INITIAL SUBMITTAL

SEQUOYAH EXAM
50-327, 328/2000-301

AUGUST 7 - 21, 2000

INITIAL SUBMITTAL
RO/SRO WRITTEN EXAMINATION

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information	
Name:	Region: II
Date:	Facility/Unit: TVA Sequoyah
License Level: RO	Reactor Type: W
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____
Applicant's Signature

Results	
Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

1. Given the following plant conditions:
   - Unit 2 is operating at 95% reactor power.
   - The crew is recovering from a control rod misalignment.
   - Control rod M8 is 15 steps lower than the other rods in control bank D.
   - M8 rod has been misaligned for 20 minutes
   - Reactor engineering has determined that no restrictions exist on realignment of M8 rod.
   - The decision has been made to realign control rod M8 with control bank D.

   Which ONE (1) of the following describes the required crew actions in preparation for realignment?

   Disconnect the lift coil(s) for:

   A. the affected GROUP (except M8) and adjust the affected GROUP step counter to the misaligned rod position.

   B. the affected BANK (except M8) and adjust the affected GROUP step counter to the misaligned rod position.

   C. control rod M8 and adjust the affected GROUP step counter to the misaligned rod position.

   D. control rod M8 and adjust both control BANK D step counters to the misaligned rod position.

2. Given the following plant conditions:
   - Unit 2 is operating at 60% RTP.

Which ONE (1) of the following is required following a sustained loss of CCS flow to the RCPs?

A. To continue operation, restore CCS flow within five minutes to the affected Unit.

B. Trip the reactor and all reactor coolant pumps within two minutes

C. Trip the reactor and the affected reactor coolant pumps when motor bearing temperature exceeds $180^{O}F$.

D. Reduce CCS loads and increase seal injection flow if power is greater than 10%.

3. Given the following plant conditions:
   - A reactor trip has occurred on Unit 1 due to a loss of offsite power.
   - The crew is performing the actions of ES-0.2, Natural Circulation Cooldown.
   - When adjusting steam dumping rate to control natural circulation, the operators also adjust AFW flow to all of the S/Gs.

   Which ONE (1) of the following explains why narrow range level is maintained in all S/Gs?

   A. To maintain symmetric cooling of the RCS for decay heat removal.

   B. To flood all SGs for subsequent entry into Mode 5.

   C. SG wide range level indication is lost on loss of offsite power.

   D. Top of SG tubes on all SGs must be covered for natural circulation to occur.

4. Given the following plant conditions:
   - The operating crew is responding to a reactor trip without Safety Injection using appropriate emergency procedures.
   - Reactor coolant pumps are running
   - Core burnup is 15,000 MWD/MTU

Which ONE (1) of the following describes conditions that require Emergency Boration?

A. Tavg is 544 degrees and decreasing following closure of the steam dump and atmospheric relief valves.

B. Tavg is 537 degrees and continuing to decrease with all rods fully inserted.

C. Control rod C5 RPI is indicating 90 steps withdrawn and control rod M8 RPI is indicating 11 steps withdrawn. All other RPIs indicate zero steps.

D. Control rod H4 RPI is indicating 224 steps withdrawn. All other RPIs indicate zero steps.

5. Given the following plant conditions:
   - Unit 2 in MODE 3 for maintenance
   - Panel 0-XA-55-27B-D Annunciator A-4, MISC EQUIPM SUPPLY HEADER FLOW LOW, starts alarming
   - Panel 0-XA-55-27B-D Annunciator A-6, LETDOWN HX OUTLET FLOW/TEMP ABNORMAL, starts alarming

   Which ONE (1) of the following events could cause both alarms to actuate?

   A. CCS supply header rupture.

   B. Letdown HX tube rupture.

   C. Loss of seal injection.

   D. Loss of charging flow.

6. With the Pressurizer Pressure Control System selected for PT-68-340, Channel I pressure transmitter fails LOW. The operator swaps the Pressure Control Channel Selector Switch (XS-68-340D) to operable channels per the AOP.

   Which ONE (1) of the following correctly describes which is the controlling channel and which channel is selected as the backup channel?

