follows: <ul style="list-style-type: none"> Control rods – IN "AUTO" AND STEPPING IN P/R neutron flux – DECREASING. <i>? Check</i>
	ALL	IF AT ANY TIME reactor power is greater than 100%, THEN perform Step 3 RNO.
	RO	Verify Pzr level – STABLE OR INCREASING.
	ALL	IF AT ANY TIME Pzr level is decreasing in an uncontrolled manner, THEN RETURN TO Step 6.

*Like to see.**acceptible*

Op-Test No.: NRC Scenario No.: 2 Event No.: 6

Event Description: S/G 1D PORV fails to intermediate position

Time	Position	Applicant's Actions or Behavior
	BOP	<p><u>IF AT ANY TIME</u> VCT level goes below 23%, <u>THEN</u> align NV pump suction to FWST as follows:</p> <ol style="list-style-type: none"> Open the following valves: <ul style="list-style-type: none"> 1NV-252A (NV Pumps Suct From FWST) 1NV-253B (NV Pumps Suct From FWST). Close the following valves: <ul style="list-style-type: none"> 1NV-188A (VCT Otlt Isol) 1NV-189B (VCT Otlt Isol).
	ALL	<p>Attempt to identify and isolate leak as follows:</p> <ol style="list-style-type: none"> Verify the following conditions – NORMAL <ul style="list-style-type: none"> Containment temperature Containment pressure Containment humidity Containment floor & equipment sump level. Dispatch operators to locate and identify source of steam leak.
	RO	<ol style="list-style-type: none"> Verify S/G PORVs – CLOSED. Informs SRO that 1D S/G PORV is NOT CLOSED.
	SRO	Transitions to Step 9.c RNO.

Op-Test No.: NRC Scenario No.: 2 Event No.: 6

Event Description: S/G 1D PORV fails to intermediate position

Time	Position	Applicant's Actions or Behavior
	RO	c. <u>IF</u> S/G pressure is less than 1090 PSIG, <u>THEN</u> perform the following: <div style="text-align: right;"><i>all S/G's on 1D</i></div> 1) Close affected S/G PORV. <i>How</i> 2) IF S/G PORV is still open, THEN: a) Close affected S/G PORV isolation valve.
	RO	Informs SRO that 1D S/G PORV isolation valve is closed.
	SRO	Transitions to Step 9.d A/ER column.
	RO	d. Verify condenser dump valves – CLOSED. ✓ e. Verify atmospheric dump valves – CLOSED. ✓ f. Verify CAPT #1 – OFF. g. <u>IF</u> leak is suspected to be in the doghouse, <u>THEN</u> close the following valves: • Outside DH: • 1SM-74B (S/G 1B Otlt Hdr Bldwn C/V) • 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V).
	SRO	Determine required notifications: • <u>REFER TO</u> RP/0/A/5000/001 (Classification of Emergency) • <u>REFER TO</u> RP/0/B/5000/013 (NRC Notification Requirements).
	BOP	Notify RP of leak.

Op-Test No.: NRC Scenario No.: 2 Event No.: 6

Event Description: S/G 1D PORV fails to intermediate position

Time	Position	Applicant's Actions or Behavior
	RO	Verify – LEAK ISOLATED.
	SRO	Determine long term plant status. <u>RETURN TO</u> procedure and step in effect.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: Main Generator will trip approximately 5 seconds after loss of switchyard resulting in a loss of both onsite and offsite power.
	ALL	Recognize indications of a loss of the switchyard followed by a loss of in-house power: <ul style="list-style-type: none"> • Control rods stepping in, (then reactor trip) • Speed / megawatt meter shifts to speed indication, (then turbine trip) • Steam dumps open • NC PORVs open
		EXAMINER NOTE: SRO may enter E-0 initially, but will transition to ECA-0.0 at Step 4 of E-0.
	SRO	Implements EP/1/A/5000/ECA-0.0 (Loss of All AC Power) and directs the operators.
	SRO	CSF Status trees should be monitored for information only. Do not exit this procedure to implement any of the CSF procedures.
	RO	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

When you enter a procedure, identify the procedure, there after identify the procedure when applicable.

Operator Actions

Form ES-D-22

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8		
Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.		
Time	Position	Applicant's Actions or Behavior
	RO	Verify Turbine Trip: <ul style="list-style-type: none"> All Turbine Stop valves – CLOSED All Turbine Control valves – CLOSED.
	BOP	Establish NC pump seal injection from the SSF: (CRITICAL TASK) <ul style="list-style-type: none"> Notify Security Officer at SSF to perform Enclosure 2 (Establishing NC Pump Seal Injection From the SSF). Dispatch operator to 1ETA switchgear room to swap power supply for 1EMXS. REFER TO Enclosure 1 (Swapping Power Supply for 1EMXS). Dispatch operator to SSF to establish NC pump seal injection. REFER TO Enclosure 2 (Establishing NC Pump Seal Injection From the SSF).
	BOP	Verify NC System is isolated as follows: <ol style="list-style-type: none"> All Pzr PORVs – CLOSED. All the following letdown isolation valves – CLOSED <ul style="list-style-type: none"> 1NV-10A (Letdn Orif 1B Cont Isol) 1NV-11A (Letdn Orif 1C Cont Isol) 1NV-13A (Letdn Orif 1A 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).
	BOP	Determines that 1NV-1A and 1NV-2A are not closed and informs SRO.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Step 5.b RNO column and continues.
	BOP	Manually close valves. <i>what valves</i> is this the same
	BOP	Manually closes 1NV-1A and 1NV-2A and informs SRO.
	SRO	Transitions to Step 5.c A/ER column and continues.
	BOP	<i>Verify</i> 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). <i>Verifying</i>
	BOP	Verify total CA flow – GREATER THAN 450 GPM.
	BOP	Attempt to restore power to 1ETA or 1ETB as follows: <ol style="list-style-type: none"> Manually start D/Gs from control room. Verify D/G load sequencer – AUTOMATICALLY LOADING BUS.
	BOP	Determines that D/G 1B is running but D/G 1B breaker is open and sequencer is not loading the bus and informs SRO.
	SRO	Transitions to Step 7.b RNO and directs operators.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Perform the following for the affected train(s):</p> <ul style="list-style-type: none"> • 1ETA (Not available) <p>EXAMINER NOTE: 1ETA will be the bus that will be returned later in the scenario, but currently without power.</p> <ul style="list-style-type: none"> • 1ETB: <ol style="list-style-type: none"> 1) <u>IF</u> 1ETB is de-energized, <u>THEN</u>: <ol style="list-style-type: none"> a) Ensure the following breakers – OPEN: <ul style="list-style-type: none"> • “ETB NORM FDR FRM ATD” • “ETB ALT FDR FRM SATB”. b) <u>IF</u> 1ETB is still de-energized, <u>THEN</u>: <ol style="list-style-type: none"> (1) Depress and <u>hold</u> the D/G “OFF” pushbutton. (2) Dispatch operator to open 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372). (3) <u>WHEN</u> 1EDF-F01F is open, <u>THEN</u> release the D/G “OFF” pushbutton. <p><i>Step 7.c.</i></p>
	SRO	Transitions to step 7.c A/ER column and continues.
	BOP	<p>7.c. Verify 1ETA or 1ETB – ENERGIZED.</p> <p>Determines that neither bus is energized and informs SRO.</p>
	SRO	Transitions to Step 7.c RNO. —
	SRO	<u>GO TO</u> Step 8.
	SRO	Transitions to Step 8 A/ER column and continues.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify CA supply is adequate as follows: a. VI pressure – GREATER THAN 85 PSIG. b. Ensure proper CA pump suction supply, <u>REFER TO</u> AP/1A/5500/06 (Loss Of S/G Feedwater).
	SRO	Implement RP/0/A/5000/01 (Classification Of Emergency).
	ALL	<u>WHEN</u> power is restored to one essential bus, <u>THEN GO TO</u> Step 31.
	BOP	Verify S/I status as follows: a. "SAFETY INJECTION ACTUATED" status light (1SI-13) – LIT. Determines that light is NOT lit and informs SRO.
	SRO	Transitions to Step 11.a RNO and directs operators.
	SRO	Perform the following: 1) <u>IF AT ANY TIME</u> an S/I signal is generated while in this procedure, <u>THEN</u> , after the 1 minute time delay, reset ECCS. 2) <u>GO TO</u> Step 12.
	BOP/SRO	Dispatch operator with a screwdriver to load shed essential busses and verify lockout relay status. <u>REFER TO</u> Enclosure 4 (Manual Load Shed of 1ETA and 1ETB).

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	BOP/SRO <i>Step 13</i> <i>when in this?</i>	<p>Restore power to at least one essential bus as follows:</p> <ol style="list-style-type: none"> Dispatch operator and maintenance IAE personnel to D/G rooms to prepare D/Gs for start. REFER TO the following: <ul style="list-style-type: none"> Enclosure 20 (Local Start of Diesel Generator 1A) Enclosure 21 (Local Start of Diesel Generator 1B). EM/1/A/5200/003 (Troubleshooting Cause For a Diesel Generator Failing to Start) Verify switchyard – ENERGIZED. — <i>RNO</i> — <i>open PCB</i> WHEN time and manpower permit, THEN perform Enclosure 22 (Switchyard Battery Conservation). <p>NOTE: Offsite power may be unavailable for reasons other than switchyard de-energized.</p> <ol style="list-style-type: none"> Verify at least one of the following power sources available: <ul style="list-style-type: none"> Offsite Power OR D/G 1A OR D/G 1B Verify offsite power – AVAILABLE. <p>EXAMINER NOTE: Crew may determine that offsite power is available however, the intent is to restore power from 1A D/G. Whether the crew responds that offsite power is available or is NOT available, the final result will be the same.</p> <p>In the former case, they will be directed to restore power from offsite per Enclosure 6 (Restoration of Offsite Power) and in step 1 of that enclosure, the dispatcher will inform them NOT to reconnect to the switchyard at this time. For the latter case, Step 13.e RNO directs the crew to restore power to one essential bus per Enclosure 5 (Power Restoration From D/Gs).</p>

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8		
Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.		
Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Step 14 A/ER column and directs operators.
	BOP	Verify one train of VC/YC – OPERATING. Determines neither train of VC/YC is in service and informs SRO.
	SRO	Transitions to Step 14 RNO and directs the operators.
	BOP/SRO	<p>Perform the following:</p> <ul style="list-style-type: none"> a. Request IAE to open the doors on control room cabinets within 30 minutes of the loss of power. REFER TO Enclosure 9 (Control Room Cabinet Doors to Open). b. IF Unit 2 power is available, THEN notify the Unit 2 Supervisor to dispatch operator to align Unit 2 power to 1EMXG and 2EMXH as follows: <p>NOTE: The following breakers are kirk-key interlocked.</p> <p>EXAMINER NOTE: The following would be performed by Unit 2 personnel. Steps will not be completed for this scenario.</p> <ul style="list-style-type: none"> • 1EMXG: <ol style="list-style-type: none"> 1) Open 1EMXG-F03A (Incoming Breaker Fed from Unit 1 Load enter 1ELXA). 2) Close 1EMXG-F06A (Incoming Breaker Fed From Unit 2 Load Center 2ELXA). 3) Close 2ELXA-5B (MCC 1EMXG Unit 2 Feeder). • 2EMXH: <ol style="list-style-type: none"> 1) Open 2EMXH-F06A (Incoming Breaker Fed From Unit 1 Load Center 1ELXB). 2) Close 2EMXH-F03A (Incoming Breaker Fed From Unit 2 Load Center 2ELXB). 3) Close 2ELXB-5B (MCC 2EMXH Unit 2 Feeder) .

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>c. Place one train of VC/YC in service with power from Unit 2. REFER TO OP/0/A/6450/11 (Control Room Area Vent/Chilled Water System).</p> <p>d. WHEN one train of VC/YC is returned to service, THEN close the cabinet doors previously opened.</p>
	510/RO	<p>Isolate NC pump seals as follows:</p> <p>a. Notify operator at SSF to ensure 1NV-89A (NC Pmps Seal Ret Cont Isol) – CLOSED.</p> <p>b. Notify operator at SSF to verify standby makeup pump – ON.</p>
	510/RO	<p>Verify S/Gs are isolated as follows:</p> <p>a. Verify the following SM valves – CLOSED:</p> <ul style="list-style-type: none"> • All MSIVs • All MSIV bypass valves.
	SRO	Transitions to Step 16.a RNO and directs the operators.
	510/RO	<p>Perform the following:</p> <p>1) Manually close valve(s).</p> <p>Manually closes all MSIVs and MSIV bypasses and informs SRO.</p>
	510/RO	<p>b. Verify the following CF valves – CLOSED:</p> <ul style="list-style-type: none"> • All CF control valves • All CF bypass control valves. <p>c. Verify all blowdown flow control valves – CLOSED.</p>

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8		
Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.		
Time	Position	Applicant's Actions or Behavior
	SAC/RO <i>SAC/RO</i>	d. Dispatch operator to 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 (SG 1D Otlt Hdr Bldwn C/V).
	SAC/RO <i>SAC/RO</i>	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 <i>SAC/RO</i>	Verify S/G tubes are intact as follows: <ul style="list-style-type: none"> • 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) • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-34 (S/G Sample).
		EXAMINER NOTE: At this point, the operator at the 1A D/G will call the Control Room to inform them that the D/G is ready to start per Enclosure 20. The crew will return to step 13 and restore power per Enclosure 5. Once power is restored to 1ETA, the crew will immediately transition to Step 31 and the scenario will be terminated. (CRITICAL TASK)

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	5/12 RO 5/12	<p>Control intact S/G levels as follows:</p> <ol style="list-style-type: none"> Maintain total CA flow from CA Pump #1 less than 1000 GPM while feeding S/G(s) in the following steps. Verify CA flow to all intact S/Gs – INDICATING FLOW. Verify N/R level in all intact S/Gs – GREATER THAN 11% (29% ACC). Throttle CA flow from the control room to maintain S/G N/R level in all intact S/Gs between 11% (29% ACC) and 50%. IF AT ANY TIME NR level in any S/G increases in an uncontrolled manner, THEN: <p>EXAMINER NOTE: The remainder of this step is N/A.</p>
	5/12 BOP 5/12	<p>Reduce nonvital DC loads as follows:</p> <ol style="list-style-type: none"> Dispatch operator to open breakers for Group A, large nonvital DC loads. REFER TO Enclosure 12 (DC Loads to be Shed During Loss of All AC Power), Step 1. WHEN the large nonvital DC loads are removed, THEN notify operator to open additional breakers to maintain the required voltage on the following "DIST CTR VOLTS" meters (1MC-8). REFER TO Enclosure 12 (DC Loads to be Shed During Loss Of All AC Power), Step 2: <ul style="list-style-type: none"> 1CDA greater than 105 volts 1CDB greater then 105 volts 1DPD greater than 210 volts.

*Insert
Enclosure 5*

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8		
Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.		
Time	Position	Applicant's Actions or Behavior
	<i>SAC</i> BOP <i>SAC</i>	<p>Verify criteria requiring NC System cooldown and depressurization as follows:</p> <ul style="list-style-type: none"> Standby makeup pump – OFF <p>OR</p> <ul style="list-style-type: none"> Pzr level – DECREASING IN AN UNCONTROLLED MANNER.
	<i>SAC</i> BOP <i>SAC</i>	<p>Verify the following Monitor Light Panel Group 5 St lights – LIT:</p> <p>a. VP, VQ, and VY:</p> <ul style="list-style-type: none"> G- 1 or G-11 G-2 or G-10 G-3 or G-9 G-4 or G-8 G-5 or G-7 H-2 or H-10 H-3 or H-9 H-4 or H-8 H-5 or H-7 H-11 or I-2 I-3 or I-10 I-6 or I-7 <p>c. VUCDT:</p> <ul style="list-style-type: none"> L-12 or M-1 <p>Determines that VUCDT lights are both dark and informs SRO.</p>

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8		
Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.		
Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Step 22.b RNO and directs the operators.
	BOF/SRO	Dispatch operator to locally close outside containment isolation valve for affected penetration. <u>REFER TO</u> Enclosure 16 (Local Isolation of Phase B Isolation Valves).
	ALL	<p>CAUTION: Lowering S/G pressures less than 65 PSIG will cause injection of nitrogen from the CLAs into the NC System.</p> <p>NOTE: Pzr level may be lost and reactor vessel head voiding may occur due to depressurization of S/Gs.</p>
9:40 SRO	RO SRO	<p>Depressurize intact SGs to 165 PSIG as follows:</p> <ol style="list-style-type: none"> Verify S/G N/R level in at least one intact S/G – GREATER THAN 11% (29% ACC). Ensure operator monitors Enclosure 13, (S/G Depressurization Limits) throughout the S/G depressurization. Dump steam from all intact S/G PORVs at maximum rate. <p>EXAMINER NOTE: A S/G is isolated because of leaking PORV and should not be used during the cooldown.</p> <ol style="list-style-type: none"> Verify all NC T-Colds – GREATER THAN 280°F. Maintain at least one intact S/G N/R level greater than 11% (29% ACC). Verify all intact S/G pressures – LESS THAN 165 PSIG.
	RO	Determines all intact S/G Pressures are not less than 165 psig and informs SRO.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to 23.f RNO and directs operators. 1) <u>WHEN</u> all intact S/G pressures are less than 165 PSIG, <u>THEN</u> perform Step 23.g. 2) <u>GO TO</u> Step 24. <i>1AUG 3 358 PM</i>
	SRO	Transitions to Step 24 A/ER column and directs operators.
	<i>4:19</i> SRO <i>4:24</i>	Verify the reactor is subcritical as follows: <ul style="list-style-type: none"> • I/R SUR – ZERO OR NEGATIVE • S/R SUR – ZERO OR NEGATIVE.
	<i>4:29</i> BOP <i>4:25</i>	Verify S/I signal status as follows: a. Verify S/I – HAS BEEN ACTUATED b. After 1 minute time delay, reset ECCS.
	<i>4:39</i> BOP <i>4:24</i>	Verify Phase A Containment Isolation as follows: a. Phase A "RESET" lights – DARK b. Monitor Light Panel Group 5 St lights – LIT. Determines that Monitor Light Panel is not in proper alignment and informs SRO.
	SRO	Transitions to Step 26.b RNO and directs the operators.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8

Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.

