

CONSTELLATION ENERGY R. E. GINNA NUCLEAR POWER PLANT EXAMINATION SCENARIO	NO.: Exam 04-2 Scenario 1	REV: 0
	TITLE: NRC Exam Scenario 04-2-1	
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Date: 9/13/04

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Date of exam: \_\_\_\_\_

Examinees

Evaluators

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Final review \_\_\_\_\_  
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Date: \_\_\_\_\_

Approved for use \_\_\_\_\_  
 Director Operations Training  
 or Designee

Date: \_\_\_\_\_

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1. SCENARIO OVERVIEW

- 1.1 The plant is initially at approximately 47% power following a load decrease to clean condenser water boxes. The operators are currently in procedure O-5.2, Load Increases and are ready to start the second Main Feedwater Pump and increase power to 100% at the normal rate of 10%/hr. The "B" Charging Pump is out of service for an overhaul and cannot be restored in less than 24 hours.
- 1.2 The crew will start the B MFW pump IAW O-5.2 Load Increases, step 5.2.11 and Attachment MFW Pump B and continue with the load increase at 10%/hr.
- 1.3 PT-449 Przr Pressure Controlling channel fails high causing full spray and RCS pressure to decrease rapidly. The crew should take manual control of PC-431K to close the spray valves and defeat the channel per ER-INST.1. The CRF should check Tech Specs for operability requirements (defeat in 6 hrs) (Tech Spec 3.3.1).
- 1.4 Safeguard Bus 16 Faults causing the bus to deenergize. The crew should respond using procedure AP-ELEC.14/16 and start redundant equipment and prepare for plant shutdown. The CRF should check Tech Specs for operability requirements (Tech Spec 3.8.9).
- 1.5 Charging Pump "A" trips causing loss of all charging flow. The crew should enter AP-CVCS.3, Loss of all Charging. They should initiate a rapid shutdown.
- 1.6 A main steamline rupture occurs resulting in a SI and PTS condition. The operator should respond per E-0, E-2, ECA-2.1 and FR-P.1 and take actions to reduce AFW Flow and Terminate SI to prevent over pressurizing the RCS.

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2. SCENARIO OBJECTIVES

- 2.1 Demonstrate the following abilities during the simulator scenario.
  - 2.1.1 Ability to start a MFW pump and increase power at normal rates.
  - 2.1.2 Ability to respond to a loss of PT-449 which causes a rapid RCS depressurization and to defeat the channel and restore normal operations.
  - 2.1.3 Ability to respond to a loss of Safeguard Bus 16 and to take compensatory measures and start redundant equipment.
  - 2.1.4 Ability to respond to a loss of all charging by performing a rapid power decrease taking the plant offline and shutting the reactor down.
  - 2.1.5 Ability to respond to a PTS event by limiting the cooldown and terminating SI.

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3. CRITICAL TASKS (CTs)

CT FR-P.1-B

Task: Control the AFW flow rate in order to minimize RCS cooldown rate before transition out of FR-P.1.

Cues: RCS cold leg cooldown rate > 100°F in last 60 minutes  
and  
 Cold leg temperature on either cold leg is < 285°F  
and  
 AFW flow rate to faulted S/G is > 50 gpm

Indication: Manipulation of control to throttle AFW flow to both faulted S/G to 50 gpm (within the ability to control the AFW control valves)

Feedback: RCS cooldown slow and eventually stops

CT FR-P.1-A

Task: Terminate SI flow so that if the challenge to integrity CSF is  
 - severe, an extreme challenge is prevented  
 - extreme, SI is terminated by the end of the scenario

Cues: Indication of a red or orange challenge to the integrity CSFST  
and  
 SI and Rx trip actuated  
and  
 Indication that SI termination criteria are met

Indication: Manipulation of controls to terminate SI flow and SI and RHR pump breakers