   A. Channel II (334) is controlling; channel III (323) is backup.

   B. Channel II (334) is controlling; channel IV (322) is backup.

   C. Channel III (323) is controlling; channel II (334) is backup.

   D. Channel III (323) is controlling; channel IV (322) is backup.

7. Given the following plant conditions:
   - Unit 2 was stable at 81% power
   - The following Panel XA-55-5C annunciators have just illuminated:
     - Window A-6 TS-68-2M/N RC LOOPS T AVG/AUCT T AVG DEVN HIGH-LOW
     - Window B-6 TS-68-2/A/B REACTOR COOLANT LOOPS DELTA T DEVN HIGH-LOW
     - Window C-6 TS-68-2P/Q REAC COOL LOOPS T REF T AUCT HIGH-LOW

Which ONE (1) of the following plant transients could cause these three annunciators to begin alarming at the same time?

A. Steam line break.

B. Dropped control rod.

C. Continuous rod withdrawal.

D. Turbine runback

8. Given the following plant conditions:
   - A LOCA has occurred on Unit 1 and the operating crew has implemented the EOPs.
   - The crew is currently performing E-1, "Loss of Reactor or Secondary Coolant"
   - The STA reports a RED path for FR-P.1, "Pressurized Thermal Shock".

   Which ONE (1) of the following correctly describes the parameter the STA used to make his determination and the reason it was used?

   A. Tcold temperature since it most closely reflects the temperature in the beltline region of the reactor vessel.

   B. Tcold temperature since it most closely reflects the temperature in the core.

   C. Incore thermocouple temperature since it most closely reflects the temperature in the beltline region of the reactor vessel.

   D. Incore thermocouple temperature since it reflects the temperature in the core.

9. Given the following plant conditions:
   - Condenser pressure is at 2.6 psia and steadily increasing.
   - Turbine load is 75%.

   Which ONE (1) of the following would be the FIRST to occur OR be procedurally required?

   A. Automatic trip of both Main Feedwater pumps.

   B. Loss of Steam dump capability.

   C. "Condenser Vacuum Low" annunicator lit, requiring a manual turbine trip.

   D. Automatic trip of the main turbine.

10. Given the following plant conditions:
    - Units 1 and 2 have experienced a Loss of All AC Power
    - ECA-0.0, "Loss of All AC Power" has been implemented
    - Step 13 directs the crew to place selected equipment in PULL TO LOCK or OFF

    Which ONE (1)of the following describes the reason for placing the equipment in PULL-TO-LOCK or OFF position?

    A. To prevent potential overload of the Shutdown Boards when they are re-energized.

    B. To prevent ECCS pump starting and thermal shock to RCS penetrations.

    C. To prevent ESF pump starts without proper cooling water and auxiliary support equipment available.

    D. To prevent RWST inventory depletion.

11. Given the following plant conditions:
    - Unit 1 has experienced a loss of 120V AC Vital Instrument Power Board 1-I.
    - The operators enter AOP-P.03.

Which ONE (1) of the following correctly identifies actions to be taken per AOP-P.03.

A. Check to see if the Reactor is Tripped. If not THEN continue with AOP-P.03

B. ENSURE the reactor tripped and continue with AOP-P.03

C. Immediately place 1-FIC-3-103 , Main FW Reg Valve, in MANUAL

D. ENSURE the reactor tripped AND GO TO E-0 WHILE continuing in AOP-P.03

12. Given the following plant conditions:
    - Unit #1 is operating at 100%.
    - All systems aligned normal.
    - Loss ERCW Supply header 2A occurs due to a rupture in the yard.

    Which ONE (1) of the following describes indications the Unit 1 operator would see in the main control room in this event? (Assume no operator actions)

    A. Ice condenser chillers trip.

    B. Containment temperature decreasing.

    C. General ventilation chillers trip.

    D. CCS surge tank level increasing with auto makeup valve closed.

13. Given the following plant conditions:
    - Unit 1 is at 100% power.
    - Unit 2 is in a refueling outage.
    - The shift is fully staffed.

An outage contract worker reports that a Class B fire has just started in the Auxiliary Building.

Which ONE (1) of the following types of fire should the Fire Brigade expect to fight upon arrival at the scene?

A. A fire which involves flammable liquid, oils, or grease.

B. A fire which involves combustible metals.

C. A fire which involves electrical equipment.

D. A fire which involves wood, paper, or cloth.

14. Which ONE (1) of the following conditions represents a loss of containment integrity per Technical Specifications 3.6.1.1, Containment Integrity?

A. With the reactor at 100% power, an electrician opens the outer airlock door.

B. With the RCS average coolant temperature 250°F, an inspection of the equipment hatch determines that the hatch is NOT sealed.