Time	Position	Applicant's Actions or Behavior
	4:09 BOP 2:40 BOP	Perform the following: 1) Manually close valves 2) <u>If</u> valves cannot be closed, <u>THEN</u> dispatch operator to close affected outside containment isolation valves. <u>REFER TO</u> Enclosure 15 (Local Isolation of Phase A Isolation Valves).
	SRO	Transitions to Step 27 A/ER column and directs the operators.
	4:17 BOP 2:27	Verify containment pressure – HAS REMAINED LESS THAN 3 PSIG.
	2:21	Ensure H ₂ recombiners remain de-energized on power restoration as follows: a. Verify H ₂ recombiners – HAVE BEEN PLACED IN SERVICE. Determines that H ₂ recombiners have not been placed in service and informs SRO.
	SRO	Transitions to Step 28.a RNO and then goes to Step 29.
	4:19 BOP 2:29	Verify containment radiation levels are normal as follows: • 1EMF-53A (Containment Train A) – LESS THAN 10 R/HR • 1EMF-53B (Containment Train B) – LESS THAN 10 R/HR.
	RO 4:01	Verify Core exit T/Cs – LESS THAN 1200°F.

Op-Test No.: NRC Scenario No.: 2 Event No.: 7 and 8		
Event Description: Loss of all AC power, station blackout; 1B D/G field fails to flash.		
Time	Position	Applicant's Actions or Behavior
	BOP	Verify either 1ETA or 1ETB undervoltage status lights (1SI-14) – DARK. EXAMINER NOTE: D/G 1A should be running and supplying 1ETA prior to reaching this step due to earlier directions to restore power per Enclosure 20 (Local Start of Diesel Generator 1A).

TERMINATE SCENARIO WHEN POWER RESTORED TO 1ETA

Classification: SITE AREA EMERGENCY – 4.5.S.1 – All AC electrical power to the vital busses (Offsite and Onsite) has been lost for more than 15 minutes. This condition, by itself, posed no immediate threat to public safety.

EMERGENCY NOTIFICATION FORM

1.	<input checked="" type="checkbox"/> THIS IS A DRILL	<input checked="" type="checkbox"/> ACTUAL EMERGENCY	<input type="checkbox"/> INITIAL	<input type="checkbox"/> FOLLOW-UP	MESSAGE NUMBER _____
2.	TE: <u>Catawba Nuclear Site</u>	UNIT: _____	REPORTED BY: _____		
3.	TRANSMITTAL TIME/DATE: _____ / _____ / _____ <small>(Eastern) mm dd yy</small>		CONFIRMATION PHONE NUMBER: <u>(803) 831-3807 (Simulator)</u>		
4.	AUTHENTICATION (If Required): _____ <small>(Number)</small>		_____ <small>(Codeword)</small>		

5. EMERGENCY CLASSIFICATION:

<input checked="" type="checkbox"/> NOTIFICATION OF UNUSUAL EVENT	<input checked="" type="checkbox"/> ALERT	<input type="checkbox"/> SITE AREA EMERGENCY	<input checked="" type="checkbox"/> GENERAL EMERGENCY
---	---	--	---

6. ☐ Emergency Declaration At: ☒ Termination At: TIME/DATE: _____ / _____ / _____ (If B, go to item 16.)
(Eastern) mm dd yy

7. EMERGENCY DESCRIPTION/REMARKS: EAL # 4.5.S.1 - All AC electrical power to the vital busses (Offsite and Onsite) has been lost for more than 15 minutes. This condition, by itself, poses no immediate threat to public safety.

8. PLANT CONDITION: ☒ IMPROVING ☒ STABLE ☐ DEGRADING

9. REACTOR STATUS: ☒ SHUTDOWN TIME/DATE: _____ / _____ / _____ ☒ _____ % POWER
(Eastern) mm dd yy

10. EMERGENCY RELEASE(S):

☒ NONE (Go to item 14.) ☐ POTENTIAL (Go to item 14.) ☐ IS OCCURRING ☐ HAS OCCURRED

**11. TYPE OF RELEASE: ☐ ELEVATED ☐ GROUND LEVEL

☒ AIRBORNE: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____
Time(Eastern) Date

☒ LIQUID: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____
Time(Eastern) Date

**12. RELEASE MAGNITUDE: ☐ CURIES PER SEC. ☐ CURIES

☒ NOBLE GASES _____ ☒ IODINES _____

☒ PARTICULATES _____ ☐ OTHER _____

**13. ESTIMATE OF PROJECTED OFFSITE DOSE: ☐ NEW ☐ UNCHANGED PROJECTION TIME: _____
(Eastern)

	TEDE mrem	Thyroid CDE mrem
SITE BOUNDARY	_____	_____
2 MILES	_____	_____
5 MILES	_____	_____
10 MILES	_____	_____

ESTIMATED DURATION: _____ HRS.

**14. METEOROLOGICAL DATA: ☒ WIND DIRECTION (from) _____ ° ☒ SPEED (mph) _____

☒ STABILITY CLASS _____ ☐ PRECIPITATION (type) _____

15. RECOMMENDED PROTECTIVE ACTIONS:

☐ NO RECOMMENDED PROTECTIVE ACTIONS

☒ EVACUATE _____

☐ SHELTER IN-PLACE _____

☐ OTHER _____

16. APPROVED BY: _____ TIME/DATE: _____ / _____ / _____
(Name) (Title) (Eastern) mm dd yy

* If items 8-14 have not changed, only items 1-7 and 15-16 are required to be completed.

** Information may not be available on initial notifications.

B/4**S/G D LEVEL DEVIATION**

SETPOINT:	$\pm 5\%$ narrow range level deviation from programmed level.
ORIGIN:	S/G 1D level is compared to "demand level" programmed from selected nuclear instrument channel.
PROBABLE CAUSE:	<ol style="list-style-type: none">1. Malfunction in steam generator level control.2. Step load increase or decrease.3. Instrument malfunction.
AUTOMATIC ACTIONS:	None
IMMEDIATE ACTIONS:	None
SUPPLEMENTARY ACTIONS:	<ol style="list-style-type: none">1. Compare controlling channel to other channels.2. <u>IF</u> necessary, manually control level.3. Refer to Tech Specs for operable channel requirements (TS 3.3.1, 3.3.2, 3.3.3 and 3.3.4).
REFERENCES:	<ol style="list-style-type: none">1. FSAR, Figure 7.2.1-1 (13 of 16)2. CNM-1399.03-23, Sh 33 & 173. <u>W</u> L, P & S4. CNEE-0173-03.025. NSM CN-19810

D/5

DFCS NOT IN AUTO

SETPOINT: System logic for quality signal control.

ORIGIN: DFCS Cabinet #6

PROBABLE CAUSE:

1. Failure of control inputs (more than 1 input):
 - N/R S/G level
 - W/R S/G level
 - CF flow
 - Stm flow
 - CF temperature
 - CF header pressure
 - Nuclear power (NI44 **NOT** used)
2. Operator selection of manual on the following controllers:
 - Both auto/manual stations on one loop for the main and bypass control valves

OR

- CFPT master controller

AUTOMATIC ACTIONS:

- Individual loop valves to manual:
 - N/R S/G level
 - W/R S/G level (if in low power control mode)
 - CF flow
 - Stm flow (if in high power control mode)
- All loop valves to manual:
 - CF temperature
 - CF header pressure
 - Nuclear power
- CFPT master controller to manual:
 - CF header pressure

IMMEDIATE ACTIONS: Control S/G level and CF flow by manual operation of controller.

CONTINUED ON NEXT PAGE

D/5

DFCS NOT IN AUTO (Cont'd)

- SUPPLEMENTARY ACTIONS:**
1. Notify LAE to determine and correct cause of DFCS malfunction.
 2. **WHEN** malfunction is corrected, then restore valve control to auto as follows:
 - 2.1 Place both main and bypass control valves in manual.
 - 2.2 Place both main and bypass control valves in auto.
 - 2.3 Verify auto control restores S/G level and feed flow to proper values for plant conditions.

- REFERENCES:**
1. CNM-1399.01-0002.019
 2. CNM-1399.01-0002.020
 3. CN-11168/00

PANEL: 1AD-7

H/1

VCT HI LVL

SETPOINT: HI - 83.5%

ORIGIN: INVLT5760 or INVLT5761

PROBABLE CAUSE:

1. INV-172A (3-Way Divert to VCT-RHT) malfunction
2. Makeup Control System malfunction
3. Charging/Letdown mismatch for extended period of time

NOTE: INVLT5760 and INVLT5761 share process taps on the VCT. The failure of one process tap will effect both level transmitters.

AUTOMATIC ACTIONS:

1. Automatic makeup secures at 52.8% VCT Level
2. INV-172A (3-Way Divert to VCT-RHT) diverts on level signal (91.4%) from level transmitter INVLT5760 (AB-565, MM-51, Rm 300).

IMMEDIATE ACTIONS:

1. Verify high level by:
 - 1.1 VCT level indication from both level channels:
 - 1.1.1 INVLT5761 on IMC5
 - 1.1.2 Computer Point - CIA0843 - NV Summary - from INVLT5761
 - 1.1.3 Computer Point CIA1524 from INVLT5760
 - 1.1.4 Dispatch operator to local gauge INVLT5760 (AB-560, MM-51)
- 1.2 VCT pressure indication:
 - 1.2.1 Increasing or abnormally high pressure (normal pressure 30-40#)

CONTINUED ON THE NEXT PAGE

H/1**VCT HI LVL (Cont'd)****IMMEDIATE
ACTIONS: (cont'd)**

2. **IF** charging > letdown **AND** actual HI LVL **CANNOT** be verified:
 - 2.1 By OAC Points above or local indication in 4-5 minutes
AND
 - 2.2 Reactor Makeup Control System is secured, realign the charging pump suction to the FWST by:
 - 2.2.1 Opening the following valves:
 - INV-252A (NV Pump Suction From FWST)
 - INV-253B (NV Pump Suction From FWST)
 - 2.2.2 Closing the following valves:
 - INV-188A (VCT OTLT Isol)
 - INV-189B (VCT OTLT Isol)
 - 2.2.3 Refer to AP/1/A/5500/09 (Rapid Downpower) or OP/1/A/6100/003 (Controlling Procedure For Unit Operation).

**SUPPLEMENTARY
ACTIONS:**

- IF** necessary, maintain VCT level (34-52.8%) by:
1. Manually controlling INV-172A (3-Way Divert To VCT-RHT) and,
 2. Manually operating Reactor Makeup Control System.

REFERENCES:

1. VCT Level Control - File No. - CN-208.50
2. CNM-1399.03-23, Sheet 28
3. CN-1499-NV14.01
4. NSM-CN-10279
5. CNEE-0173-01.03
6. CNEE-0157-03.13

RN ESSENTIAL HDR A PRESSURE - LO

A/2

SETPOINT: 46 psig decreasing

ORIGIN: 1RNPS5020

PROBABLE CAUSE:

1. Loss of an operating RN pump.
2. Header isolation or rupture.
3. Failure of miniflow system.

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS: IF due to loss of an RN pump, determine cause and attempt to restart the pump or start an alternate pump per OP/0/A/6400/006C (Nuclear Service Water System).

SUPPLEMENTARY ACTIONS:

1. Verify operation of the miniflow system
2. Refer to AP/0/A/5500/20 (Loss of Nuclear Service Water).

REFERENCES:

1. CNEE-0138-01.86
2. CNEE-0138-01.60

RN ESSENTIAL HDR B PRESSURE - LO

A/5

SETPOINT: 46 psig decreasing

ORIGIN: 1RNPS5030

PROBABLE CAUSE:

1. Loss of an operating RN pump.
2. Header isolation or rupture.
3. Malfunction of miniflow system.

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS: IF due to loss of an RN pump, determine cause and attempt to restart the pump or start an alternate pump per OP/0/A/6400/006C (Nuclear Service Water System).

SUPPLEMENTARY ACTIONS:

1. Verify operation of the miniflow system.
2. Refer to AP/0/A/5500/20 (Loss of Nuclear Service Water).

REFERENCES:

1. CNEE-0138-01.86
2. CNEE-0138-01.60

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Load shed 1ETA as follows:

a. Open the following breakers:

- • 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496)
- • 1ELXA-4B (Normal Incoming Breaker Fed From Xfmr 1ETXA) (AB-577, AA-47, Rm 496)
- • 1ELXC-4B (Normal Incoming Breaker Fed From Xfmr 1ETXC) (AB-577, AA-46, Rm 496).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. (Continued)

b. Open the following breakers on 1ETA:

- ☐ • 1ETA 02 (Alternate Feeder to 4160 VAC Blackout Switchgear 1ETA)
- ☐ • 1ETA 03 (Normal Incoming Feeder From Xfmr 1ATC)
- ☐ • 1ETA 04 (Alternate Incoming Feeder From Xfmr SATA)
- ☐ • 1ETA 06 (1A1 KC Pump Motor)
- ☐ • 1ETA 07 (1A2 KC Pump Motor)
- ☐ • 1ETA 08 (1A NS Pump Motor)
- ☐ • 1ETA 09 (1A ND Pump Motor)
- ☐ • 1ETA 11 (1A NI Pump Motor)
- ☐ • 1ETA 12 (1A NV Pump Motor)
- ☐ • 1ETA 13 (1A CA Pump Motor)
- ☐ • 1ETA 14 (1A RN Pump Motor)
- ☐ • 1ETA 15 (1A KF Pump Motor)
- ☐ • 1ETA 17 (A VC Compressor Unit 1 Supply)
- ☐ • 1ETA 18 (1A Diesel Generator).

c. Verify the following 1ETA lockout targets - DARK:

- ☐ • 86N (1ETA 03 Cubicle)
- ☐ • 86B (1ETA 03 Cubicle)
- ☐ • 86S (1ETA 04 Cubicle)
- ☐ • 86D (1ETA 19 Cubicle).

- ☐ c. Request Control Room SRO to notify IAE to assist in clearing essential bus lockout relays.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. (Continued)

- d. Remove the following control power fuses from 1ETA 13 (1A CA Pump Motor):

- • AU
- • AX
- • AZ.

- e. Remove the following control power fuses from 1ETA 08 (1A NS Pump Motor):

- • AY
- • AX.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. Load shed 1ETB as follows:

a. Open the following breakers:

- • 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372)
- • 1ELXB-4B (Normal Incoming Breaker Fed From Xfmr 1ETXB) (AB-560, AA-47, Rm 372)
- • 1ELXD-4B (Normal Incoming Breaker Fed From Xfmr 1ETXD) (AB-560, AA-46, Rm 372).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. (Continued)

b. Open the following breakers on 1ETB:

- ☐ • 1ETB 02 (Alternate Feeder to 4160
VAC Blackout Switchgear 1FTB)
- ☐ • 1ETB 03 (Normal Incoming Feeder
From Xfmr 1ATD)
- ☐ • 1ETB 04 (Alternate Incoming Feeder
From Xfmr SATB)
- ☐ • 1ETB 06 (1B1 KC Pump Motor)
- ☐ • 1ETB 07 (1B2 KC Pump Motor)
- ☐ • 1ETB 08 (1B NS Pump Motor)
- ☐ • 1ETB 09 (1B ND Pump Motor)
- ☐ • 1ETB 11 (1B NI Pump Motor)
- ☐ • 1ETB 12 (1B NV Pump Motor)
- ☐ • 1ETB 13 (1B CA Pump Motor)
- ☐ • 1ETB 14 (1B RN Pump Motor)
- ☐ • 1ETB 15 (1B KF Pump Motor)
- ☐ • 1ETB 17 (B VC Compressor Unit 1
Supply)
- ☐ • 1ETB 18 (1B Diesel Generator).

c. Verify the following 1ETB lockout
targets - DARK:

- ☐ • 86N (1ETB 03 Cubicle)
- ☐ • 86B (1ETB 03 Cubicle)
- ☐ • 86S (1ETB 04 Cubicle)
- ☐ • 86D (1ETB 19 Cubicle).

- ☐ c. Request Control Room SRO to notify
IAE to assist in clearing essential bus
lockout relays.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. (Continued)

- d. Remove the following control power
fuses from 1ETB 13 (1B CA Pump
Motor):

- ___ • AU
- ___ • AX
- ___ • AZ.

- e. Remove the following control power
fuses from 1ETB 08 (1B NS Pump
Motor):

- ___ • AY
- ___ • AX.

- ___ 3. Notify Control Room SRO of status.

1. Monitor all of the following conditions while dumping steam from intact S/Gs:

- IF any NC T-Cold is less than 280°F, THEN:

- ___ a. Stabilize all intact S/G pressures at existing pressure.
- ___ b. Return this enclosure to the Control Room SRO.

- IF all intact S/G N/R levels are less than 11% (29% ACC), THEN:

- ___ a. Stop S/G depressurization.
- ___ b. Restore at least one intact S/G level N/R level to greater than 11% (29% ACC).
- ___ c. WHEN at least one intact S/G N/R level is greater than 11% (29% ACC), THEN continue S/G depressurization.

- IF I/R SUR OR S/R SUR is positive, THEN:

- ___ a. Stop S/G depressurization.
- ___ b. Allow NC System to heatup to obtain a negative SUR.
- ___ c. WHEN a negative SUR is obtained, THEN continue S/G depressurization.