Feedback: SI and RHR flow rate zero

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4. INSTRUCTOR ACTIONS

<u>Problem Time</u>	<u>Actions</u>	<u>Notes</u>
4.1	Startup and setup the simulator per OTG-3.2	
	NOTE: Times may be varied at the discretion of the lead evaluator	
4.2	Initial Conditions	
4.2.1	IC-20 47% Power MOL Xenon increasing (Setup saved as IC-171)	Print out Xenon plant for plant conditions.
4.2.2	Verify A, C Charging Pumps running. Pull Stop "B" Charging Pump	A-52.4 on B Charging Pump out 4 days overhaul (Tracking only) TRM 3.1.1
4.2.3	Verify A MFW running B MFW Pump in Pull Stop	Fill out O-5.2 up to Step 5.2.11 (N/A up to step 5.2.10) B MFW Att fill out up to Step 8.0 (N/A A MFW Attachment).
4.2.4	Set up Turbine EHC for 10%/hour increase setter to 95% in Imp In, Place in Hold	
4.3	Insert Malfunctions	
4.3.1	PT-449 Fails High MALF PZR02D, 3100 psig, 30 sec Ramp, 0 sec TD Trigger 1	
4.3.2	Bus 16 Fault MALF EDS04B, 0 sec TD Trigger 2	
4.3.3	Trip of A Charging Pump MALF CVC12A, 0 sec TD, Trigger 3	

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4.3.4 Main Steam Line Rupture/Both  
 MSIV's Stuck Open  
 MALF STM05A, 100%, 0 sec TD  
 MALF STM05B, 100%, 0 sec TD  
 MALF STM03, 5E6 lbm/hr, 0 sec  
 Ramp, 0 sec TD, Trigger 4

#### 4.4 Event Initiation

0 min	4.4.1 Start MFW Pump	Note: If CRF calls mechanic the B MFW motor shaft has already been centered.
10 min	4.4.2 PT-449 Fails High Trigger 1	
25 min	4.4.3 Bus 16 Faults Trigger 2	When notified to investigate, call back after 20 minutes, respond that it will take a few hours to repair (failed insulator on bus bar).
40 min	4.4.4 "A" Charging Pump Trip Trigger 3	AO reports burnt insulation smell in Charging Pump Room on investigation.
55 min	4.4.5 Steamline Rupture Trigger 4	AO cannot gain access to MSIV's due to steam.

Terminate scenario at direction of Lead Examiner.

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5. TURNOVER INFORMATION

5.1 Plant Status

47% Power MOL C<sub>b</sub> 850 ppm, Xenon increasing slightly. Came down from 100% 8 hours ago to look at one of the condenser water boxes (cleaned). The plant is ready to go back to 100% power. Currently at step 5.2.11 of O-5.2.

5.2 Equipment Out of Service

"B" Charging Pump is out for a major overhaul. It cannot be restored in less than 24 hours.

5.3 Work in Progress

Power increase per O-5.2  
 "B" Charging Pump overhaul

5.4 Planned Work

Return to 100% power

5.5 Significant Events

5.6 Remarks

Start the "B" MFW pump and increase load.

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6. EVALUATION

Event:   1  

Event Title:   Start the "B" MFW Pump  

Expected Response/Behavior

CUES: Procedure O-5.2 directs start of the pump

Response:

		<u>RATING</u>	<u>N/A</u>
SRO	Direct BOP to start the B MFW pump IAW O-5.2 step 5.2.11 and Attachment B MFW pump	_____	_____
RO/BOP	Start the B MFW pump	_____	_____

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6 EVALUATION

Event:   2  

Event Title: PT-449 Fails High

Expected Response/Behavior

CUES: PI-449 Fails High  
 Hi PRZR Press Alarm  
 Lo PRZR Press Alarm  
 Both Spray Valves Open  
 PI-429, 430, 431 Rapidly decreasing

Response:

		<u>RATING</u>	<u>N/A</u>
RO/BOP	Notify SRO of PT-449 Failing High Rapid decreasing PRZR Pressure	_____	_____
SRO	Direct RO to place PC-431K in manual and to manually control PRZR Pressure	_____	_____
SRO	Enter AP-PRZR.1 Abnormal PRZR Pressure	_____	_____
SRO	Direct RO to check PRZR Pressure Channels/Determine PT-449 has failed Refer to ER-INST.1	_____	_____
SRO	Note that Tech Specs for Rx Press < 2205 have been entered	_____	_____
SRO	Enter ER-INST.1	_____	_____
SRO	Determine that PORV do not have to be isolated and Hot leg streaming is not an issue (no power reduction required)	_____	_____
SRO	Direct BOP to defeat PT-449 per attachment (STA or RO to peer or IV)	_____	_____
SRO	When attachment complete, direct RO to restore PC-431K to Auto	_____	_____

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|-----|--|-------|-------|
| SRO | Check Tech Spec<br>- 3.3.1 functions 5, 7a<br>- 3.3.1 functions 1 and 6<br>(all satisfied after defeat A-52.4 for tracking only) | _____ | _____ |
| SRO | Return to AP-PRZR.1  | _____ | _____ |
| SRO | Direct restoration of normal plant conditions<br>- PRZR Heater/Sprays<br>- PORV<br>- 431K  | _____ | _____ |
| SRO | Notify Higher Supervision  | _____ | _____ |

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6. EVALUATION

Event:   3  

Event Title: Bus 16 Fault

Expected Response/Behavior

CUES: Breaker Trip  
 Bus 16 deenergized  
 B D/G starts but does not load

Response:

		<u>RATING</u>	<u>N/A</u>
SRO	Determine Bus 16 is lost, enter AP-ELEC.14/16	_____	_____
SRO	Direct rod be placed in manual	_____	_____
SRO	Check D/G's and Buses Determine ECA-0.0 should not be entered (Step 3 RNO)	_____	_____
SRO/RO/ BOP	Check Equipment - CCW Pumps - Charging Pumps - MFW Reg Valves	_____	_____
SRO	Direct starting of redundant equipment on Bus 14 - Boric Acid Pumps - RMW Pump - Rx Compartment Cooling Fan - Penetration Cooling Fan - SFP Cooling	_____	_____
SRO	Direct AO to Swap Aux Building Lighting	_____	_____
SRO	Direct AO to supply alternate cooling to D/G B and to cross connect the fuel oil transfer systems (ER-D/G.1)	_____	_____
SRO/RO	Check the following - VCT Makeup - Charging Pump (one running) - > 20 gpm Charging line flow	_____	_____

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- Letdown line flow
- Przr Heaters
- Rod

- |     |   |                |
|-----|---|----------------|
| SRO | Direct crew to stabilize plant condition<br>- Tavg<br>- PRZR Press<br>- PRZR Level  | _____<br>_____ |
| SRO | Determine Bus 16 not restored   | _____<br>_____ |
| SRO | Check DC Loads<br>- TDAFW Pump Oil Pump<br>- Battery Chargers <ul style="list-style-type: none"> <li>• Direct electricians crosstie B Battery to TSC</li> </ul> | _____<br>_____ |

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6. EVALUATION

Event: 4

Event Title: "A" Charging Pump Trip

Expected Response/Behavior

CUES: Loss of Charging Line and Seal Injection Flow  
 Regen Hx Hi Outlet Temp Alarm (A-4)  
 Motor Off Alarm (G-25)

Response:

		<u>RATING</u>	<u>N/A</u>
SRO	Recognize loss of charging Enter AP-CVCS.3	_____	_____
SRO	Direct restart of "A" Charging Pump	_____	_____
SRO	Direct Letdown be isolated	_____	_____
SRO	Direct RO/BOP to check the following: - Thermal Barrier Cooling - PRZR Level - VCT M/U	_____	_____
SRO	Determine no Charging Pumps available Go to Step 17 (Load Reduction)	_____	_____
SRO	Direct Load Reduction/4160V Bus Transfer	_____	_____
SRO	Direct monitoring of plant parameters - Tavg - IA - PRZR Press - MFW Reg Valves	_____	_____
SRO	Direct one MFW be secured	_____	_____