C. During an operability test of two normally open, redundant containment isolation valves at 100% power, one of the valves fails to close.

D. During an Integrated Leakage Rate Test in Mode 5, containment leakage exceeds the maximum allowable Technical Specification leakage rate.

15. The operating crew entered procedure FR-C.1, "Inadequate Core Cooling." All attempts to establish high pressure Safety Injection flow were unsuccessful. RVLIS lower range level is 28% and dropping slowly, Core Exit Thermocouples are reading 820 degrees F and slowly increasing. Reactor Coolant pumps have been secured.

    Which ONE (1) of the following methods would be the NEXT step in mitigating the core cooling challenge?

    A. Enter the Severe Accident Management Guidelines (SAMGs).

    B. Open available pressurizer PORVs to allow RCS depressurization to the SI accumulator and SI injection pressures.

    C. Depressurize all intact steam generators using Steam dumps or ARVs to 125 psig to allow RCS depressurization to the SI accumulator and SI injection pressures.

    D. Restart one RCP in an idle loop to provide forced two-phase flow through the core.

16. Given the following plant conditions:
    - Unit 1 has operated at 90% RTP for 45 days.
    - Chem lab has been sampling RCS for Iodine every 4 hours for the past 20 hrs.
    - Last RCS activity sample (1 hour ago) was 1.5 microcuries/gram Dose Equivalent Iodine.
    - AOP-R.06 "High RCS Activity" was entered 20 hrs ago.

    Which ONE (1) of the following actions describe the expected recommendation from the chem lab?

    A. Place mixed beds and cation bed demins in service.

    B. Divert letdown flow to Holdup Tank.

    C. Isolate letdown flow.

    D. Reduce power by 15% within one hour and sample for reduced Iodine activity.

17. Given the following plant conditions:

- Unit 1 at 95% power and is responding to continuous rod withdrawal.
- AOP-C.01 was entered and the crew transitioned to AOP-C.02.
- AOP-C.02 directs the control room operator to check for evidence of boration flow.

Which ONE (1) of the following will provide indications of flow through emergency borate valve (FCV-62-138)?

-Flow indicated on emergency borate flow indicator, FI-62-137A AND:

A. -Red light on handswitch for FCV-62-138 on Panel M-6, LIT
-Flow indicated on emergency borate flow indicator, FI-62-137B

B. -Red light on handswitch for FCV-62-138 on Panel M-6, LIT
-NO flow indicated on emergency borate flow indicator, FI-62-137B

C. -Green light on handswitch for FCV-62-138 on Panel M-6, LIT
-Flow indicated on emergency borate flow indicator, FI-62-137B

D. -Green light on handswitch for FCV-62-138 on Panel M-6, LIT
-NO flow indicated on emergency borate flow indicator, FI-62-137B

18. Given the following plant conditons:
    - Unit 1 is operating at 68% RTP.
    - The control rods are in manual
    - The crew is responding to a "Full Length Rods on Bottom" alarm
    - Control rod M4 RPI indicates zero
    - The reactor did not trip

Which ONE (1) of the following sets of parameters describes the effect of this malfunction?

A. Delta I for N41 will change from +1% to -2%, QPTR will remain the same, and Delta T for all loops will decrease from 68% to 64% and remain at 64%.

B. Delta I for N41 will change from +1% to -2%, QPTR will remain the same, and Delta T for all loops will not change.

C. Delta I for all NIS channels will not change, QPTR will change from 1.001 to 1.015, and Delta T for all loops will decrease from 68% to 64% and remain at 64%.

D. Delta I for all NIS channels will not change, QPTR will change from 1.001 to 1.015, and Delta T for all loops will decrease from 68% to 64% and return to 68%.

19. Given the following plant conditions:
    - Unit 1 Reactor tripped from 100% power.
    - The crew completed the first 4 steps of E-0 and transitioned to ES-0.1.
    - SI occurred and crew transitioned back to E-0.
    - US is in E-0 at step 9, "Monitor containment spray not actuated".
    - The STA informs the US of a RED PATH on Heat Sink.

    Which ONE (1) of the following describes the actions required by the US?

    A. Transition immediately to FR-H.1, "Response to Loss of Secondary Heat Sink".

    B. Continue with E-0 through the event diagnostic steps and enter FR-H.1 when directed to transition to E-1, E-2, or E-3.