- ___ 2. WHEN each intact S/G pressure is less than 165 PSIG, THEN throttle the affected S/G PORV to maintain S/G pressure at 165 PSIG.

- ___ 3. Continue to monitor this enclosure until all intact S/G pressures are at 165 PSIG.

- ___ 4. WHEN all intact S/G pressures are less than 165 PSIG, THEN perform Section C. (Operator Actions), Step 23.g.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- ___ 1. Verify load shed of essential bus to be energized - COMPLETE.

___ Do not continue attempts to energize 1ETA or 1ETB until load shed is complete. REFER TO Enclosure 4 (Manual Load Shed of 1ETA and 1ETB).

- ___ 2. Verify following lockout targets - DARK:

- ___ • 86N (Cubicle 3)
- ___ • 86S (Cubicle 4)
- ___ • 86B (Cubicle 3)
- ___ • 86D (Cubicle 19).

___ Do not continue attempts to energize 1ETA or 1ETB until all lockouts have been cleared.

- ___ 3. Notify dispatched operators to start at least one D/G. REFER TO the following applicable enclosure(s):

- ___ • Enclosure 20 (Local Start of Diesel Generator 1A)
- ___ • Enclosure 21 (Local Start of Diesel Generator 1B)

Perform the following:

___ a. IF no D/G will start, THEN notify IAE to provide an auto start signal. Refer to EM/1/A/5200/004 (Install Jumper to Auto Start Diesel Generator 1A or 1B).

___ b. IF no D/G can be started, THEN:

- ___ 1) Notify Control Room SRO of status.
- ___ 2) Continue attempts to energize an essential bus from other sources.
- ___ 3) Return this enclosure to the Control Room SRO.

- ___ 4. Do not continue in this enclosure until a D/G has been started.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- ___ 5. Notify the dispatched operator to close the D/G breaker for the D/G(s) that was started.

Perform the following:

- ___ a. Notify dispatched operator to stop the running D/G.
- ___ b. Notify dispatched operator to perform Enclosure 18 (Manual Operation of 4160V Bus Breakers).
- ___ c. **WHEN** notified by the dispatched operator that Enclosure 18 (Manual Operation of 4160V Bus Breakers) is complete, **THEN GO TO** Step 6.
- ___ d. Do not continue with this enclosure.

- ___ 6. Verify the bus associated with running D/G(s) - ENERGIZED.

Perform the following:

- ___ a. Notify dispatched operator to stop running D/G.
- ___ b. Continue attempts to energize an essential bus from other sources.
- ___ c. Do not continue with this enclosure.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. **Notify dispatched operator to close the load center normal incoming breakers on the energized bus:**

• 1ETA:

___ • 1ELXA-4B (Normal Incoming Breaker Fed From Xfmr 1ETXA) (AB-577, AA-47, Rm 496)

___ • 1ELXC-4B (Normal Incoming Breaker Fed From Xfmr 1ETXC) (AB-577, AA-46, Rm 496).

• 1ETB:

___ • 1ELXB-4B (Normal Incoming Breaker Fed From Xfmr 1ETXB) (AB-560, AA-47, Rm 372)

___ • 1ELXD-4B (Normal Incoming Breaker Fed From Xfmr 1ETXD) (AB-560, AA-46, Rm 372).

___ 8. **Do not continue in this procedure until the affected breakers listed in the previous step are closed.**

___ 9. **Manually start train related RN pump.**

___ 10. **Ensure RN flow through the operating D/G's KD Hx.**

IF RN flow cannot be established to the KD Hx, THEN:

- ___ a. Stop the associated D/G.
- ___ b. Notify the Control Room SRO of status.
- ___ c. Return this enclosure to the Control Room SRO.

___ 11. **GO TO Section C. (Operator Actions), Step 31.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. **Notify Transmission Control Center (TCC), using one of the following methods, to coordinate attempts to restore power:**

• Outside line:

- ___ • 704-382-9404
- ___ • 704-382-9411
- ___ • 704-382-4413
- ___ • 704-382-9403
- ___ • 704-399-9744.

___ • Two-way radio.

- ___ 2. **Notify TCC to verify adequate switchyard voltage and grid reliability.**

___ **Do not continue in this enclosure until switchyard voltage and grid reliability have been verified.**

- ___ 3. **Ensure both main transformer's MODs - CLOSED.**

- ___ 4. **Verify both turbine generator breakers - OPEN.**

___ **Open both turbine generator breakers.**

5. **Prepare the 6.9 KV busses for power restoration as follows:**

- a. **Dispatch operator to ensure breakers for all motor loads on following 6.9 KV busses - OPEN:**

- ___ • 1TA
- ___ • 1TB
- ___ • 1TC
- ___ • 1TD.

- b. **Place switches for the following pumps in the "OFF" position:**

- ___ • All hotwell pumps
- ___ • All condensate booster pumps.

Simulation Facility: CatawbaScenario No.: NRC-3

Op-Test No: _____

Examiners: _____

Operators: _____

Objectives: To evaluate the applicants' ability to reduce power using NOPs while maintaining Tave matched to Tref, and to use AOPs to respond to instrument failures in the Rod Control program, a failure of the transmitter controlling reactor coolant pump seal injection flow and the ability to diagnose and use the AP for a small Reactor Coolant System leak. The applicants will be evaluated using EOPs to mitigate an ejected control rod that results in a small break LOCA. Mitigation efforts will be complicated by the failure of the reactor to automatically trip and the failure of SI cold leg injection valves 1NI-9A and 1NI-10B to open automatically. When the emergency diesel generators are secured in E-1, normal power will be lost to 1 ETA. The applicants will have to restart the equipment that was running prior to the loss of 1 ETA.

Initial Conditions: 100% power 400 EFPD 30 [B] Equilibrium Xenon conditions (SNAP 151)
Block auto and manual reactor trip
Block auto safety injection

Turnover: 100% power 400 EFPD 30 [B] Equilibrium Xenon conditions
1B diesel in maintenance mode for injector maintenance
1B CA pump tagged out for an oil change. Back in 4 hours.
Channel 4 FWST level transmitter is inoperable (Failed)
Thunderstorms in the area
Reduce power to 0% in preparation for the next refueling outage

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP	Boration for load decrease
2		R-RO	Reduce turbine load
3		I-RO	T-cold fails to 630° F
4		I-BOP	NCP seal injection transmitter failure
5		M	Small reactor coolant leak
6		M	Rod ejection
7		C-RO	ATWS
8		C-BOP	Failure of 1NI-9A and 1NI-10B to open autoatically
9		C-BOP	Loss of normal power to 1ETA <i>Can't Find</i>

Op-Test No.: NRC

Scenario No.: 3

Event No.: 1

*IR 7D for refuel with
to almost totally on B¹⁰*

Event Description: Boration for load decrease

#94(Boron) To Be added

Time	Position	Applicant's Actions or Behavior
	BOP	Refer to OP/1/A/6150/009, Boron Concentration Control. <i>Enclosure 4.2 (Boration)</i>
	BOP	Ensure the following valve control switches in "AUTO": <ul style="list-style-type: none"> • INV-238A (B/A Xfer Pmp To Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	Adjust the boric acid batch counter to the desired volume of boric acid to be added. <i>3 Batch size</i>
	BOP	Place the "NC MAKEUP MODE SELECT" switch in "BORATE".
	BOP	Adjust the controller for 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller to the desired flow.
	BOP	Ensure 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller in "AUTO".
	BOP	NOTE: If necessary, Boration can be manually secured at any time by placing the "NC MAKEUP CONTROL" switch to "STOP" position. Ensure at least one boric acid transfer pump in "AUTO" or "ON".
	BOP	Place the "NC MAKEUP MODE SELECT" switch in "START" position.
	BOP	Verify the following valves open: <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	If in "AUTO", verify the boric acid transfer pump starts.

*SRO ACTIONS?
late Panel?*

Op-Test No.: NRC Scenario No.: 3 Event No.: 1

Event Description: Boration for load decrease

Time	Position	Applicant's Actions or Behavior
	BOP	Verify proper flow by observing the boric acid flow totalizer. {PIP 96-0137}
	BOP	When the desired volume of boric acid is reached on the boric acid batch counter, ensure the following valves close: <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	<u>IF</u> desired, flush the makeup line as follows: <ul style="list-style-type: none"> • Open the following valves: <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • Ensure one reactor makeup water pump is in "ON". • <u>WHEN</u> ~20 gallons of makeup water have been flushed through the makeup line, close the following valves: <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • Place the following valve control switches in "AUTO": <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • <u>IF NOT</u> required for current plant operation, place the reactor makeup water pump started in earlier step in "AUTO".
	BOP	<u>IF</u> automatic makeup is desired, refer to Enclosure 4.1 (Automatic Makeup).

Op-Test No.: NRC Scenario No.: 3 Event No.: 2

Event Description: Decrease turbine load

Time	Position	Applicant's Actions or Behavior
	RO	Refer to OP/1/B/6300/001, Turbine Generator, Enclosure 4.2, Section 2.4
	RO	Depress the "Load Rate" pushbutton and verify it illuminates. <i>Expected?</i>
	RO	Input the desired load rate on the numeric keypad and verify the load rate appears on the Variable Display.
	RO	Depress the "Enter" pushbutton.
	RO	Depress the "Target" pushbutton and verify it illuminates.
	RO	Input the desired load target on the numeric keypad and verify the load target appears on the Target Display.
	RO	Depress the "Enter" pushbutton.
	RO	To start load decrease, depress the "Go" pushbutton and verify it illuminates.
	RO	S/G Blowdown changes should be coordinated with Secondary Chemistry.

SRO action

Op-Test No.: NRC Scenario No.: 3 Event No.: 3

Event Description: Tc Fails to 630 °F. (This instrument failure will cause the Control Rods to step in at maximum rate).

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Recognizes unwarranted rod motion and places rods to manual. Refers to Annunciator Response and Required Actions per: <ul style="list-style-type: none"> 1AD-2 A/4 and 1AD-6 A/6,B/6,C/6 EVALUATOR NOTE: The Annunciator Response is attached.
	SRO	May determine transition to AP/1/A/5500/15 is appropriate, Case II. <i>Do we have? dict in Scenario 2</i>
	SRO/RO	Ensure "CRD BANK SELECT" switch – IN MANUAL.
	RO	Verify all rod motion – STOPS
	RO	Manually adjust control rods as necessary to maintain T-Avg within 1°F of T-Ref <i>Scenario 2 Pg 11 says within 1.5°F. which is it? what is max acceptable & by what time?</i>
	SRO/RO	Determine and correct cause of continuous rod movement <i>How?</i>
	SRO	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)

Op-Test No.: NRC Scenario No.: 3 Event No.: 3

Event Description: Tc Fails to 630 °F. (This instrument failure will cause the Control Rods to step in at maximum rate).

Time	Position	Applicant's Actions or Behavior
	SRO	Determine required notifications: <ul style="list-style-type: none">• <u>REFER TO</u> RP/0/A/5000/001 (Classification Of Emergency)• <u>REFER TO</u> RP/0/B/5000/013 (NRC Notification Requirements)
		Determine long term plant status. <u>RETURN TO</u> procedure in effect. <i>which is?</i> <i>NEVER SAID</i>

Op-Test No.: NRC Scenario No.: 3 Event No.: 4

Event Description: NC Pump Seal Injection Flow Meter Fails LOW (1NVP5650)

*controlled
is it the valve or meter*

Time	Position	Applicant's Actions or Behavior
<i>?</i>	BOP	Recognizes 1NV-309 failing closed and takes valve to manual based on SRO direction.
	SRO	Directs activities of BOP. <i>what are the expected directed activities</i>
	BOP	Refers to annunciator response and required actions per <ul style="list-style-type: none"> • 1AD-7. E/1, E/2. and F/3.
	SRO	Calls SPOC and reports failure of NC Pump Seal Injection flow meter. 1NVP5650)

Op-Test No.: NRC Scenario No.: 3 Event No.: 5

Event Description: NCS Leak (\cong 90 GPM)

Time	Position	Applicant's Actions or Behavior
	ALL	Recognize increase in Containment Activity/Humidity/Pressure/ OAC alarm for unidentified leakage in containment.
	SRO	Implements AP/1/A/5500/10 (Reactor Coolant Leak) Case II NC System Leak
	ALL	Monitor Enclosure 1 (Foldout Page)
	RO	Verify Pzr level – STABLE OR INCREASING Determines Pzr pressure is decreasing and informs SRO.
	SRO	Determines Transition to step 2 RNO required

Op-Test No.: NRC Scenario No.: 3 Event No.: 5

Event Description: NCS Leak (\cong 90 GPM)

Time	Position	Applicant's Actions or Behavior
		<p>Perform the following:</p> <ul style="list-style-type: none"> ✓ a. Maintain charging flow less than 180 GPM ✓ b. Manually throttle 1NV-294 (NV Pmps A&B Disc Flow Ctrl) to stabilize Pzr level ✓ c. <u>IF</u> Pzr level is stable <u>OR</u> increasing, <u>THEN GO TO</u> Step 3. <p>SRO determines pressure is still decreasing and continues in RNO.</p> <ul style="list-style-type: none"> d. If Pzr level continues to decrease. <u>THEN</u>: <ul style="list-style-type: none"> ✓ 1) Reduce letdown flow to 45 GPM as follows: <ul style="list-style-type: none"> ✓ a) Manually control 1NV-148 (Letdn Press Control) to maintain letdown pressure at 350 PSIG ✓ b) <u>IF</u> 1NV-13A (Letdn Orif 1A Otlt Cont Isol) is open, <u>THEN</u> perform the following: <ul style="list-style-type: none"> (1) Open 1NV-11A (Letdn Orif 1C Otlt Cont Isol) (2) Close 1NV-13A (Letdn Orif 1A Otlt Cont Isol) ✓ c) <u>IF</u> 1NV-10A is open, <u>THEN</u> throttle 1NV-849 until letdown flow is 45 GPM. ✓ d) <u>WHEN</u> letdown pressure is stable at 350 PSIG, <u>THEN</u> place 1NV-148 (Letdn Press Control) in "AUTO"
	SRO	<p><u>IF</u> Pzr level continues to decrease, <u>THEN</u> ensure the following valves closed:</p> <p>SRO determines this step is N/A and continues.</p>
	SRO	<u>IF</u> Pzr level is stable <u>OR</u> increasing, <u>THEN GO TO</u> step 3
	ALL	<u>IF AT ANY TIME</u> the NC System leak increases, <u>THEN</u> perform step 2

Op-Test No.: NRC Scenario No.: 3 Event No.: 5

Event Description: NCS Leak (\approx 90 GPM)

Time	Position	Applicant's Actions or Behavior
	RO 9:41	Verify Pzr pressure – TRENDING TO OR STABLE AT 2235 PSIG
	SRO/BOP 9:41	Dispatch operator(s) to locate and isolate NC System leak EXAMINER NOTE: The crew will not send an operator to look for this since, based on indications, it is in containment.
	BOP 9:41	IF AT ANY TIME 1AD-7, I1 "VCT LO LVL" alarm is lit, THEN align NV pump suction to the FWST as follows: SRO evaluates step as currently not applicable and continues.
	RO 9:41	Determine NC leak rate by any of the following methods: <ul style="list-style-type: none"> ✓ Compare charging flow and letdown flow OR ✓ Monitor OAC NV graphic OR ✓ Initiate OAC Program "NSNCLEAK" OR • Monitor OAC point EROPLEAK OR ✓ Monitor OAC point C1P0976 (Gross NC System Leak Rate, Ten Min Run Avg)
	RO 9:41	Verify auxiliary building radiation is normal as follows: <ul style="list-style-type: none"> • EMF-41 (Aux Bldg Ventilation) – TRIP 1 LIGHT DARK AND COUNTRATE STABLE • All area monitor EMF trip 1 lights – DARK

Op-Test No.: NRC Scenario No.: 3 Event No.: 5

Event Description: NCS Leak (\cong 90 GPM)

Time	Position	Applicant's Actions or Behavior
	ALL	<u>NOTE:</u> Letdown flow and pressure are monitored between the Letdown HX and 1NV-148 (Letdn Press Control)
	SRO/BOP <i>9:08</i>	Verify letdown lines – INTACT
	BOP <i>10</i>	Verify the following NC pump thermal barrier alarms – DARK: <ul style="list-style-type: none"> • 1AD-6, E/1, "NCP A THERMAL BARRIER KC OUTLET HI/LO FLOW" • 1AD-6, E/2, "NCP B THERMAL BARRIER KC OUTLET HI/LO FLOW" • 1AD-6, E/3, "NCP C THERMAL BARRIER KC OUTLET HI/LO FLOW" • 1AD-6, E/4, "NCP D THERMAL BARRIER KC OUTLET HI/LOW FLOW"
	BOP <i>11</i>	Verify 1EMF-46A and 1EMF-46B (Component Cooling) – TRIP 1 LIGHTS DARK AND COUNTRATE STABLE.
	BOP <i>12</i>	Verify containment conditions are normal as follows: <ul style="list-style-type: none"> ✓ • Containment EMF – Trip 1 LIGHTS DARK AND COUNTRATE STABLE: ✓ • 1EMF38 (Containment Particulate) ✓ • 1EMF39 (Containment Gas) ✓ • 1EMF40 (Containment Iodine) ✓ • Containment floor and equipment sump level(s) - STABLE <i>which are not.</i>
	SRO	Determines transition to step 12 RNO appropriate

Op-Test No.: NRC Scenario No.: 3 Event No.: 5

Event Description: NCS Leak (\cong 90 GPM)