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SRO	Direct Checking - Trim valves - AMSAC - HDT pump	_____ _____
SRO	Direct MFW Bypass Valve be placed in Auto and systems aligned for low power operations	_____ _____
SRO	Direct Turbine Trip and Verification of Steam Dump operation	_____ _____
SRO	Direct Rx Shutdown	_____ _____

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6. EVALUATION

Event:   5  

Event Title: Steamline Rupture Both MSIV Stuck Open

Expected Response/Behavior

CUES: Loud Noise in MCR  
 Steam Pressure decreases rapidly  
 SI

Response:

		<u>RATING</u>	<u>N/A</u>
SRO	Recognize SI occurred Transition to E-0	_____	_____
SRO	Verify Immediation Actions - Rx Trip - Turbine Trip - Power - 14, 17, 18 energized, 16 deenergized - SI Actuated	_____	_____
SRO	Verify Auto Actions (step 5-13) One Train only (Bus 16 deenergized) - Verify SI/RHR pumps running • A/C SI, A RHR - Verify CNMT Recirc Fans Running • A/D - Verify CNMT Spray not required	_____	_____
SRO	Check Main Steam Isolation • Determine MSL should be isolated/direct CO to manually close - Verify MFW Isolation - Verify MDAFW Pump • Verify TDAFW Pump running - Verify SW pumps running - Verify CI/CVI - Check CCW Pump running - Check SI/RHR flows - Verify AFW Valve Alignment	_____	_____
SRO	Monitor Heat Sink - Verify > 200 gpm flow	_____	_____

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SRO            Direct RO/BOP to check System Alignments            \_\_\_\_\_

- SI/RHR
- CCW to RCP Thermal Barriers
- TDAFW (Do not stop)

NOTE: May throttle AFW to 50 gpm/SG based on ECA-2.1, Anticipatory Action.

SRO            Check RCS Temp            \_\_\_\_\_

- Decreasing uncontrollably
- Direct throttling AFW to 200 gpm total
- Attempt to close MSIV's

Check PORVs and Sprays

Check RCP Trip Criteria  
(should not be met)

SRO            Check S/G Secondary Sides            \_\_\_\_\_

- Determine they are faulted
- Transition to E-2

(Note: At some point, depending on the rate they proceed through E-2 and ECA-2.1, they will reach an Orange Path on FR-P Integrity Status Tree. When they reach that point, the SRO should transition to FR-P.1)

SRO            Direct attempt to close MSIV's            \_\_\_\_\_

SRO            Determine both S/G's Faulted            \_\_\_\_\_

Transition to ECA-2.1

SRO            Direct attempt to isolate S/G (ECA-2.1 Step 1)            \_\_\_\_\_

		SAT	UNSAT
CT FR P.1-B	Control the AFW Flow Rate before an extreme (Red Path) challenge develops to the integrity CSFST (Throttle AFW to ~ 50 gpm/SG)	_____	_____

(More actions may be taken in ECA-2.1 depending on timing)

SRO            Determine Orange Path exists            \_\_\_\_\_

Transition to FR-P.1

SRO            Check RCS Pressure and Cold Leg Temp (Control AFW flow)            \_\_\_\_\_

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SRO	Check SI Pump Running	_____	_____
SRO	Determine SI can be terminated	_____	_____
SRO	Direct Reset of SI	_____	_____
SRO	Direct stopping all SI and RHR pumps	_____	_____

		SAT	UNSAT
CT FR P.1-A	Terminate SI flow so that if the challenge to The integrity CSF is severe and extreme Challenging is powerful and if extreme, SI is Terminated prior to the end of the scenario.	_____	_____

(NOTE: Do not terminate scenario until a Red Path exists on the Integrity CSFST in order to allow for proper classification.)

End Scenario