    C. Review all CSF's to determine if any higher priority RED paths exist, then immediately transition to highest priority procedure.

    D. Transition to FR-H.1 when directed in E-0 at step 14, "determine if secondary HEAT SINK available".

20. Given the following conditions:
    - An automatic reactor trip and safety injection occurred on Unit 2 as a result of decreasing RCS pressure
    - Pressurizer pressure dropped prior to and following the SI
    - RCS average temperature was stable prior to and following the SI
    - Pressurizer level rose prior and following the SI
    - CCP Amp meter indicated decreasing amps and CCP flow meter indicated decreasing flow prior to the SI
    - Reactor power was stable prior to the reactor trip and dropped following the reactor trip

    Which ONE (1) of the following accidents would result in these conditions?

    A. Steamline break

    B. Double-ended hot leg break

    C. Stuck open pressurizer safety valve

    D. 3 inch break on a RCS cold leg

21. A small break LOCA has occurred and operators have implemented E-0, "Reactor Trip or Safety Injection".

Which ONE (1) of the below statements indicates the basis for tripping the RCPs if minimum RCS pressure is lost and SI flow has been established?

A. Prevent excessive depletion of RCS inventory through a small break leading to severe core uncovery if the RCPs were later tripped.

B. Prevent damage to the RCP seal packages due to possibility of two-phase flow in RCS.

C. Prevent damage to RCP impeller due to cavitation and pitting.

D. To further decrease RCS pressure, enhancing ESF systems ability to inject borated liquid into RCS.

22. Given the following plant conditions:
    - Unit 2 is operating at 100% power when a LOCA outside containment is recognized.
    - The operators initiated safety injected.

Which ONE (1) of the following best describes the procedure methodology to mitigate this condition?

A. Once the RWST empties the operator should transfer ECCS pumps to the containment sump.

B. If the LOCA can not be isolated then transition to the Loss of RHR Sump Recirculation procedure.

C. Guidance is provided to identify which train of SIS has the LOCA.

D. If the LOCA can not be isolated then transition to E-1.

23. During the performance of ES-1.2, "Post-LOCA Cooldown and Depressurization," it is desirable to have only one RCP running.

    Which ONE (1) of the following describes the reason for having only one RCP in service?

    A. One RCP provides the DELTA-P required to provide letdown. Additional RCPs would add unnecessary heat load.

    B. One RCP is desired for spray and RCS heat transport to the SGs. Additional RCPs would add unnecessary heat load.

    C. One RCP is needed for RCS heat transport to the SGs. Additional RCPs could overload the electrical power supply.

    D. One RCP is desired for spray and RCS mixing. Additional RCPs would strain the plant electrical power supply in the post-LOCA condition.

24. While performing the actions for a Loss RHR Sump Recirculation, a RED path condition is identified for the Containment Status Tree.

Which ONE (1) of the following reasons describes why the Containment Spray Pumps are operated within the guidelines of ECA-1.1, "Loss of RHR Sump Recirculation" instead of using the guidelines contained in FR-Z.1, "High Containment Pressure."

A. Ensures that the maximum heat removal system capacity that is available is used to reduce the containment pressure.

B. ECA-1.1 pump operating criteria is more restrictive, ensuring continuous containment spray system operation to reduce containment pressure.

C. ECA-1.1 pump operating criteria is less restrictive, permitting reduced containment spray operation to conserve RWST inventory.

D. Provide a more rapid means of verifying automatic actuation of the containment spray system.

25. Given the following plant conditions:
    - Unit #1 has experienced a Reactor Trip and SI.
    - The crew has transitioned to and performed the proper procedures and are currently performing ES-1.1 "SI Termination."
    - The CRO notices that the pressure in #2 Steam Generator is decreasing rapidly out of control and notifies the SRO.

Which ONE (1) of the following describes the direction the SRO should give the crew?

A. Close all MSIVs, SG PORVs and isolate Main Feedwater, Auxiliary Feedwater, and S/G blowdown lines.

B. Transition to E-2, "Faulted Steam Generator Isolation" from the Fold Out Page.

C. Transition to E-1, "Loss of Reactor or Secondary Coolant" from the Fold Out Page.

D. Verify all Steam Dumps and Steam Generator PORVs are closed, then close all MSIVs.

26. Unit 1 control room operators are investigating a possible malfunction of the Reactor Coolant Makeup system based on abnormal indications following an RCS makeup evolution. The RO suspects the controller setting for 1-FC-62-139, Boric Acid Blender Flow Control, may have been set wrong.