Time	Position	Applicant's Actions or Behavior
	BOP 12	Stop any VQ releases in progress. <u>REFER TO</u> OP/1/A/6450/017 (Containment Air Release and Addition).
	SRO	Transition to Step 13 A/ER column and continues.
	BOP 13	Verify NCDT conditions are normal as follows: <ul style="list-style-type: none"> • NCDT pressure – STABLE • NCDT level – STABLE • NCDT discharge flow – EQUAL TO RECIRC FLOW • NCDT temperature – STABLE
	BOP 14	Verify PRT conditions are normal as follows: <ul style="list-style-type: none"> • PRT pressure – LESS THAN 8 PSIG • PRT level – LESS THAN 89% • PRT temperature – LESS THAN 130°F
	SRO	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	Determine required notification: <ul style="list-style-type: none"> • <u>REFER TO</u> RP/0/A/5000/001 (Classification Of Emergency) • <u>REFER TO</u> RP/0/B/5000/013 (NRC Notification Requirements)

Op-Test No.: NRC Scenario No.: 3 Event No.: 5

Event Description: NCS Leak (\cong 90 GPM)

Time	Position	Applicant's Actions or Behavior
	ALL 17	Verify NC System leak – ISOLATED Determines transition to step 17 RNO appropriate:
	SRO/BOP 17	<u>IF</u> shutdown is required, <u>THEN</u> : a. Decrease the unit load at a rate based on the ability to remove the unit from line in a controlled manner b. Notify Reactor Group Engineer of occurrence. c. <u>IF</u> reactor power is greater than 15%, <u>THEN</u> : 1) Initiate unit shutdown. <u>REFER TO</u> : • OP/1/A/6100/003 (Controlling Procedure For Unit Operation) OR • AP/1/A/5500/09 (Rapid Downpower) 2) Ensure adequate shutdown margin is maintained. <u>REFER TO</u> ROD Book, Section 5.11 3) <u>GO TO</u> Step 18.
	SRO	Consult with station management for further actions Determine long term plant status. <u>RETURN TO</u> procedure in effect

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	ALL	Recognizes increased RCS Leakage by Pressurizer Pressure and Level decreasing and Containment Conditions (temp, pressure and/or Radiation levels) increasing.
	SRO	Directs RO/BOP to manually initiate a Reactor Trip and Safety Injection. Evaluate and perform Immediate action's of EP/1/A/5000/E-0.
	RO/BOP	Monitor Enclosure 1 (Foldout Page)
	RO	Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights – LIT (NO) • All reactor trip and bypass breakers – OPEN (NO) • I/R amps – DECREASING (NO) Determines reactor is not tripped and informs SRO and performs immediate actions of FR-S.1
	SRO	Transitions to step 1 RNO
	RO	Perform the following: <ul style="list-style-type: none"> • Manually trip reactor • <u>IF</u> reactor will not trip, <u>THEN</u> concurrently: <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees) • <u>GO TO</u> EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS)
	SRO	Determines transition to EP/1/A/5000/FR-S.1 (Response To Nuclear Power Generation/ATWS) is required.

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	RO	Verify Reactor Trip: <ul style="list-style-type: none"> • All rod bottom lights – LIT (NOT LIT) • All reactor trip and bypass breakers – OPEN (NOT OPEN) • I/R amps – DECREASING (NO)
	SRO	Determines transition to RNO of step 1 is required
	RO	Perform the following: <ul style="list-style-type: none"> • Manually trip the reactor • IF reactor will not trip, THEN manually insert rods (CRITICAL STEP) (Rx NOT tripped)
	SRO	Transitions to Step 2 A/ER column and continues.
	RO	Verify Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves – CLOSED (CLOSED) OR <ul style="list-style-type: none"> • All turbine control valves – CLOSED (CLOSED)
	BOP	Verify CA pumps are running as follows: <ol style="list-style-type: none"> Motor driven CA pumps – ON EXAMINER NOTE: The SRO may determine that the 1B CA pump is tagged and determine the RNO is Not Applicable

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)

NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	RO	3 b 3 S/G levels – GREATER THAN 11% Determines this condition does not exist and informs SRO
	SRO	Transitions to step 3.b RNO.
	BOP	Ensure CA Pump #1 – RUNNING
	BOP	Initiate emergency boration of NC System as follows: a. Verify 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: • 1NV-321A (Chrg Line Cont Isol) • 1NV-314B (chrg Line Cont Isol) Determines that this does not exist and informs SRO.
	SRO	Transition to step 4.e RNO

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Perform the following:</p> <ol style="list-style-type: none"> 1) Align NV pump suction to the 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: <ol style="list-style-type: none"> c) 1NV-188A (VCT Otlt Isol) d) 1NV-189B (VCT Otlt Isol) 2) Ensure the following valves – OPEN: : (CRITICAL TASK) <ul style="list-style-type: none"> • 1NI-9A (NV Pmp C/L Inj Isol) (<i>manually opens</i>) • 1NI-10B (NV Pmp C/L Inj Isol) (<i>manually opens</i>)
	SRO	Transitions back to Step 4.f A/ER column and directs operators.
	RO	Verify Pzr pressure – LESS THAN 2335 PSIG.
	BOP	<p>Verify S/I status as follows:</p> <ol style="list-style-type: none"> a. "SAFETY INJECTION ACTUATED" status light (1SI-13 – LIT b. WHEN manpower AND time permits, THEN verify proper system alignments. REFER TO Enclosure 1 (System Verification Following S/I Actuation) <p>EXAMINER NOTE: Enclosure 1 attached.</p>
	RO	<p>Verify the following trips have occurred:</p> <ul style="list-style-type: none"> • Reactor Trip <p>Determines reactor not tripped and informs SRO.</p>

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Step 6.a RNO.
	RO <i>Take</i>	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. <i>where necessary)</i>
	SRO	Transitions to Step 6.b A/ER column and directs operators.
	RO	Verify Turbine Trip <i>No discussion w/ RO tripping RCP's with loss of SBCLG</i>
	RO <i>GR</i>	Control S/G levels as follows: Verify N/R level in at least one S/G – GREATER THAN 11% (29% ACC) Determines this does not exist and informs SRO. <i>check</i>
	SRO	Transition to step 7 RNO.
	RO	Perform the following: <ul style="list-style-type: none"> • <u>IF</u> total CA flow is less than 1000 GPM, <u>THEN</u> manually start pumps and align valves as required • <u>WHEN</u> N/R level is greater than 11% (29% ACC) in at least one S/G, <u>THEN</u> perform step 7.b • <u>GO TO</u> step 7.c

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP <i>5/11/8</i>	<p><u>WHEN</u> either of the following annunciators are lit, <u>THEN REFER TO</u> AP/1/A/5500/06 (Loss Of S/G Feedwater)</p> <ul style="list-style-type: none"> 1AD-5, H/4 "CACST LO LEVEL" <p>OR</p> <ul style="list-style-type: none"> 1AD-8, B/1 "UST LO LEVEL"
	BOP <i>5/11/8</i>	<p>Ensure all dilution paths are isolated as follows:</p> <ul style="list-style-type: none"> Place NC makeup control switch to "STOP" Place reactor makeup water pumps to "OFF"
	RO <i>5/11/8</i>	<p>Verify main steamlines are intact as follows:</p> <p>a. Verify the following:</p> <ul style="list-style-type: none"> All S/G pressures – STABLE OR INCREASING All S/Gs – PRESSURIZED
	SRO <i>9.0</i>	<u>GO TO</u> step 12.
	RO <i>12</i>	Verify all NC T-Colds – STABLE OR INCREASING.
	RO <i>13</i>	Verify Core Exit TCs – LESS THAN 1200°F.
	RO <i>14</i>	<p>Verify the reactor is subcritical as follows:</p> <ul style="list-style-type: none"> P/R channels – LESS THAN 5% I/R SUR – NEGATIVE

*Lock at potential Rn
 1500 gpm SI
 through by V. R.
 h.c.s.*

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure adequate shutdown margin as follows: <ul style="list-style-type: none"> a. Ensure the following signals – RESET: <ul style="list-style-type: none"> • Phase A Containment Isolations • KC NC NI NM St signals
	BOP/SRO	<ul style="list-style-type: none"> b. Obtain current NC boron concentration from Primary Chemistry.
	ALL	<ul style="list-style-type: none"> b. <u>WHEN</u> current NC boron concentration is obtained, <u>THEN</u> perform shutdown margin calculation. REFER TO OP/0/A/6100/006 (Reactivity Balance Calculation) c. <u>WHEN</u> following conditions are satisfied, <u>THEN</u> stop NC System boration: <ul style="list-style-type: none"> • Adequate shutdown margin is obtained • Uncontrolled cooldown has been stopped
	SRO	Implement RP/0/A/5000/001 (Classification Of Emergency). <i>what is it</i>
	SRO	<u>RETURN TO</u> procedure and step in effect.
	SRO	Determines transition to EP/1/A/5000/E-0, Step 1 is appropriate. Reminds RO/BOP to monitor Enclosure 1 of EP/1/A/5000/E-0.
	RO <i>gfr</i>	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

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	RO <i>SEP 10</i>	Verify Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves – CLOSED OR • All turbine control valves – CLOSED
	BOP <i>SEP 10</i>	Verify 1ETA and 1ETB – ENERGIZED
	BOP <i>SEP 10</i>	Verify S/I is actuated: <ul style="list-style-type: none"> • "SAFETY INJECTION ACTUATED" status light (1SI-13) – LIT • E/S load sequencer actuated status lights (1SI-14) – LIT
	RO <i>SEP 10</i>	Announce "Unit 1 Safety Injection". <i>Kind of quiet</i>
	SRO <i>SEP 10</i>	Implement RP/0/A/5000/001 (Classification Of Emergency).
	RO <i>SEP 10</i>	Verify all Feedwater Isolation status lights (1SI-5) – LIT.
	BOP <i>SEP 10</i>	Verify Phase A Containment Isolation status as follows: <ul style="list-style-type: none"> • Phase A "RESET" lights – DARK • Monitor Light Panel Group 5 St lights – LIT.
	BOP <i>SEP 10</i>	Verify proper Phase B actuation as follows: <ol style="list-style-type: none"> a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG <p>Determines that containment pressure has exceeded 3 psig and informs SRO.</p>

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)

NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	SRO	Transition to step 10.a RNO.
	BOP <i>step 10.a RNO</i>	<p>Perform the following:</p> <p>NOTE: This time may be used later to determine when to align ND Aux spray</p> <ul style="list-style-type: none"> Record approximate time of reactor trip _____ Verify NS pumps – INDICATING FLOW. IF flow is not indicated, THEN manually initiate Phase B Isolation. <i>↖</i> <p>Determines step does not apply and continues.</p> <ul style="list-style-type: none"> Verify Phase B Isolation has actuated as follows: <ul style="list-style-type: none"> Phase B Isolation "RESET" lights – DARK IF Phase B Isolation "RESET" lights are lit, THEN manually initiate Phase B Isolation. Verify following monitor light panel lights – LIT: <ul style="list-style-type: none"> Group 1 Sp lights Group 5 Sp lights Group 5 St lights L/11 and L/12 <p><i>SPRICA RNO(S)</i></p> <p>IF monitor light panel is not in correct alignment, THEN ensure correct valve alignment and component operation.</p>
	BOP	Stop all NC pumps while maintaining seal injection flow.

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	SRO	<u>GO TO</u> step 11
	BOP 11c	Verify proper CA pump status as follows: <ul style="list-style-type: none"> • Motor driven CA pumps – ON EXAMINER NOTE: The SRO may determine that the 1B CA pump is tagged and determine that the RNO is Not Applicable.
	RO 11b	3 S/G N/R levels – GREATER THAN 11%
	SRO	Transitions to step 11 b RNO.
	BOP 11b	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 14	Verify all Unit 1 and Unit 2 RN pumps – ON

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP 9/11/12	<ul style="list-style-type: none"> 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 14	Verify all S/G pressures – GREATER THAN 775 PSIG.
	BOP/RO 17	Verify proper S/I flow as follows: <ul style="list-style-type: none"> "NV S/I FLOW" – INDICATING FLOW NC pressure – LESS THAN 1620 PSIG NI pumps – INDICATING FLOW NC pressure – LESS THAN 285 PSIG Determines NC pressure is greater than 285 psig and informs SRO.
	SRO	Transition to step 17.d RNO.
	BOP	Perform the following: Ensure ND pump miniflow valve on operating ND pump(s) – OPEN
	SRO	GO TO step 18.

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP <i>3 separate steps to be constant</i> 19 20	Control S/G levels as follows: <ul style="list-style-type: none"> • Verify total CA flow – GREATER THAN 450 GPM 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% <ul style="list-style-type: none"> • Verify all CA isolation valves – OPEN • Verify S/I equipment status based on monitor light panel – IN PROPER ALIGNMENT
	SRO	NOTE: Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.
	RO 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"> • All Pzr PORVs – CLOSED • Normal Pzr spray valves – CLOSED • At least one Pzr PORV isolation valve – OPEN
	RO	Verify NC subcooling based on core exit T/Cs – GREATER THAN 0°F Determines that subcooling has been lost and informs SRO.
	SRO	Transitions to step 23 RNO.

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP <i>14</i>	<p><u>IF</u> any NV <u>OR</u> NI pump is on, <u>THEN</u>:</p> <ul style="list-style-type: none"> • Ensure all NC pumps – OFF • Maintain seal injection flow
	RO <i>24</i>	<p>Verify main steamlines are intact as follows:</p> <ul style="list-style-type: none"> • All S/G pressures – STABLE OR INCREASING • All S/Gs – PRESSURIZED
	BOP <i>25</i>	<p>Verify S/G tubes are intact as follows:</p> <ul style="list-style-type: none"> • Verify the following EMF trip 1 lights – DARK • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-34 (S/G Sample) • 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	<p>Verify NC System is intact as follows:</p> <ul style="list-style-type: none"> • Containment pressure – LESS THAN 1 PSIG. <p>Determines pressure has exceeded 1 psig and informs SRO.</p>
	SRO	<p>Performs step 26 RNO and transitions to EP/1/A/5000/E-1 (Loss of Reactor Or Secondary Coolant.</p> <p><i>Implement F-C CSFSI</i></p>

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	ALL 1	Monitor Enclosure 1 (Foldout Page).
	RO 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: <ul style="list-style-type: none"> • Verify N/R level in all intact S/Gs – GREATER THAN 11% (29% ACC) Determines condition does not exist and informs SRO.
	SRO	Performs Step 3.a RNO. <i>Expect 1</i>
	BOP 3a-2nd 3b →	<ul style="list-style-type: none"> • Maintain Total Feed Flow > 450 GPM until at least 1 intact S/G N/R > 11% (29% ACC) • Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%
	ALL	Ensure CA suction source switchover criterion is monitored. REFER TO Enclosure 1 (Foldout Page).

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP 4	<p>Verify secondary radiation is normal as follows:</p> <p>Ensure the following signals – RESET:</p> <ul style="list-style-type: none"> • Phase A Containment Isolations • CA System valve control • KC NC NI NM St signals <p>Align all S/Gs for Chemistry sampling.</p> <p>Perform at least one of the following:</p> <ul style="list-style-type: none"> • Notify Chemistry to sample all S/Gs for activity <p>OR</p> <ul style="list-style-type: none"> • Notify Chemistry or RP to frisk all cation columns for activity <p>Verify the following EMF trip 1 lights – DARK:</p> <ul style="list-style-type: none"> • 1EMF-33 (Condenser Air Ejector Exhaust) • 1EMF-34 (S/G Sample) • 1EMF-26 (Steamline 1A) • 1EMF-27 (Steamline 1B) • 1EMF-28 (Steamline 1C) • 1EMF-29 (Steamline 1D)
	ALL	<p>WHEN activity results are reported, THEN verify all S/Gs indicate no activity.</p>

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	BOP 5 a b c	Verify Pzr PORV and isolation valve status as follows: <ul style="list-style-type: none"> • Power to all Pzr PORV isolation valves – AVAILABLE • All Pzr PORVs – CLOSED • At least one Pzr PORV isolation valve – OPEN
	ALL 5 d	<u>IF AT ANY TIME</u> a Pzr PORV opens due to high pressure, <u>THEN</u> , after Pzr pressure decreases to less than 2315 PSIG, ensure the valve closes or is isolated.
	RO/BOP 6 a b c d	Verify S/I termination criteria as follows: <ul style="list-style-type: none"> a NC subcooling based on core exit T/Cs – GREATER THAN 0°F b Verify secondary heat sink as follows: <ul style="list-style-type: none"> • 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) (NO)
	SRO	Transitions to step 6.d RNO.
	BOP	<u>IF</u> NC pressure is increasing AND normal Pzr spray is available,

Carry over
to next page

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
		<p><u>THEN</u> attempt to stabilize NC pressure using normal Pzr spray</p> <p>EXAMINER NOTE: Normal spray is not available due to NC pumps being secured.</p>
	SRO	<u>GO TO</u> step 6.f.
	ALL	<p>Monitor S/I termination criteria. <u>REFER TO</u> Enclosure 2 (S/I Termination Criteria)</p> <p><u>IF AT ANY TIME</u> S/I termination criteria is met while in this procedure, <u>THEN RETURN TO</u> step 6.</p>
	BOP	<p>Verify proper NS pump operation as follows:</p> <p>At least one NS pump – ON</p> <p>Verify the following valves – OPEN:</p> <ul style="list-style-type: none"> 1FW-27A (ND Pump 1A Suct From FWST) 1FW-55B (ND Pump 1B Suct From FWST) <p>Containment pressure – LESS THAN 2.4 PSIG</p> <p>Ensure S/I – RESET:</p> <ul style="list-style-type: none"> ECCS D/G load sequencers

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	ALL 7d3	IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on. <i>what is B/O?</i>
	BOP 7E 7F 7G	Reset NS Stop NS pumps 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 7 a b c d	Verify criteria to stop operating ND pumps as follows: <ul style="list-style-type: none"> • NC pressure – GREATER THAN 285 PSIG • NC pressure – STABLE OR INCREASING • At least one ND pump – ON • Ensure S/I – RESET: <ul style="list-style-type: none"> • ECCS • D/G load sequencers
	ALL 7d3	IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.
	BOP 7E	Ensure all ND pump(s) not supporting Cold Leg Recirc – STOPPED.