Desired boron concentration is 500 ppm
BAT boron concentration at 6820 ppm
Primary water flowrate of 70 gpm
Primary Water boron concentration of 10 ppm
(BAT conc - Desired conc)xRequired B.A. flow = (Desired conc - PW conc)xPW flow

Which ONE (1) of the following would be the most correct setting for 1-FC-62-139?

A. 2.7

B. 5.4

C. 8.7

D. 11.0

27. Which ONE (1) of the following is an indication of vortexing at the suction of the RHR pump during reduced inventory conditions?

A. Erratic pump amps

B. RHR suction relief lifting

C. RHR flow decrease and stable at the lower value

D. Constant pump discharge pressure

28. Which ONE (1) of the following describes the effects on Source Range Monitor (SRM) output as detector voltage BEGINS to drift from the optimum of 870v?

The SRM detectors operate in the:

A. proportional region and detector output counts increase as detector voltage drifts high.

B. proportional region and the output counts decrease as detector voltage drifts low.

C. ionization region and the output increases as detector voltage drifts high.

D. ionization region and the output remains constant as detector voltage drifts high.

29. Given the following plant conditions:
    - The operating crew has identified a S/G tube leak.
    - AOP-R.01 has been implemented.
    - Letdown flow = 75 gpm.
    - 1 CCP is in service with charging valves FCV 62-93 and 89 full open.
    - Charging flow = 160 gpm.
    - Pressurizer level is stable at 58%.
    - All other parameters are normal

    Which ONE (1) of the following best estimates the total primary to secondary leak rate?

    A. 55 gpm.

    B. 75 gpm.

    C. 85 gpm.

    D. 150 gpm.

30. During operation at power steam generator tube leakage is detected and estimated at 250 gpm by the reactor operator. The following plant indications existed at that time:

    - RCS pressure – 2200 psig and decreasing
    - SG Pressures – 1000 psig

    The unit is tripped and plant parameters following the trip are:

    - RCS pressure – 1700 psig and decreasing
    - SG Pressures – 1100 psig

    Using the provided equation sheet, determine which ONE (1) of the below describes the leakage following the trip.

    A. one half of the initial leak rate or about 125 gpm.

    B. essentially equal to the initial leak rate or about 250 gpm.

    C. approximately 70% of the initial leak rate or about 175 gpm.

    D. One third of the initial leak rate or about 83 gpm.

31. Procedure FR-H.1, "Loss of Secondary Heat Sink", directs operators to stop all RCPs if actions to restore AFW flow are not successful.

Which ONE (1) of the following is the reason the RCPs are stopped in this situation?

A. Minimize the possibility of a tube rupture when AFW is eventually restored to the steam generators.

B. Conserve reactor coolant inventory by reducing seal leakoff.

C. Obtain increased safety injection flow by decreasing RCS cold leg pressure.

D. Conserve steam generator inventory by reducing RCS heat input.

32. Given the following plant conditions:
    - Both units are at 100% power
    - All systems are aligned normal

    - Window A-5 is "125V DC VITAL BAT BD I ABNORMAL"
    - Window A-4 is "125 V DC VITAL CHGR I FAILURE OR VITAL BAT I DISCHARGE"
    - Window E-2 is "125V DC VITAL SPARE CHGR 1 FAILURE"

    Which ONE (1) of the following sets of conditions would be indicative of a loss of a 125V DC Vital battery charger with the 125V DC battery supplying the board?

    A. Annuciator window 1-XA-55-1C A-5 lit and 125V DC Volt meter selected to Batt I and indicating downscale to 75 Volts.

    B. Annuciator window 1-XA-55-1C A-4 lit and EI-57-92 (Batt BD I AMPS) is indicating upscale from zero.

    C. Annuciator window 1-XA-55-1C A-4 is lit and EI-57-92 (Batt BD I AMPS) is indicating downscale from zero.

    D. Annuciator window 1-XA-55-1C E-2 is lit with 125V DC Voltmeter selected to Batt Bd I and indicating 129 Volts.

33. Given the following plant conditions:
    - Unit 1 is responding to a LOCA
    - ES-1.3 was completed and containment recirculation cooling is in progress
    - The STA has identified an orange path on containment radiation

Which ONE (1) of the following best describes a high level action in FR-Z.3, High Containment Radiation?