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)
 NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	ALL 9 F	IF AT ANY TIME NC pressure decreases to less than 285 PSIG in an uncontrolled manner, THEN restart ND pumps.
	RO 9	Verify LOCA has occurred as follows: <ul style="list-style-type: none"> • All S/G pressures –STABLE or increasing • NC pressure – STABLE OR DECREASING
	BOP 10 a b c d e f	<p>Verify conditions to stop operating D/Gs as follows:</p> <p>At least one D/G – ON</p> <p>Verify 1ETA is energized by offsite power as follows:</p> <ul style="list-style-type: none"> • "D/G 1A BKR TO ETA" – OPEN • 1ETA undervoltage status lights (1SI-14) – DARK <p>WHEN S/I is reset, THEN dispatch operator to stop 1A D/G and place in standby readiness. REFER TO OP/1/A/6350/002 (Diesel D/G Generator Operation)</p> <p>Verify 1ETB is energized by offsite power as follows:</p> <ul style="list-style-type: none"> • "D/G 1B BKR TO ETB" – OPEN • 1ETB undervoltage status lights (1SI-14) – DARK <p>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)</p> <p>Ensure S/I – RESET:</p> <ul style="list-style-type: none"> • ECCS • D/G load sequences

Op-Test No.: NRC Scenario No.: 3 Event No.: 6

Event Description: Rod Ejection with ATWS (NCS leak of 1500 GPM from ejected Rod)

NI-9A & NI-10B fail to automatically open on the SI signal.

Time	Position	Applicant's Actions or Behavior
	ALL	<u>IF AT ANY TIME</u> a B/O occurs, <u>THEN</u> restart S/I equipment previously on.
	BOP	Obtain containment H2 concentration as follows: <ul style="list-style-type: none"> • Ensure operator has been dispatched to secure all ice condenser air handling units. <u>REFER TO</u> Enclosure 3 (Securing All Ice Condenser Air Handling Units). • Verify containment H2 analyzers- IN SERVICE • Verify containment H2 concentration- LESS THAN 6%. • Verify containment H2 concentration-LESS THAN 0.5%. • When ice condenser air handling units are off <u>AND</u> h2 concentration is less than 6%, <u>THEN</u> energize the H2 igniters (1MC-7)
	ALL	<u>EXAMINER NOTE:</u> At this time, the normal breakers for 1ETA will open and 1A Diesel Generator will load blackout loads on the bus. Per procedure, the crew must load LOCA loads on the bus. (1A NI will be the only equipment required to be started).
	ALL	<u>EXAMINER NOTE;</u> The scenario can be terminated when the required SI loads are on the bus

TERMINATE SCENARIO WHEN REQUIRED PUMP(S) STARTED. (NI)

Classification: RP/0/A/5000/001 (Classification Of Emergency) Enclosure 4.1 – Site Area Emergency (Based on Reactor failing to Trip from a valid Reactor Trip signal received or required and automatic reactor trip was not successful, and Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing (4.4.S.1-1)

EMERGENCY NOTIFICATION FORM

1. ☒ A THIS IS A DRILL ☒ B ACTUAL EMERGENCY ☐ INITIAL ☐ FOLLOW-UP MESSAGE NUMBER _____
2. SITE: Fire Nuc Catawba Nuclear Station UNIT: _____ REPORTED BY: _____
3. TRANSMITTAL TIME/DATE: _____ / _____ / _____
(Eastern) mm dd yy CONFIRMATION PHONE NUMBER: (803) 831-3807 (Simulator)
4. AUTHENTICATION (If Required): _____
(Number) (Codeword)

5. EMERGENCY CLASSIFICATION:
- ☒ A NOTIFICATION OF UNUSUAL EVENT ☐ B ALERT ☐ C SITE AREA EMERGENCY ☐ D GENERAL EMERGENCY

6. ☐ Emergency Declaration At: ☒ Termination At: TIME/DATE: _____ / _____ / _____ (If B, go to item 16.)
(Eastern) mm dd yy

7. **EMERGENCY DESCRIPTION/REMARKS:** EAL # 4.4.S.1 - The reactor control rods have failed to automatically or manually shut down the reactor. This condition, by itself, poses no immediate threat to public safety.

8. PLANT CONDITION: ☒ A IMPROVING ☐ B STABLE ☐ C DEGRADING

9. REACTOR STATUS: **A** SHUTDOWN TIME/DATE: _____ / _____ / _____
(Eastern) mm dd yy **B** _____ % POWER

10. EMERGENCY RELEASE(S):
- ☒ A NONE (Go to item 14.) ☐ B POTENTIAL (Go to item 14.) ☐ C IS OCCURRING ☐ D HAS OCCURRED

- **11. TYPE OF RELEASE: ☒ ELEVATED ☐ GROUND LEVEL

- 3** LIQUID: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____
 Time(Eastern) Date Time(Eastern) Date

- **12. RELEASE MAGNITUDE: ☐ CURIES PER SEC. ☐ CURIES
- ☐ A NOBLE GASES _____
- ☐ B IODINES _____
- ☐ C PARTICULATES _____
- ☐ D OTHER _____
- NORMAL OPERATING LIMITS: ☐ BELOW ☐ ABOVE

- **13. ESTIMATE OF PROJECTED OFFSITE DOSE: ☒ NEW ☐ UNCHANGED PROJECTION TIME: _____ (Eastern)

	TEDE mrem	Thyroid CDE mrem
SITE BOUNDARY		
2 MILES		
5 MILES		
10 MILES		

ESTIMATED DURATION: HRS.

- **14. METEOROLOGICAL DATA: **A** WIND DIRECTION (from) _____ ° **B** SPEED (mph) _____
C STABILITY CLASS _____ **D** PRECIPITATION (type) _____

15. RECOMMENDED PROTECTIVE ACTIONS:
- ☐ NO RECOMMENDED PROTECTIVE ACTIONS
- ☐ B EVACUATE _____
- ☐ C SHELTER IN-PLACE _____
- ☐ D OTHER _____

16. APPROVED BY: _____
(Name)
- Emergency
Coordinator _____
(Title)
- TIME/DATE: _____ / _____ / _____
(Eastern) mm dd yy

* If items 8-14 have not changed, only items 1-7 and 15-16 are required to be completed.

** Information may not be available on initial notifications.

GOVERNMENT AGENCIES NOTIFIED

Record the name, date, time and agencies notified:

1.	<hr/>		<hr/>	
	(name)	York County		
	(date)	(time)	(agency)	Sel. Sig. 513 Bell Line (803) 329-1110
2.	<hr/>		<hr/>	
	(name)	Mecklenburg County		
	(date)	(time)	(agency)	Sel. Sig. 116 Bell Line (704) 943-6200
3.	<hr/>		<hr/>	
	(name)	Gaston County		
	(date)	(time)	(agency)	Sel. Sig. 112 Bell Line (704) 866-3300
4.	<hr/>		<hr/>	
	(name)	South Carolina WP/EOC		
	(date)	(time)	(agency)	Sel. Sig. 518 Bell Line (803) 737-8500
5.	<hr/>		<hr/>	
	(name)	North Carolina WP/EOC		
	(date)	(time)	(agency)	Sel. Sig. 314 Bell Line (919) 733-3300
6.	<hr/>		<hr/>	
	(name)			
	(date)	(time)	(agency)	
7.	<hr/>		<hr/>	
	(name)			
	(date)	(time)	(agency)	

BA FLOW DEVIATION**I/3**

SETPOINT:	±1.2 GPM deviation from the flow setpoint for more than 10 seconds during manual, borate or auto NC makeup mode.
ORIGIN:	INVFT5450 (Boric Acid Blend Control) Flow to the Blender as compared to selected flow.
PROBABLE CAUSE:	<ol style="list-style-type: none">1. Boric Acid Xfer pump failed to start2. Reactor makeup control system failure3. Malfunction of INV-238A (B/A To Blender Ctrl Vlv)
AUTOMATIC ACTIONS:	Valves INV-181A (B/A Blender Otlr To VCT) and INV-186A (B/A Blender Otlr To VCT Otlr) closed.
IMMEDIATE ACTIONS:	<ol style="list-style-type: none">1. Verify the Boric Acid Xfer Pump switch is in "AUTO".2. IF necessary take manual control of Reactor Makeup Control System per OP/1/A/6150/009 (Boron Concentration Control).
SUPPLEMENTARY ACTIONS:	<ol style="list-style-type: none">1. Determine and correct cause of alarm.2. Refer to TS 3.1.1, SLC 16.9-7 and SLC 16.9-8 for Boron Flow Path Requirements.
REFERENCES:	Westinghouse Precautions, Limitations and Setpoints For Nuclear Steam Supply Systems CNM-1201.00-39

T-REF/T-AUCT HI/LO**A/4**SETPOINT: $\pm 3^{\circ}\text{F}$

ORIGIN: T-REF/T-AUCT bistable in Rod Control circuit.

PROBABLE CAUSE:

1. Up power or down power maneuver causing T-AUCT to lag T-REF.
2. Malfunction in Rod Control System.
3. T-HOT or T-COLD instrument failure.
4. Channel I impulse pressure failure.

AUTOMATIC ACTIONS:

IF T-AVG fails high, the control rods will step in and charging may increase to bring pressurizer level to 100% value (55%).

IMMEDIATE ACTIONS:

1. IF due to load change, ensure T-AVG returns back to T-REF.
2. IF T-AVG failed high, take manual control of rods and return T-AVG to T-REF.
3. IF malfunction in Rod Control System, refer to AP/1/A/5500/15 (Rod Control Malfunctions).
4. IF T-AVG is low AND rods are fully withdrawn, reduce load or dilute as necessary.
5. IF T-REF is failed, put rod control in manual and control at T-AVG required for existing load.

SUPPLEMENTARY ACTIONS:

1. Refer to TS 3.4.2 (RCS Minimum Temperature for Criticality).
2. IF the following conditions are met:
 - The OAC out of service
 - TAVG < 561°F
 - Reactor is criticalrefer to PT/1/A/4600/009 (Loss of Operator Aid Computer) (TS SR 3.4.2.1) (RCS Minimum Temperature for Criticality)
3. IF malfunction due to T-AVG failing high, take affected loop out of the circuit with "T-AVG DEFEAT" and "ΔTEMP DEFEAT" switches.
4. IF instrument failure, have IAE trip bistable on affected channel within six (6) hours.
5. IF due to impulse pressure failure, ensure P-13 in required state.

CONTINUED ON THE NEXT PAGE

T-REF/T-AUCT HI/LO (Cont'd)

A/4

REFERENCES:

1. TS 3.4.2 (RCS Minimum Temperature for Criticality)
2. TS 3.3.1 (Reactor Trip System (RTS) Instrumentation)
3. FSAR, Figure 7-2 (Part 3 of 16)
4. NSM CN-19815

AUCT HI T-AVG**A/6****SETPOINT:** > 588.1°F**ORIGIN:** Auct. T-AVG:

- INCRD5420 (NC Loop A Hot Leg Temp)
- INCRD5421 (NC Loop A Hot Leg Temp)
- INCRD5422 (NC Loop A Hot Leg Temp)
- INCRD5440 (NC Loop A Cold Leg Temp)
- INCRD5460 (NC Loop B Hot Leg Temp)
- INCRD5461 (NC Loop B Hot Leg Temp)
- INCRD5462 (NC Loop B Hot Leg Temp)
- INCRD5480 (NC Loop B Cold Leg Temp)
- INCRD5500 (NC Loop C Hot Leg Temp)
- INCRD5501 (NC Loop C Hot Leg Temp)
- INCRD5502 (NC Loop C Hot Leg Temp)
- INCRD5520 (NC Loop C Cold Leg Temp)
- INCRD5540 (NC Loop D Hot Leg Temp)
- INCRD5541 (NC Loop D Hot Leg Temp)
- INCRD5542 (NC Loop D Hot Leg Temp)
- INCRD5560 (NC Loop D Cold Leg Temp)

PROBABLE CAUSE:

1. The reactor control system or steam dump system is maintaining T-AVG at an improper level.
2. Channel testing.
3. Instrument failure.

AUTOMATIC ACTIONS: If a loop T-AVG fails high, control rods will step in with control rod drive in "AUTO".

IMMEDIATE ACTIONS:

1. **IF** channel failure at power, place rod control system in "MANUAL" and stabilize reactor coolant temperature utilizing remaining loops T-AVG.
2. **IF** channel failure is indicated, defeat the affected channel with the "Δ TEMP DEFEAT" and "T-AVG DEFEAT" switches.
3. Following a load rejection, ensure steam dump operation.

CONTINUED ON THE NEXT PAGE

4/7/8

A/6

AUCT HI T-AVG (Cont'd)

SUPPLEMENTARY ACTIONS: **IF** a channel malfunction has occurred, perform the following:

1. Refer to TS Table 3.3.2-1 for required number of channels.
2. Initiate a work request to have the channel repaired.

REFERENCES:

1. FSAR, Fig. 7.2.1-1 (9 of 16)
2. Westinghouse Precautions, Limitations, and Setpoints for Nuclear Steam Supply Systems CNM-1201.00-39
3. TS Table 3.3.2-1
4. CNEE-0173-03.03
5. IAE Procedure IP/1/B/3222/77
6. NSM CN-19815

LOOP T-AVG DEVIATION**B/6****SETPOINT:**

1. Loop A: +2, -2.5°F
2. Loop B: +2, -3.5°F
3. Loop C: +2, -2.0°F
4. Loop D: +2, -3.0°F

ORIGIN:

Individual loop T-AVG compared to Auctioneered Hi T-AVG:

- INCRD5420 (NC Loop A Hot Leg Temp)
- INCRD5421 (NC Loop A Hot Leg Temp)
- INCRD5422 (NC Loop A Hot Leg Temp)
- INCRD5440 (NC Loop A Cold Leg Temp)
- INCRD5460 (NC Loop B Hot Leg Temp)
- INCRD5461 (NC Loop B Hot Leg Temp)
- INCRD5462 (NC Loop B Hot Leg Temp)
- INCRD5480 (NC Loop B Cold Leg Temp)
- INCRD5500 (NC Loop C Hot Leg Temp)
- INCRD5501 (NC Loop C Hot Leg Temp)
- INCRD5502 (NC Loop C Hot Leg Temp)
- INCRD5520 (NC Loop C Cold Leg Temp)
- INCRD5540 (NC Loop D Hot Leg Temp)
- INCRD5541 (NC Loop D Hot Leg Temp)
- INCRD5542 (NC Loop D Hot Leg Temp)
- INCRD5560 (NC Loop D Cold Leg Temp)

**PROBABLE
CAUSE:**

1. Reactor coolant pump trip.
2. TH or TC instrument failure.
3. Steam flow mismatch.
4. Feed flow mismatch.

**AUTOMATIC
ACTIONS:**

If a loop T-AVG fails high, control rods will step in.

**IMMEDIATE
ACTIONS:**

1. **IF** channel failure at power, place rod control system in "MANUAL" and stabilize reactor coolant temp utilizing remaining loops T-AVG.
2. **IF** channel failure is indicated by TH, TC, ΔT , or T-AVG indication, defeat that channel with the " Δ TEMP DEFEAT" and "T-AVG DEFEAT" switches.

CONTINUED ON THE NEXT PAGE

B/6

LOOP T-AVG DEVIATION (Cont'd)

**SUPPLEMENTARY
ACTIONS:**

1. Check steam and feedwater flow indications for aid in determining the cause of deviation.
2. **IF** instrument failure, refer to TS Table 3.3.1-1, and Table 3.3.2-1 for required number of channels.
3. Dispatch an operator to 1RFM-8 on 1RFMP1 (Cable Spreading Room, AB-574) to identify affected loop(s) and to acknowledge the alarm.
4. **WHEN** desired to place control rods in "AUTO", perform the following:
 - 4.1 Ensure T-Avg is within 1°F of T-Ref.
 - 4.2 Place control rods in "AUTO".

REFERENCES:

1. FSAR, Figure 7.2.1-1 (9 of 16) (Instrumentation and Control System Diagrams)
2. Westinghouse Precautions, Limitations and Setpoints for Nuclear Steam Supply Systems CNM-1201.00-39
3. TS Table 3.3.1-1 and Table 3.3.2-1
4. CNEE-0173-03.11
5. IAE Procedure IP/1/B/3222/77

C/6

LOOP D/T DEVIATION

SETPOINT: 5°F

ORIGIN: Individual loop D/T compared to auct D/T:

- INCRD5420 (NC Loop A Hot Leg Temp)
- INCRD5421 (NC Loop A Hot Leg Temp)
- INCRD5422 (NC Loop A Hot Leg Temp)
- INCRD5440 (NC Loop A Cold Leg Temp)
- INCRD5460 (NC Loop B Hot Leg Temp)
- INCRD5461 (NC Loop B Hot Leg Temp)
- INCRD5462 (NC Loop B Hot Leg Temp)
- INCRD5480 (NC Loop B Cold Leg Temp)
- INCRD5500 (NC Loop C Hot Leg Temp)
- INCRD5501 (NC Loop C Hot Leg Temp)
- INCRD5502 (NC Loop C Hot Leg Temp)
- INCRD5520 (NC Loop C Cold Leg Temp)
- INCRD5540 (NC Loop D Hot Leg Temp)
- INCRD5541 (NC Loop D Hot Leg Temp)
- INCRD5542 (NC Loop D Hot Leg Temp)
- INCRD5560 (NC Loop D Cold Leg Temp)

PROBABLE CAUSE:

1. Reactor coolant pump trip.
2. TH or TC instrument failure.
3. Steam flow mismatch.
4. Feed flow mismatch.

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS:

1. **IF** channel failure at power, place rod control system in "MANUAL" and stabilize reactor coolant temp utilizing remaining loop T-AVG.
2. **IF** channel failure is indicated by TH, TC, D/T, or T-AVG indication, defeat that channel with the "Δ TEMP DEFEAT" and the "T-AVG DEFEAT" switch.