A. VERIFY Containment Vent Isolation (CVI) operation.

B. VERIFY ABGTS operation.

C. VERIFY Phase A isolation.

D. NOTIFY chem lab to sample the containment sump.

34. Given the following plant conditions:
    - The Reactor is at 100% power.
    - Pressurizer Level Transmitter 1-LI-68-339 is selected for control.
    - All other systems are lined up for normal operation and in automatic.
    - The REFERENCE LEG for 1-LI-68-339 is develops a leak.

Which ONE (1) of the following describes the short term (25 to 30 min.) response to this condition?

	1-LI-68-339 level Indication Will	1-LI-68-335 & 320 level Indication Will	VCT level Indication Will
A.	Increase	Decrease	Increase
B.	Decrease	Increase	Increase
C.	Increase	Decrease	Decrease
D.	Decrease	Increase	Decrease

35. Which ONE (1) of the following describes the function of the SFP bridge crane hoist "lower" limit GEAR OPERATED switch?

A. Stops downward travel before the crane hook enters the water.

B. Stops downward travel before the fuel assembly reaches the bottom of the fuel cell.

C. Automatically changes hoist speed from fast to slow while the fuel assembly is in the fuel cell boundary.

D. Prevents bridge travel when the fuel assembly is within the fuel cell boundary.

36. Given the following plant conditions:
    - The plant is at 100% power.
    - The ERCW System is in a normal alignment.
    - J-A ERCW pump is in service, in Auto, and selected for preferred start (Selector Switch 0-XS-67-225).
    - Offsite power is lost to 6.9KV Start Bus 1B.
    - 1A-A D/G responds to the event as designed
    - Offsite power is now available to Start Bus 1B
    - BO relays reset

    Which ONE (1) of the following describes the operation of the J-A ERCW pump after the loss of power?

    The pump breaker:

    A. will trip and immediately reclose, the pump will start when D/G energizes the SD board. The pump can be normally shutdown at any time.

    B. stays connected to the bus, the pump will start when the D/G energizes the board. The pump can be normally shutdown ONLY after the SD board is paralleled to offsite power.

    C. will trip, the pump will start 15 seconds after the D/G energizes the SD board. The pump can be normally shutdown.

    D. will trip, the pump will start 15 seconds after the D/G energizes the SD board. The pump can be shutdown ONLY after Q-A ERCW pump is selected for preferred start (Selector Switch 0-XS-67-225).

37. Given the following plant conditions:
    - Unit 1 was operating at 80% power when a reactor trip occurred.
    - Reactor trip breaker "A" will not open.
    - PT-1-72, Turbine impulse pressure, has failed at 80% (as is)
    - The Steam Dump Mode Select Switch is in the Tavg position

Which ONE (1) of the following describes the response of the Steam Dumps and Atmospheric Relief valves to these conditions?

	Atmospheric Relief valves	Steam Dump valves
A.	Opened	Opened
B.	NOT Opened	Opened
C.	Opened	Not Opened
D.	Not Opened	Not Opened

38. Given the following plant conditions:
    - Unit 2 was operating at 100% power
    - All controls are in automatic
    - An emergency shutdown is in progress at 5%/min using AOP-C.03, due to high turbine vibration

Which ONE (1) of the following would indicate failure of the control rods to insert?

A. "REACTOR COOLANT LOOPS T-REF/T-AUCT HIGH-LOW" alarm, 1-XA-55-5A window C-6.

B. "REACTOR COOLANT LOOPS DELTA-T DEVN HIGH-LOW" alarm, 1-XA-55-5A window B-6.

C. "REACTOR COOLANT LOOP T-AVG/AUCT TAVG DEVIATION HIGH-LOW" alarm,1-XA-55-5A window A-6.

D. "ROD CONTROL SYSTEM NON-URGENT FAILURE" alarm 1-XA-55-4B window B-6.

39. Given the following plant conditions:
    - Unit 1 is at 30% power
    - 1B Start Bus trips out on differential relay actuation

Which ONE (1) of the following describes effect on the plant?

A. 1B-B diesel generator starts and connects to the 1B-B 6.9 kV shutdown board.

B. Control rods insert.

C. CVCS letdown isolates.

D. Reactor trips.

40. Given the following plant conditions:
    - Unit 1 is operating steady-state at 90%
    - Containment Ventilation is in normal alignment for this power level
    - A leak occurs on ERCW Supply Header 1A in the Auxiliary Building

Which ONE (1) of the following describes the plant response IF the 1A header to the Auxiliary Building is isolated to stop the leak?