CONTINUED ON THE NEXT PAGE

C/6

LOOP D/T DEVIATION (Cont'd)

**SUPPLEMENTARY
ACTIONS:**

1. Check steam and feedwater flow indications for aid in determining the cause of the deviation.
2. **IF** instrument failure indicated, refer to TS Table 3.3.1-1 and Table 3.3.2-1 for required number of channels.
3. Dispatch an operator to 1RFM-9 on 1RFMP1 (Cable Spreading Room, AB-574) to identify affected loop(s) and to acknowledge the alarm.
4. **WHEN** desired to place control rods in "AUTO", perform the following:
 - 4.1 Ensure T-Avg is within 1°F of T-Ref.
 - 4.2 Place control rods in "AUTO".

REFERENCES:

1. FSAR, Figure 7.2.1-1 (9 of 16) (Instrumentation and Control System Diagrams)
2. Westinghouse Precautions, Limitations, and Setpoints for Nuclear Steam Supply Systems CNM-1201.00-39
3. TS Table 3.3.1-1 and Table 3.3.2-1
4. CNEE-0173-03.11
5. CNEE-0173-03.12
6. IAE Procedure IP/1/B/3222/60

E/1

CHARGING LINE HI/LO FLOW

SETPOINT: HI - 150 GPM
LO - 53 GPM

ORIGIN: INVFT5630

PROBABLE
CAUSE:

LO

HI

- | | | | |
|----|--|----|---|
| 1. | Pressurizer level higher than program level. | 1. | Pressurizer level lower than program level. |
| 2. | Operating charging pump tripped. | 2. | Speed and/or Flow Controller malfunction. |
| 3. | Speed and/or Flow Controller malfunction. | 3. | ND letdown flow increased to ≤ 150 gpm in Modes 5, 6 or No Mode. |
| 4. | Gas Binding | | |

AUTOMATIC
ACTIONS: None

IMMEDIATE
ACTIONS:

CAUTION: Two charging pumps should NOT be operated simultaneously for normal charging when the suction is aligned to the VCT.

LO

HI

- | | | |
|----|--|---|
| 1. | <u>IF</u> failure of Speed and/or Flow Controllers, place the controller in manual and return charging flow to normal. | <u>IF</u> failure of Speed and/or Flow Controller, place controller in manual and return charging flow to normal |
| 2. | <u>IF</u> charging pump has tripped, go to AP/1/A/5500/12 Loss of Charging or Letdown | <u>IF</u> due to increased ND letdown flow in Modes 5, 6 <u>OR</u> No Mode, monitor charging flow to ensure flow does <u>NOT</u> exceed 180 gpm |

SUPPLEMENTARY
ACTIONS: Determine and correct the cause of alarm

- REFERENCES:
- | | |
|----|--|
| 1. | VCT Level Control File No. CN-208-50 |
| 2. | SOER 97-1 |
| 3. | CNCL-10993 |
| 4. | Westinghouse Precautions, Limitations, and Setpoints Document (CNM-1201.00-39) |

E/2**REGEN HX LETDN HI TEMP****SETPOINT:** 395°F**ORIGIN:** INVRD5110

PROBABLE CAUSE:

1. Letdown flow is too high
2. Charging flow is too low

AUTOMATIC ACTIONS: None

IMMEDIATE ACTIONS:

1. Ensure pressurizer level is correct.
2. Monitor INVP5110 (Reg Hx LD Temp) to confirm alarm

SUPPLEMENTARY ACTIONS:

1. WHEN operating at a minimum charging flowrate, increase both the charging flow and letdown flow by opening an additional letdown orifice to cool the letdown to below 380°F.
2. IF letdown rate is high in order to reduce pressurizer level, adjust charging flow and letdown flow to reduce the temperature then return to normal operation.
3. Ensure INV-148 (Letdn Press Control) is maintaining the correct pressure.
4. Monitor NC Pump seals for proper injection flow.
5. IF necessary, place Excess Letdown Hx in service per OP/1/A/6200/001 (Chemical and Volume Control System)

REFERENCES: None

F/3**LETDN HX OUTLET HI TEMP****SETPOINT:** 128°F**ORIGIN:** INVRD5590

PROBABLE CAUSE:

1. Letdown flow too high
2. 1KC-132 (Letdn Hx Oult Temp Ctrl) (controlled by INVSS5590) malfunction

AUTOMATIC ACTIONS: IF letdown temp. continues to rise, at 136°F INV-153A (Ltdn Hx Oult 3-Way Vlv) will divert Letdown to volume control tank.

IMMEDIATE ACTIONS:

1. IF due to hi letdown flow, reduce flow rate by removing orifices from service and/or taking manual control of INV-148 (Letdn Press Control Valve) as necessary.
2. IF due to a low KC flow, attempt to restore normal flow, by taking manual control of 1KC-132 (Letdn Hx Oult Temp Ctrl)

SUPPLEMENTARY ACTIONS:

1. Ensure letdown flow does NOT exceed 120 gpm.
2. Ensure ND letdown flow in Modes 5, 6 or No Mode does NOT exceed 150 gpm.
3. Verify that INV-148 (Letdn Press Control) is maintaining proper back pressure of 350 psig.
4. IF letdown temperature exceeds 136°F, ensure INV-153A (Ltdn Hx Oult 3-Way Vlv) diverts flow to the VCT
- 4.1 WHEN letdown temperature decreases below 136°F, ensure INV-153A (Ltdn Hx Oult 3-Way Vlv) directs letdown flow to the NV demineralizers.

NOTE: Completion of the evaluation/inspection in the following step should NOT delay a return to normal operation

5. IF KC flow is lost to the Letdown Hx for greater than 30 seconds, contact Engineering to evaluate/inspect for any possible damage due to water hammer.

REFERENCES:

1. Westinghouse Precautions, Limitations and Setpoints Document (CNM-1201.00-39)
2. CNCE-10993

F/5**HVAC PANEL TROUBLE**

SETPOINT:	<ol style="list-style-type: none">1. Alarm on HVAC Trouble Annunciator Panel 1AD-19 Actuated.2. Alarm on HVAC Critical Annunciator Panel 1AD-18 Actuated.
ORIGIN:	<ol style="list-style-type: none">1. Any alarm on 1AD-192. Any alarm on 1AD-18
PROBABLE CAUSE:	<ol style="list-style-type: none">1. 1AD-19 Annunciator Actuated2. 1AD-18 Annunciator Actuated
AUTOMATIC ACTIONS:	None
IMMEDIATE ACTIONS:	Dispatch an operator to investigate alarm.
SUPPLEMENTARY ACTIONS:	Take corrective action as necessary per OP/1/B/6100/010R (Annunciator Response For Panel 1AD-19) or OP/1/B/6100/010P (Annunciator Response For Panel 1AD-18).
REFERENCES:	Annunciator List

1. **NC Pump Trip Criteria:**

- IF the following conditions are satisfied, THEN trip all NC pumps while maintaining seal injection flow:
 - At least one NV or NI pump - ON
 - NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F.

2. **CA Suction Source Switchover Criteria:**

- IF either of the following annunciators are lit, THEN REFER TO AP/1/A/5500/06 (Loss Of S/G Feedwater).
 - 1AD-5, H/4 "CACST LO LEVEL"
- OR
- 1AD-8, B/1 "UST LO LEVEL"

3. **Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):**

- IF NC pressure is less than 1500 PSIG AND NV S/I flowpath is aligned, THEN close 1NV-202B and 1NV-203A.
- IF NC pressure is greater than 2000 PSIG, THEN open 1NV-202B and 1NV-203A.

4. **Cold Leg Recirc Switchover Criterion:**

- IF FWST level decreases to 37% (1AD-9, D/8 "FWST 2/4 LO LEVEL" lit), AND an S/I has occurred, THEN GO TO EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 1. Verify both E/S load sequencer actuated status lights (1SI-14) - LIT.

___ Manually initiate S/I.

___ 2. Announce "Unit 1 Safety Injection".

___ 3. Implement RP/0/A/5000/001 (Classification Of Emergency).

___ 4. Verify all Feedwater Isolation status lights (1SI-5) - LIT.

Perform the following:

___ a. Manually initiate Feedwater Isolation.

___ b. IF proper status light indication is not obtained, THEN manually close valves.

5. Verify Phase A Containment Isolation status as follows:

___ a. Phase A "RESET" lights - DARK.

___ a. Manually initiate Phase A Isolation.

___ b. Monitor Light Panel Group 5 St lights - LIT.

___ b. Manually align valves.

6. Verify proper CA pump status as follows:

___ a. Motor driven CA pumps - ON.

a. Perform the following for the affected train(s):

___ 1) Reset ECCS.

___ 2) Reset D/G load sequencer(s).

___ 3) Manually start affected pump(s).

___ 4) IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.

___ b. 3 S/G N/R levels - GREATER THAN 11%.

___ b. Ensure CA Pump #1 - RUNNING.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. Verify all of the following S/I pumps - ON:

- ☐ • NV pumps
- ☐ • ND pumps
- ☐ • NI pumps.

Perform the following for affected train(s):

- ☐ a. Reset ECCS.
- ☐ b. Reset D/G load sequencer(s).
- ☐ c. Manually start affected pump(s).
- ☐ d. **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.

☐ 8. Verify all KC pumps - ON.

Perform the following for affected train(s):

- ☐ a. Reset ECCS.
- ☐ b. Reset D/G load sequencer(s).
- ☐ c. Manually start affected pump(s).
- ☐ d. **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.

☐ 9. Verify all Unit 1 and Unit 2 RN pumps - ON.

Perform the following:

- ☐ a. **IF** any Unit 2 RN pump is off, **THEN** manually start affected pump(s).
- ☐ b. **IF** any Unit 1 RN pump is off, **THEN** perform the following for affected train(s):
 - ☐ 1) Reset ECCS.
 - ☐ 2) Reset D/G load sequencer.
 - ☐ 3) Manually start affected pump.
 - ☐ 4) **IF AT ANY TIME** a B/O occurs, **THEN** restart S/I equipment previously on.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10. Verify proper VC/YC operation as follows:

a. Verify one train of the following equipment is in operation:

- ___ • YC chiller
- ___ • CR AHU-1
- ___ • CRA AHU-1
- ___ • CRA PFT-1.

b. Verify the following alarms - DARK:

- ___ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE"
- ___ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE".

a. **IF** any train is not properly aligned, **THEN** dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. **REFER TO** the following:

- ___ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System)
- ___ • EM/0/A/5200/001 (Troubleshooting Cause for Improper Operation of VC/YC System).

b. Perform the following based on the status of given alarms:

- 1) **IF** 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE" **AND** 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE" are lit, **THEN**:

a) Ensure the following VC intake dampers - CLOSED:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet)
- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

- ___ b) **GO TO** Step 10.d.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10. (Continued)

2) **IF** 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE" is lit, **THEN**:

a) Ensure the following VC dampers - CLOSED:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet).

b) Ensure the following dampers - OPEN:

- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ c) **GO TO** Step 10.d.

3) **IF** 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE" is lit, **THEN**:

a) Ensure the following VC dampers - CLOSED:

- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

b) Ensure the following dampers - OPEN:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet).

___ c) **GO TO** Step 10.d.

c. Ensure the following VC dampers - OPEN:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet)
- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ d. Repeat Step 10.b every 8 hours until notified by station management.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11. Ensure proper VA System operation as follows:

- Ensure the following fans - ON:

- ☐ • ABFXF-1A
- ☐ • ABFXF 1B.

- Ensure the following fans - OFF:

- ☐ • ABUXF 1A
- ☐ • ABUXF 1B.

- Ensure VA System filter is in service as follows:

- ☐ • 1ABF-D-12 (VA Filt A Bypass Damper) - CLOSED
- ☐ • 1ABF-D-5 (VA Filt B Bypass Damper) - CLOSED.

12. Verify proper VE System operation as follows:

- ☐ a. VE fans - ON.

☐ IF VA System is not properly aligned, THEN dispatch operator to restore proper VA System operation. REFER TO OP/0/A/6450/003 (Auxiliary Building Ventilation System).

- ☐ a. Manually start fan(s).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12. (Continued)

- ___ b. Annulus pressure - BETWEEN
-1.4 IN. WC AND -1.8 IN. WC.

b. Perform the following:

- 1) **IF** annulus pressure is more positive
than -1.4 in. WC, **THEN**:

- a) Verify flow indicated on the
following indications:

- ___ • "VE 1A FLOW TO STACK"
___ • "VE 1B FLOW TO STACK."

- b) **IF** flow is not indicated, **THEN**
dispatch operator to verify status
of the following dampers based
on their local indication or their
operating piston rods being
extended 4" to 6":

- ___ • 1AVS-D-2 (VE A Trn Recirc
Damp) (AB-603, JJ-51, Rm
500) - CLOSED

- ___ • 1AVS-D-7 (VE B Trn Recirc
Damp) (AB-603, HH-52, Rm
500) - CLOSED

- ___ • 1AVS-D-3 (VE A Trn Exh
Damp) (AB-603, JJ-52, Rm
500) - OPEN

- ___ • 1AVS-D-8 (VE B Trn Exh
Damp) (AB-603, HH-52, Rm
500) - OPEN.

- ___ c) Consult plant engineering staff
and notify IAE/Maintenance to
troubleshoot and repair.

- ___ d) **GO TO** Step 12.c.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12. (Continued)

2) IF annulus pressure is more negative than -1.8 in. WC, THEN:

- ___ a) Determine which VE train indicates highest discharge flow to stack.
- ___ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack is secured.
- ___ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair.

- ___ c. Repeat Step 12.b every 30 minutes until notified by station management.

___ 13. Verify all S/G pressures - GREATER THAN 775 PSIG.

Perform the following:

a. Verify Main Steam Isolation as follows:

- ___ • All MSIVs - CLOSED
- ___ • All MSIV bypass valves - CLOSED
- ___ • All S/G PORVs - CLOSED.

b. IF any valve is open, THEN:

- ___ 1) Manually initiate Main Steam Isolation.
- ___ 2) IF any valve is still open, THEN manually close valve.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14. Verify proper Phase B actuation as follows:

- ___ a. Containment pressure - HAS
REMAINED LESS THAN 3 PSIG.

a. Perform the following:

- ___ 1) Verify NS pumps - INDICATING
FLOW.
- ___ 2) IF flow is not indicated, THEN
manually initiate Phase B Isolation.
- 3) 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 is not in
correct alignment, THEN ensure
correct valve alignment and
component operation.
- ___ 4) Stop all NC pumps while
maintaining seal injection flow.

- ___ b. IF AT ANY TIME containment pressure
exceeds 3 PSIG while in this procedure,
THEN perform Step 14.a.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Verify proper VC/YC operation as follows:

a. Verify one train of the following equipment is in operation:

- ___ • YC chiller
- ___ • CR AHU
- ___ • CRA AHU
- ___ • CRA PFT.

b. Verify the following alarms - DARK:

- ___ • 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE"
- ___ • 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE".

a. IF any train is not properly aligned, THEN dispatch operator and IAE/Maintenance to restore at least one train of VC/YC. REFER TO the following:

- ___ • OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System)
- ___ • EM/0/A/5200/001 (Troubleshooting Cause for Improper Operation of VC/YC System).

b. Perform the following based on the status of given alarms:

- 1) IF 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE" AND 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE" are lit, THEN:

a) Ensure the following VC intake dampers - CLOSED:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet)
- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ b) GO TO Step 1.d.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. (Continued)

2) IF 1AD-18, B/8 "UNIT 1 INTAKE HI CHLORINE" is lit, THEN:

a) Ensure the following VC dampers - CLOSED:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet).

b) Ensure the following dampers - OPEN:

- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ c) GO TO Step 1.d.

3) IF 1AD-18, E/8 "UNIT 2 INTAKE HI CHLORINE" is lit, THEN:

a) Ensure the following VC dampers - CLOSED:

- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

b) Ensure the following dampers - OPEN:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet).

___ c) GO TO Step 1.d.

c. Ensure the following VC dampers - OPEN:

- ___ • 1VC-5B (CRA Filt Inlet)
- ___ • 1VC-6A (CRA Filt Inlet)
- ___ • 2VC-5B (CRA Filt Inlet)
- ___ • 2VC-6A (CRA Filt Inlet).

___ d. Repeat Step 1.b every 8 hours until notified by station management.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. Ensure proper VA System operation as follows:

- Ensure the following fans - OFF:

- ___ • ABUXF-1A
- ___ • ABUXF-1B

- Ensure VA System filter is in service as follows:

- ___ • 1ABF-D-12 (VA Filt A Bypass Damper) - CLOSED
- ___ • 1ABF-D-5 (VA Filt B Bypass Damper) - CLOSED.

- Ensure the following fans - ON:

- ___ • ABFXF-1A
- ___ • ABFXF-1B

3. Verify proper VE System operation as follows:

___ a. VE fans - ON.

___ a. Manually start fan(s).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

3. (Continued)

- ___ b. Annulus pressure - BETWEEN
-1.4 IN. WC AND -1.8 IN. WC.

b. Perform the following:

- 1) IF annulus pressure is more positive
than -1.4 in. WC, THEN:

- a) Verify flow indicated on the
following indications:

- ___ • "VE 1A FLOW TO STACK"
___ • "VE 1B FLOW TO STACK".

- b) IF flow is not indicated, THEN
dispatch operator to verify status
of the following dampers based
on their local indication or their
operating piston rods being
extended 4" to 6":

- ___ • 1AVS-D-2 (VE A Trn Recirc
Damp) (AB-603, JJ-51, Rm
500) - CLOSED

- ___ • 1AVS-D-7 (VE B Trn Recirc
Damp) (AB-603, HH-52, Rm
500) - CLOSED

- ___ • 1AVS-D-3 (VE A Trn Exh
Damp) (AB-603, JJ-52, Rm
500) - OPEN

- ___ • 1AVS-D-8 (VE B Trn Exh
Damp) (AB-603, HH-52, Rm
500) - OPEN.

- ___ c) Consult plant engineering staff
and notify IAE/Maintenance to
troubleshoot and repair. REFER
TO EM/1/A/5200/002
(Troubleshooting Cause For VE
System Hi/Lo Pressure.

- ___ d) GO TO Step 3.c.

(RNO continued on next page)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

3. (Continued)

2) IF annulus pressure is more negative than -1.8 in. WC, THEN:

- ___ a) Determine which VE train indicates highest discharge flow to stack.
- ___ b) Within 2 hours, ensure VE train that indicates highest discharge flow to stack is secured.
- ___ c) Consult plant engineering staff and notify IAE/Maintenance to troubleshoot and repair. REFER TO EM/1/A/5200/002 (Troubleshooting Cause For VE System Hi/Lo Pressure.

- ___ c. Repeat Step 3.b every 30 minutes until notified by station management.

RESPONSE NOT OBTAINED

- [illegible]

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Verify at least one NC pump - ON.

Perform the following:

- a. Use NC T-Colds to determine NC temperature as required in subsequent steps.
- b. GO TO Step 4.

2. Use NC T-Avg to determine NC temperature as required in subsequent steps.

3. IF AT ANY TIME NC pumps are tripped, THEN use NC T-Colds to determine NC temperature as required in subsequent steps.

4. Verify one of the following:

GO TO Step 7.

- NC temperature - STABLE

OR

- NC temperature - TRENDING TO 557°F.

5. Continue to monitor NC temperature.

6. Do not continue in this enclosure until one of the following occurs:

- NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER.

OR

- NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. Verify NC temperature - LESS THAN 557°F AND DECREASING.

Perform the following:

- a. IF NC temperature is greater than 557°F AND increasing, THEN stabilize NC temperature at 557°F as follows:
- 1) IF steam dumps are available, THEN use steam dumps.
 - 2) IF steam dumps are not available, THEN use S/G PORVs.
- b. GO TO Step 9.

8. Attempt to stop the NC cooldown as follows:

- a. Ensure all steam dumps - CLOSED.
- b. Verify all S/G PORVs - CLOSED.

- b. IF any S/G PORV cannot be closed, THEN close its isolation valve.

- c. 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).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

8. (Continued)

d. Depress and hold "SV 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).

e. Verify NC cooldown - STOPPED.

e. 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:
 - 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:
 - 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:
 - All MSIVs
 - All MSIV bypass valves.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9. Continue to perform the actions of this enclosure as required to ensure one of the following:

- NC temperature - STABLE

OR

- NC temperature - TRENDING TO 557°F.

Simulation Facility: CatawbaScenario No.: NRC-4

Op-Test No: _____

Examiners: _____

Operators: _____

Objectives: To evaluate the applicants' ability to reduce power using NOPs while maintaining Tave matched to Tref, and the applicants' ability to use the APs to respond to failures including loss of operating KC pump and Pressurizer Pressure Channel I failing high. A MSIV will close at power requiring a reactor trip at which time a large break LOCA on a cold leg will be initiated. The main turbine will fail to trip automatically on reactor trip, and automatic safety injection will fail to actuate on both trains. When FWST level reaches ~45%, 1A ND pump will trip and will not be available for the remainder of the scenario.

Initial Conditions: (SNAP 152)

Failure of automatic safety injection signal on both trains
 1B Diesel in maintenance mode.
 B CA pump racked out.
 FWST level channel 4 failed to zero.

Turnover: 100% power 400 EFPD 30 ppm [B] 100% CPL Equilibrium Xenon
 1B D/G tagged for gasket replacement. Expected back in 10 hours.
 1B CA Pump is tagged for oil change. Expected back in 4 hours.
 FWST level channel 4 is inoperable and IAE is preparing to troubleshoot; no estimated repair time.
 There are thunderstorms in the area.

Unit Manager requests turbine load reduction to ~90% for turbine control valve testing.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	Borate to match load reduction
2	N/A	R-RO	Reduce turbine load to 90%
3	OVR-KC016C OFF OVR-KC016D ON MAL-KC001C	C-BOP	Trip of running KC pump
4	XMT-NC028 SV=2500	I-BOP	Pressurizer pressure channel I fails high
5	VLV-SM004F SV=0	C-RO	Main Steam Isolation Valve closes at power
6	MAL-EHC002 AUTO	C-RO	Main turbine fails to trip automatically on reactor trip
7	MAL-NC013C SV=27.5	M	Large LOCA
8	MAL-ISE002A MAL-ISE002B	C-BOP	Failure of automatic safety injection when required
9	LOA-ND004	C-BOP	Trip of 1A ND pump

SRO direction

Appendix D

Operator Actions

Form ES-D-2

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

Event Description: Boration for load decrease

Time	Position	Applicant's Actions or Behavior
	BOP	EXAMINER NOTE: Refer to OP/1/A/6150/009 (Boron Concentration Control), Enclosure 4.2 (Boration). Ensure the following valve control switches in "AUTO": <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) <i>Expected total amount of BA to be added?</i>
	BOP	Adjust the boric acid batch counter to the desired volume of boric acid to be added.
	BOP	Place the "NC MAKEUP MODE SELECT" switch in "BORATE".
	BOP	Adjust the controller for 1NV-238A (B/A Xfer Pmp to Blender Ctrl) to the desired flow.
	BOP	Ensure 1NV-238A (B/A Xfer Pmp to Blender Ctrl) controller in "AUTO".
	BOP	Ensure at least one boric acid transfer pump in "AUTO" or "ON".
	BOP	NOTE: If necessary, boration can be manually secured at any time by placing the "NC MAKEUP CONTROL" switch to the "STOP" position.
	BOP	Place the "NC MAKEUP MODE SELECT" switch to the "START" position. Verify the following valves open: <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	<u>IF</u> in "AUTO", verify the boric acid transfer pump starts.

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

Event Description: Boration for load decrease

Time	Position	Applicant's Actions or Behavior
	BOP	Verify proper flow by observing the boric acid flow totalizer {PIP 96-0137}
	BOP	<p>WHEN the desired volume of boric acid is reached on the boric acid batch counter, ensure the following valves close:</p> <ul style="list-style-type: none"> • 1NV-238A (B/A Xfer Pmp To Blender Ctrl Vlv) • 1NV-186A (B/A Blender Otlt To VCT Otlt)
	BOP	<p>IF desired, flush the makeup line as follows:</p> <ul style="list-style-type: none"> • Open the following valves: <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • Ensure one reactor makeup water pump is in "ON". • WHEN ~20 gallons of makeup water have been flushed through the makeup line, close the following valves: <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • Place the following valve control switches in "AUTO": <ul style="list-style-type: none"> • 1NV-242A (RMWST To B/A Blender Ctrl) • 1NV-186A (B/A Blender Otlt To VCT Otlt) • IF NOT required for current plant operation, place the reactor makeup water pump started in earlier step in "AUTO". <p>IF automatic makeup is desired, refer to Enclosure 4.1 (Automatic Makeup).</p>

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

Event Description: Decrease turbine load

Time	Position	Applicant's Actions or Behavior
	RO	Refer to OP/1/B/6300/001 (Turbine Generator), Enclosure 4.2 (Load Changing), Step 2.4
	RO	Depress the "Load Rate" pushbutton and verify it illuminates. <i>Expected</i>
	RO	Input the desired load rate on the numeric keypad and verify the load rate appears on the Variable Display.
	RO	Depress the "Enter" pushbutton.
	RO	Depress the "Target" pushbutton and verify it illuminates.
	RO	Input the desired load target on the numeric keypad and verify the load target appears on the Target Display.
	RO	Depress the "Enter" pushbutton.
	RO	To start load decrease, depress the "Go" pushbutton and verify it illuminates.
	RO	S/G blowdown changes should be coordinated with Secondary Chemistry.

Op-Test No.: NRC Scenario No.: 4 Event No.: 3

Event Description: Trip of running KC Pump

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports Trip of operating KC Pump. <i>alarm</i>
	SRO	Implements and directs actions of AP/1/A/5500/21 (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.
	RO/BOP \	Monitor Enclosure 1 (Foldout Page).
	ALL	NOTE: The following step prevents damage to the 1B2 KC pump as a result of deadheading. (PIP #00-5862)
	BOP 2	IF AT ANY TIME the following conditions are met: <ul style="list-style-type: none"> • Train B KC isolation valves – CLOSED <i>VLth</i> AND <ul style="list-style-type: none"> • 1KC-81B (KC to ND HX 1B Sup Isol) – CLOSED. THEN a. Ensure less than 2 train B KC Pumps – IN SERVICE.
	BOP 3	Verify at least one KC pump – ON Determines no KC pumps are running and informs SRO.
	SRO	Transitions to Step 3 RNO and directs the operators.
	ALL	CAUTION: Operation of more than one train B KC pump should be avoided when the train B KC isolation valves and 1KC-81B (KC To ND HX 1B Sup Isol) are closed.

Op-Test No.: NRC Scenario No.: 4 Event No.: 3

Event Description: Trip of running KC Pump

Time	Position	Applicant's Actions or Behavior
	BOP 4	Perform the following: a. Start at least one KC pump Determines that alternate KC pump started and informs SRO.
	SRO	SRO determines that Step 3.b RNO does not apply and transitions to Step 4 A/ER column and directs operators.
	ALL	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 4	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 5 a	Verify KC available as follows: Verify the following Train A KC 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)
	BOP 5 b	Verify the following Train B KC 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)

Op-Test No.: NRC Scenario No.: 4 Event No.: 3

Event Description: Trip of running KC Pump

Time	Position	Applicant's Actions or Behavior
	ALL	CAUTION: Operation of more than one train B KC pump should be avoided when the train B KC isolation valves and 1KC-81B (KC To ND Hx 1B Sup Isol) are closed
	BOP 5	Start additional KC pump(s) as necessary to supply any KC loads presently in service.
	BOP/SRO 6	Verify KC surge tank levels normal as follows: a. Verify both KC surge tank levels – 50% - 90% AND STABLE. b. <u>GO TO</u> Step 10.
	BOP 10	Ensure KC heat exchanger outlet mode switches – PROPERLY ALIGNED. <i>what is "properly" for this scenario</i>
	SRO 11	Determine and correct cause of loss of KC.

Op-Test No.: NRC Scenario No.: 4 Event No.: 3

Event Description: Trip of running KC Pump

Time	Position	Applicant's Actions or Behavior
	SRO 12	<p>Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual:</p> <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 Charging Pump – 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)
	SRO 13	<p>Determine required notification:</p> <ul style="list-style-type: none"> • <u>REFER TO</u> RP/0/A/5000/001 (Classification Of Emergency) • <u>REFER TO</u> RP/0/A/5000/013 (NRC Notification Requirements)
	ALL 14	<p><u>IF</u> KC Hx leak to RN is suspected, <u>THEN</u> perform the following:</p> <p>Determines that this step is not applicable and continues to Step 15.</p>
	BOP 15	<p>Verify KC surge tanks level as follows:</p> <ul style="list-style-type: none"> • Greater than 50% • Stable or increasing
	SRO 16	<p><u>WHEN</u> plant conditions permit, <u>THEN</u> return KC pumps to normal operation. <u>REFER TO</u> OP/1/A/6400/005 (Component Cooling System)</p>
	RO 17	<p>Verify 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" – DARK</p>

Op-Test No.: NRC Scenario No.: 4 Event No.: 3

Event Description: Trip of running KC Pump

Time	Position	Applicant's Actions or Behavior
	BOP 19	IF desired to restore letdown flow through the NV demineralizers, <u>THEN</u> momentarily place 1NV-153A (Ltdn Hx Otlt 3-Way Vlv) to the "DEMIN" position and return to "AUTO"
	SRO 19	Determine long term plant status. <u>RETURN TO</u> procedure in affect

Op-Test No.: NRC Scenario No.: 4 Event No.: 4

Event Description: Pressurizer Pressure Channel I Fails High

Time	Position	Applicant's Actions or Behavior
	BOP	Determines that Pressurizer Pressure Channel I has failed high, informs SRO, and performs immediate action steps from memory.
	SRO	Implements AP/1/A/5500/11 (Pressurizer Pressure Anomalies), Case I (Pressurizer Pressure Decreasing) and directs operators.
	BOP 1	Verify all Pzr level channels – INDICATING THE SAME Determines that Channel I is reading high and informs SRO.
	BOP 1 ⁶	IF either selected channel is failed high, <u>THEN</u> place "PZR PRESS CTRL SELECT" switch in any alternate operable channel position. <i>which one (1031102)</i>
	BOP 2	Verify all Pzr PORVs – CLOSED.
	BOP 3	Verify Pzr Spray Valve(s) – CLOSED
	BOP 4	Verify all Pzr heaters – ENERGIZED.
	BOP 5	Ensure 1NV-37A (NV Supply To Pzr Aux Spray) – CLOSED.
	RO 6	Verify NC pressure – STABLE OR INCREASING.
	BOP 7	IF a Pzr pressure channel is failed high, <u>THEN</u> notify IAE to fail the following bistables for the affected channel under Model W/O #91002943. Bistables shall be tripped within six (6) hours: <ul style="list-style-type: none"> • Pzr low pressure S/I • OT Delta T • Pzr high pressure Reactor Trip • Pzr low pressure Reactor Trip

Op-Test No.: NRC Scenario No.: 4 Event No.: 4

Event Description: Pressurizer Pressure Channel I Fails High

Time	Position	Applicant's Actions or Behavior
	SRO 9	Ensure compliance with appropriate Tech Specs: <ul style="list-style-type: none"> • 3.3.1 (Reactor Trip System Instrumentation) • 3.3.2 (Engineered Safety Features Actuation System) • 3.3.3 (Post Accident Monitoring 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)
	BOP 9	Ensure "PZR PRESS REC SELECT" is selected to an operable channel.
	ALL 10	Determine long term plant status. <u>RETURN TO</u> procedure in effect.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	RO	Determines Main Steam Isolation Valve has closed and informs SRO.
	SRO	Directs RO to trip the reactor.
	RO	Trips Reactor.
	RO/BOP	Perform Immediate Actions of E-0 from memory. EXAMINER NOTE: Turbine will fail to trip automatically on reactor trip and RO will have to manually trip the turbine. Additionally, automatic S/I will not occur and the BOP will have to manually initiate both trains of safety injection.
	SRO	Enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and direct actions of operators. <i>Stuck open S-I train?</i> EXAMINER NOTE: A large break LOCA occurs coincident with the reactor trip. <i>(no action: LB LOCA)</i>
	RO/BOP	Monitor Enclosure 1 (Foldout Page)
	RO	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