A. The standby Lower Compartment Cooling Unit will automatically start on high containment temperature.

B. Motor winding temperatures on Reactor Coolant Pumps 1 & 3 will increase above the 311^{o}F, requiring unit shutdown.

C. Containment temperature and pressure will rapidly increase resulting in a safety injection and Phase A containment isolation

D. CRDM suction dampers will automatically realign from the reactor vessel shroud area to lower containment on high containment temperature.

41. Given the following plant conditions:
    - Unit 1 is increasing power from 50% to 100% power
    - Boron concentration has been reduced from 1070 ppm to 1020 ppm
    - Full load boron concentration has been calculated to be 1005 ppm

Which ONE (1) of the following describes the boron concentration differential limit between the RCS and the Pressurizer, and operator actions required to stay below this limit when changing the RCS boron concentration?

The differential limit is less than or equal to:

A. 10 ppm. It is maintained by turning on a PZR backup heater and allowing the PZR sprays to maintain RCS pressure.

B. 50 ppm. It is maintained by turning on a PZR backup heater and allowing the PZR sprays to maintain RCS pressure.

C. 10 ppm. It is maintained by "cracking open" a PZR spray valve and allowing the PZR backup heaters to cycle to maintain RCS pressure.

D. 50 ppm. It is maintained by "cracking open" a PZR spray valve and allowing the PZR backup heaters to cycle to maintain RCS pressure.

42. Given the following plant conditions:
    - Unit 1 is performing a startup from Hot Standby to 100% power.
    - Reactor power is 25% with RCS boron concentration of 520 ppm.

Which ONE (1) of the following describes the number of gallons of primary water needed to dilute the RCS by 75 ppm?

A. 9968 gallons ±10

B. 9938 gallons ±10

C. 9569 gallons ±10

D. 9272 gallons ±10

43. Which ONE (1) of the following supplies voltage for OPERATION of the SLAVE RELAYS in the SSPS output cabinets?

A. 15V DC from redundant power supplies in the SSPS cabinets.

B. 48V DC from a power distrubution bus in the SSPS cabinets.

C. 120V AC from redundant inverters in the SSPS cabinets.

D. 120V AC Vital Instrument Power from a distribution bus in the SSPS cabinets.

44. Given the following plant conditions:
    - Unit 1 is conducting refueling operations with core alterations in progress
    - Source Range Monitors N-31 and N-32 are reading 10 cps.
    - BOTH Intermediate Range Monitors are off scale LOW.
    - Power Range Monitor N-41 is OOS with all appropriate BISTABLES TRIPPED.
    - Power Range Monitor N-42 = 0%.
    - Power Range Monitor N-43 = 0%.
    - Power Range Monitor N-44 = 0%.

Which ONE (1) of the following describes the required actions if Power Range Monitor N-44 fails high?

A. Notify IMs to investigate the power range instrument failure and continue with core alterations.

B. Immediately stop all core alterations or positive reactivity changes and determine the boron concentration of the RCS at least once per 12 hours.

C. Ensure NR-45 recorder is selected to the intermediate range channels and continue with core alterations.

D. Immediately stop all core alterations and emergency borate per EA-68-4, "Emergency Boration".

45. Which ONE (1) of the following describes the annunciation "Reactor Coolant Saturation Margin Trouble"?

The annunciator will:

A. alarm if Reactor Coolant System pressure decreases by 40 psig while Reactor power is > 10% of rated thermal power.

B. alarm if RCS pressure decreases to 2205 psig and Reactor power is < 10% of rated thermal power.

C. alarm if RCS saturation margin is < 50 degrees and Reactor power is < 10% of rated thermal power.

D. alarm if RCS saturation margin is < 40 degrees and Reactor power is < 10% of rated thermal power.

46. Given the following plant conditions:
    - Unit 1 is stable at 100% power
    - Lower compartment temperature is 105 degrees F and upper compartment temperature is 95 degrees F
    - 3 Lower Compartment Coolers are in service
    - 3 Upper Compartment Coolers are in service
    - The ICS computer has just failed

    Which ONE (1) of the following describes the effect on Containment Temperature?