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	RO ³	Verify Turbine Trip: <ul style="list-style-type: none"> • All turbine stop valves – CLOSED OR <ul style="list-style-type: none"> • All turbine control valves – CLOSED Notifies SRO that turbine did not trip automatically.
	SRO	Transitions to Step 3 RNO and directs operators.
	RO/SRO	Perform the following: <ol style="list-style-type: none"> Manually trip the turbine. (See BSW Trips) <u>IF</u> the turbine will not trip, <u>THEN</u>: Determines step is N/A and continues. <u>IF</u> the turbine will not runback then, <u>THEN</u> close: Determines step is N/A and continues.
	SRO	Transitions back to Step 4 A/ER column and directs operators.
	BOP ⁴	Verify 1ETA and 1ETB – ENERGIZED.
	BOP ⁵	Verify S/I is actuated: <ol style="list-style-type: none"> "SAFETY INJECTION ACTUATED" status light (1SI-13) – LIT Notifies SRO that S/I did not automatically initiate.
	SRO	Transitions to Step 5.a RNO and directs operators.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Perform the following: <div style="float: right; text-align: right;"> <i>where do you expect to find ND P's?</i> </div> <ol style="list-style-type: none"> 1) Verify conditions requiring S/I: <ul style="list-style-type: none"> • Pzr pressure – LESS THAN 1845 PSIG. <li style="text-align: center;">OR • Containment pressure – GREATER THAN 1.2 PSIG. 2) <u>IF</u> S/I is required, <u>THEN</u> manually initiate S/I. (CRITICAL TASK) 3) <u>IF</u> S/I is not required, <u>THEN</u> concurrently: Determines step is N/A and continues.
	SRO	Transitions to Step 5.b in A/ER column and directs operators.
	BOP	b. E/S load sequence actuated status lights (1SI-14) – LIT
	RO	Announce "Unit 1 Safety Injection"
	SRO	Implement RP/0/A/5000/001 (Classification Of Emergency)
	RO	Verify all Feedwater Isolation status lights (1SI-5) – LIT
	BOP	Verify Phase A Containment Isolation status as follows: <ol style="list-style-type: none"> a. Phase A "RESET" lights – DARK Monitor Light Panel Group 5 St lights – LIT
	BOP	Verify proper Phase B actuation as follows: <ol style="list-style-type: none"> a. Containment pressure – HAS REMAINED LESS THAN 3 PSIG Determines that pressure has not remained less than 3 psig and informs SRO.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	SRO	<p>Transitions to Step 10.a RNO and directs operators.</p> <p>EXAMINER NOTE: Greater than 3 psig in containment requires use of ACC numbers throughout the remainder of the scenario. ACC numbers are designated in parentheses behind normal values.</p>
	BOP/RO	<p>Perform the following:</p> <p>NOTE: This time may be used later to determine when to align ND Aux spray.</p> <ol style="list-style-type: none"> 1) Record approximate time of reactor trip. _____ 2) Verify NS pumps – INDICATING FLOW. 3) IF flow is not indicated, THEN manually initiate Phase B Isolation. <p>Determines that this step 3) is not required based on plant conditions.</p> <ol style="list-style-type: none"> 4) Verify Phase B Isolation has actuated as follows: <ol style="list-style-type: none"> a) Phase B Isolation "RESET" lights – DARK. b) IF Phase B Isolation "RESET" lights are lit, THEN manually initiate Phase B: <p>Determines that this step b) is not required based on plant conditions.</p> <ol style="list-style-type: none"> c) Verify following monitor light panel lights – LIT: <ul style="list-style-type: none"> • Group 1 Sp lights • Group 5 Sp lights • Group 5 St lights L/11 and L/12. d) IF monitor light panel is not in correct alignment, THEN ensure correct valve alignment and component operation. 5) Stop all NC pumps while maintaining seal injection flow. 6) GO TO Step 11.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	RO	Verify proper CA pump status as follows: a. Motor driven CA pumps – ON Determines that 1B CA Pump is not running due to being tagged out and informs SRO.
	SRO	Determines that transition to RNO is not required due to pump being tagged out for work and unable to start. Continues in A/ER column.
	RO	b. 3 S/G N/R levels – GREATER THAN 11%
	BOP	Verify all of the following S/I pumps – ON: <ul style="list-style-type: none"> • NV pumps • ND pumps • NI pumps
	BOP	Verify all KC pumps – ON. Determines that 1B1 KC pump is off and informs SRO.
	SRO	Transition to step 13 RNO.
	BOP	Perform the following for affected train(s): a. Reset ECCS. b. Reset D/G load sequencer. c. Manually start affected pump. d. <u>IF AT ANY TIME</u> a B/O occurs, <u>THEN</u> restart S/I equipment previously on.
	SRO	Transitions back to Step 14 A/ER column and directs operators.
	BOP	Verify all Unit 1 and Unit 2 RN pumps – ON

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	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	Verify all S/G pressures – GREATER THAN 775 PSIG.
	RO/BOP	Verify proper S/I flow as follows: <ol style="list-style-type: none"> a. "NV S/I FLOW" – INDICATION 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	Control S/G levels as follows: <ol 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% (20% ACC), THEN throttle feed flow to maintain all S/G N/R levels between 11% (29% ACC) and 50%.
	RO	Verify all CA isolation valves – OPEN.
	BOP	Verify S/I equipment status based on monitor light panel – IN PROPER ALIGNMENT.
	ALL	NOTE: Enclosure 4 (NC Temperature Control) shall remain in effect until subsequent procedures provide alternative NC temperature control guidance.
	RO	Control NC temperature REFER TO Enclosure 4 (NC Temperature Control).

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP	Verify Pzr PORV and Pzr spray valve status as follows: a. All Pzr PORVs – CLOSED. b. Normal Pzr spray valves – CLOSED. c. At least one Pzr PORV isolation valve- OPEN.
	RO	Verify NC subcooling based on core exit T/Cs – GREATER THAN 0°F. Determines that subcooling is less than 0°F and notifies SRO.
	SRO	Transition to step 23 RNO.
	RO	<u>IF</u> any NV OR NI pump is on, <u>THEN</u> : a. Ensure all NC pumps – OFF. b. Maintain seal injection flow. EXAMINER NOTE: NC Pumps should have previously been tripped per Enclosure 1 guidance.
	SRO	Transition to Step 24 A/ER column and directs operators.
	RO	Verify main steamlines are intact as follows: • All S/G pressures – STABLE OR INCREASING • All S/Gs – PRESSURIZED.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	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-34 (S/G Sample) • 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	Verify NC System is intact as follows: <ul style="list-style-type: none"> • Containment pressure – LESS THAN 1 PSIG. Determines that containment pressure is greater than 1 psig and informs SRO.
	SRO	Transitions to Step 26 RNO.
	ALL	Concurrently: <ul style="list-style-type: none"> • Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). • <u>GO TO</u> EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant). EXAMINER NOTE: When FWST Level reaches 37%, ECCS pumps will swap suction to containment sump. ND pump 1A trip will occur at ~45% FWST Level.
	SRO	Transition to EP/1/A/5000/FR-P.1 (Response to Imminent PTS Condition) due to valid RED (OR ORANGE) PATH and direct actions.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	RO	Verify NC pressure – GREATER THAN 285 PSIG. Determines that pressure is less than 285 psig and notifies SRO.
	SRO	Transitions to Step 1 RNO and directs operators.
	BOP	IF ND flow to C: Legs is greater than 675 GPM, <u>THEN RETURN TO</u> procedure and step in effect. Determines flow greater than 675 GPM and informs SRO.
	SRO	Transitions back to Step 1 of E-1 (Loss of Reactor or Secondary Coolant).
	RO/BOP	Monitor Enclosure 1 (Foldout Page)
	RO	Verify main steamlines are intact as follows: <ul style="list-style-type: none"> • All S/G pressures – STABLE OR INCREASING All S/Gs – PRESSURIZED.
	RO	Control intact S/G levels as follows: <ul style="list-style-type: none"> • Verify N/R level in all intact S/Gs – GREATER THAN 11% (29% ACC). • Throttle feed flow to maintain all intact S/G N/R levels between 11% (29% ACC) and 50%. • Ensure CA suction source switchover criterion is monitored. <u>REFER TO</u> Enclosure 1 (Foldout Page).

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Verify secondary radiation is normal as follows:</p> <ol style="list-style-type: none"> Ensure the following signals – RESET: <ol style="list-style-type: none"> Phase A Containment Isolations CA System valve control KC NC NI NM St signals. Align all S/Gs for Chemistry sampling. Perform at least one of the following: <ul style="list-style-type: none"> Notify Chemistry to sample al S/Gs for activity. OR <ul style="list-style-type: none"> Notify Chemistry or RP to frisk all cation columns for activity. Verify the following EMF trip 1 lights – DARK <ul style="list-style-type: none"> 1EMF-33 (Condenser Air Ejector Exhaust) 1EMF-34 (S/G Sample) 1EMF-26 (Steamline 1A) 1EMF-27 (Steamline 1B) 1EMF-28 (Steamline 1C) 1EMF-29 (Steamline 1D). <u>WHEN</u> activity results are reported, THEN verify all S/Gs indicate no activity.
		<p>EXAMINER NOTE: When FWST level reaches 37%, go to page 25 of this guide. When swap to cold leg recirculation is complete then scenario will be terminated. The additional steps of E-1 are due to differences among crews in timing and implementing the EPs and the time required to reduce FWST level to 37%.</p>

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	Verify Pzr PORV and isolation valve status as follows: <ol style="list-style-type: none"> Power to all Pzr PORV isolation valves – AVAILABLE All Pzr PORVs – CLOSED At least one Pzr PORV isolation valve – OPEN <u>IF AT ANY TIME</u> a Pzr PORV opens due to high pressure, <u>THEN</u> after Pzr pressure decreases to less than 2315 PSIG, ensure the valve closes or is isolated.
	RO/BOP	Verify S/I termination criteria as follows: <ol style="list-style-type: none"> NC subcooling based on core exit T/Cs – GREATER THAN 0°F. Determines that S/I termination criteria is not met and informs SRO.
	SRO	Transition to Step 6.a RNO and then <u>GO TO</u> Step 6.f
	SRO	Transition to Step 6.f of A/ER column and directs operators.
	RO/BOP	<ol style="list-style-type: none"> Monitor S/I termination criteria. <u>REFER TO</u> Enclosure 2 (S/I Termination Criteria). <u>IF AT ANY TIME</u> S/I termination criteria is met while in this procedure, <u>THEN RETURN TO</u> Step 6.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Verify proper NS pump operation as follows:</p> <ol style="list-style-type: none"> At least one NS pump – ON. 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). Containment pressure – LESS THAN 2.4 PSIG. Ensure S/I – RESET: <ol style="list-style-type: none"> ECCS. D/G load sequencers. <u>IF AT ANY TIME</u> a B/O occurs, <u>THEN</u> restart S/I equipment previously on. Reset NS. Stop NS pumps. 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	<p>Verify criteria to stop operating ND pumps as follows:</p> <ol style="list-style-type: none"> NC pressure – GREATER THAN 285 PSIG. <p>Determines that pressure is less than 285 psig and informs SRO.</p>
	SRO	Transition to Step 8.a RNO and then <u>GO TO</u> Step 10.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
		EXAMINER NOTE: The following steps are in EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation). Transition to this point will occur when FWST level reaches 37%. Also, at this point, ND Pump 1A has previously tripped. (CRITICAL TASK)
	RO/BOP	Monitor Enclosure 1 (Foldout Page).
	ALL	CAUTION: S/I recirculation flow to NC System must be maintained at all times.
	ALL	Perform Steps 3 through 8 without delay. CSFs should not be implemented prior to completion of these steps.
	BOP	Verify containment sump level – GREATER THAN 3.5 FT.
	BOP	Verify KC flow to ND heat exchangers – GREATER THAN 5000 GPM.
	BOP/ALL	Ensure S/I – RESET: <ol style="list-style-type: none"> ECCS. D/G load sequencers. IF AT ANY TIME a B/O occurs, THEN restart S/I equipment previously on.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Align S/I system for recirc as follows:</p> <p>a. Verify following valves – OPEN:</p> <ul style="list-style-type: none"> • 1NI-185A (ND Pump 1A Cont Sump Suct) • 1NI-184B (ND Pump 1B Cont Sump Suct). <p>b. Verify following valves- CLOSED:</p> <ul style="list-style-type: none"> • 1FW-27A (ND Pump 1A Suct From FWST) • 1FW-55B (ND Pump 1B Suct From FWST). <p>c. Verify ND pumps – ON.</p> <p>Determines that 1A ND pump is not on and informs SRO.</p>
	SRO	Transitions to Step 6.c RNO and directs operators.
	BOP	<p>Perform the following:</p> <p>1) Start ND pump(s) with suction aligned to an open containment sump suction valve.</p> <p>EXAMINER NOTE: ND Pump 1A will not start.</p> <p>2) <u>IF</u> no ND pump can be started <u>OR</u> no ND train can be aligned for recirc, <u>THEN</u>:</p> <p>Determines that this step is N/A and continues.</p>
	SRO	Transitions to Step 6.d A/ER column and directs operators.

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>d. Isolate NI pump miniflow as follows:</p> <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 Miniflow Hdr To FWST Isol). <p>e. Close the following valves:</p> <ul style="list-style-type: none"> • 1ND-32A (ND Train 1A Hot Leg Inj Isol) • 1ND-65B (ND Train 1B Hot Leg Inj Isol). <p>f. Verify at least one of the following NV pumps miniflow valves CLOSED:</p> <ul style="list-style-type: none"> • 1NV-203A (NV Pumps A&B Recirc Isol) <p>OR</p> <ul style="list-style-type: none"> • 1NV-202B (NV Pumps A&B Recirc Isol). <p>g. Align ND train discharges to NI and NV pump suctions as follows:</p> <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).

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>h. Isolate FWST from NV and NI pumps as follows:</p> <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). <p>i. Verify proper Recirc Flow as follows:</p> <ul style="list-style-type: none"> • "NV S/I FLOW" – INDICATING FLOW • NI pumps – INDICATING FLOW • ND pumps – INDICATING FLOW.
	BOP	<p><u>WHEN</u> FWST level decreases to 11% (1AD-9, E/8 "FWST LO-LO LEVEL" alarm lit), <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> a. Stop NS Pumps b. Align NS for recirc. <u>REFER TO</u> Enclosure 2 (Alignment NS for Recirculation).
	BOP	<p>Verify proper recirc flow as follows:</p> <ul style="list-style-type: none"> • "NV S/I FLOW" – INDICATING FLOW • NI pumps – INDICATING FLOW • ND pumps – INDICATING FLOW

Op-Test No.: NRC Scenario No.: 4 Event No.:5-9

Event Description: Main Steam Isolation Valve Closes at Power, LB LOCA, Failure of auto S/I, ND Pump 1A trip.

Time	Position	Applicant's Actions or Behavior
	SRO	EP/1/A/5000/F-0 (Critical Safety Function Status Trees) may now be implemented.

TERMINATE SCENARIO WHEN RECIRC FLOW IS VERIFIED

CLASSIFICATION: Alert 4.1.A.1 Loss or potential loss of Nuclear Coolant System. This EAL poses no threat to the safety of plant personnel or the general public.

EMERGENCY NOTIFICATION FORM

1. ☒ THIS IS A DRILL ☒ ACTUAL EMERGENCY ☐ INITIAL ☐ FOLLOW-UP MESSAGE NUMBER _____

SITE: Catawba Nuclear Site UNIT: _____ REPORTED BY: _____

TRANSMITTAL TIME/DATE: _____ / _____ / _____ CONFIRMATION PHONE NUMBER: (803) 831-3807 (Simulator)

(Eastern) mm dd yy

4. AUTHENTICATION (If Required): _____ (Number) _____ (Codeword)

5. EMERGENCY CLASSIFICATION:

☒ NOTIFICATION OF UNUSUAL EVENT ☒ ALERT ☒ SITE AREA EMERGENCY ☒ GENERAL EMERGENCY

6. ☒ Emergency Declaration At: ☒ Termination At: TIME/DATE: _____ / _____ / _____ (If B, go to item 16.)

(Eastern) mm dd yy

7. EMERGENCY DESCRIPTION/REMARKS: EAL # 4.1.A.1 - Loss or Potential Loss of Nuclear Coolant System

This EAL poses no threat to the safety of plant personnel or the general public.

8. PLANT CONDITION: ☒ IMPROVING ☒ STABLE ☒ DEGRADING

9. REACTOR STATUS: ☒ SHUTDOWN TIME/DATE: _____ / _____ / _____ ☒ % POWER

(Eastern) mm dd yy

10. EMERGENCY RELEASE(S):

☒ NONE (Go to item 14.) ☒ POTENTIAL (Go to item 14.) ☒ IS OCCURRING ☒ HAS OCCURRED

**11. TYPE OF RELEASE: ☐ ELEVATED ☐ GROUND LEVEL

☒ AIRBORNE: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____

Time(Eastern) Date Time(Eastern) Date

☒ LIQUID: Started: _____ / _____ / _____ Stopped: _____ / _____ / _____

Time(Eastern) Date Time(Eastern) Date

**12. RELEASE MAGNITUDE: ☐ CURIES PER SEC. ☐ CURIES NORMAL OPERATING LIMITS: ☐ BELOW ☐ ABOVE

☒ NOBLE GASES _____ ☒ IODINES _____

☒ PARTICULATES _____ ☒ OTHER _____

**13. ESTIMATE OF PROJECTED OFFSITE DOSE: ☐ NEW ☐ UNCHANGED PROJECTION TIME: _____

(Eastern)

TEDE Thyroid CDE

mrem mrem

ESTIMATED DURATION: _____ HRS.

SITE BOUNDARY

2 MILES _____

5 MILES _____

10 MILES _____

**14. METEOROLOGICAL DATA: ☒ WIND DIRECTION (from) _____ ° ☒ SPEED (mph) _____

☒ STABILITY CLASS _____ ☒ PRECIPITATION (type) _____

15. RECOMMENDED PROTECTIVE ACTIONS:

☒ NO RECOMMENDED PROTECTIVE ACTIONS

☒ EVACUATE _____

☒ SHELTER IN-PLACE _____

☒ OTHER _____

16. APPROVED BY: _____ Emergency Coordinator TIME/DATE: _____ / _____ / _____

(Name) (Title) (Eastern) mm dd yy

* If items 8-14 have not changed, only items 1-7 and 15-16 are required to be completed.

** Information may not be available on initial notifications.

A/1

KC SUPPLY HDR FLOW TO NCP BRGS LOW

SETPOINT: 425 gpm

ORIGIN: 1KCPS-9170

PROBABLE CAUSE:

1. Header isolated
2. Misalignment of KC System
3. Loss of KC pumps

AUTOMATIC ACTION: None

IMMEDIATE ACTIONS:

1. Verify low flow.
2. Check pump flow path.
3. Monitor upper and lower motor bearing temperature.

SUPPLEMENTARY ACTIONS:

NOTE: A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which may result in shaft seizure.

1. If alarm is due to a loss of KC flow, refer to AP/1/A/5500/21 (Loss of Component Cooling).

REFERENCES:

1. CNM-1201.00-39
2. CNEE-0142-01.43

A/1

KC SUPPLY HDR FLOW TO NCP BRGS LOW

SETPOINT: 425 gpm

ORIGIN: 1KCPS9180

PROBABLE CAUSE:

1. Header isolated
2. Misalignment of KC System
3. Loss of KC pumps

AUTOMATIC ACTION: None

IMMEDIATE ACTIONS:

1. Verify low flow.
2. Check pump flow path.
3. Monitor upper and lower motor bearing temperature.

NOTE: A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which may result in shaft seizure.

SUPPLEMENTARY ACTIONS:

1. If alarm is due to a loss of KC flow, refer to AP/1/A/5500/21 (Loss of Component Cooling).

REFERENCES:

1. CNM-1201.00-39
2. CNEE-0142-01.43