A. Upper compartment temperature will rapidly increase because its TCVs will fail closed when the ICS signal is lost.

B. Lower compartment temperature will rapidly decrease because its TCVs will fail open when the ICS signal is lost.

C. Upper and Lower compartment temperatures will remain approximately the same because the TCV controllers are normally operated in local manual.

D. Lower compartment temperature will remain approximately the same if the TCV controllers are NOT reset locally.

47. During outages the CRDM motor power supply may be temporarily realigned to supply receptacle power in the lower containment.

Which ONE (1) of the following describe how this condition is controlled?

With the motor breaker racked out:

A. the motor leads are lifted and re-landed on the receptacle power pack. A TACF is placed on the breaker to identify this temporary condition.

B. the motor leads are lifted and re-landed on the receptacle power pack. A Caution Order is placed on the breaker to identify this temporary condition.

C. a transfer switch is aligned to supply power to the receptacle power pack. A TACF is placed on the breaker to identify this temporary condition.

D. a transfer switch is aligned to supply power to the receptacle power pack. A Caution Order is placed on the breaker to identify this temporary condition.

48. Given the following plant conditions:
    - Unit 2 is in Mode 5 for repair of an RCP motor
    - Containment purge is in service to the Upper and Lower compartments
    - Containment equipment hatch is closed
    - Upper and Lower containment personnel airlocks are closed

    Which ONE (1) of the following describes the affect on the plant if the Lower Containment Personnel Airlock was breached to carry equipment into containment?

    A. Auxiliary Building pressure will increase above the Tech Spec limit due to air flow out of containment.

    B. Auxiliary Building Gas Treatment System will automatically start to limit Auxiliary Building pressure increase due to air flow out of containment.

    C. The Ice Condenser lower inlet doors may come open due to a pressure imbalance.

    D. The Ice Condenser upper deck doors may come open due to a pressure imbalance.

49. Given the following plant conditions:
    - Unit 1 was operating at 100% power.
    - An inadvertent reactor trip and safety injection occurred.
    - The ice condenser system glycol, that was trapped between the inside and outside containment penetration's return isolation valves, expanded due to heating.

Which ONE (1) of the following statements describes the system response to the glycol expansion?

A. The penetration's inside glycol isolation valve disks are designed to relieve trapped glycol into the containment side glycol header

B. A small bypass line with a check valve is installed around the penetration's outside isolation valve to relieve trapped glycol into the auxiliary building side glycol supply header.

C. A small bypass line with a check valve is installed around the penetration's inside isolation valve to relieve trapped glycol into the containment side glycol header.

D. A relief valve is installed around the penetration's outside isolation valve to relieve trapped glycol into the auxiliary building side glycol return header.

50. Given the following plant conditions:
    - Unit 1 at 45% with startup in progress
    - Two hotwell pumps running
    - Two condensate Booster pumps (CBP) running
    - 1A MFPT in service
    - 1B MFPT out of service with condenser isolation valves closed
    - While preparing for startup of 1B MFPT, the operator inadvertently closes the 1A MFPT condenser outlet isolation valve
    - Both Hotwell pumps trip due to loss of flow path

Which ONE (1) of the following describes how this action effects the Condensate Booster pumps and Main Feedwater pumps?

A. 1A MFPT trips due to loss of Net Positive Suction Head AND both CBPs trip due to loss of injection water.

B. 1A MFPT trips due to loss of Net Positive Suction Head AND both CBPs trip due to loss of Net Positive Suction Head.

C. 1A MFPT trips due to a loss of injection water AND both CBPs trip due to loss of injection water.

D. 1A MFPT trips due to a loss of injection water AND both CBPs trip due to loss of Net Positive Suction Head.

51. Given the following plant conditions:
    - Unit 2 is starting up from cold shutdown conditions
    - Condensate and feedwater systems are shutdown

Which ONE (1) of the following describes the Caution in 2-SO-2/3-1 and basis for throttling the pump discharge valve prior to starting the first Hotwell pump?

The discharge valve is turned 25 turns from the fully:

A. open position to prevent damage to piping and hangers.

B. open position to prevent pump runout.

C. closed position to prevent damage to piping and hangers.

D. closed position to prevent pump runout.

52. Given the following plant conditions and information:
    - Unit is at 100% rated thermal power
    - Feedwater Master Controller and Feedwater Pump Speed Controllers are in AUTOMATIC.
    - Main Feedwater Regulating Valves are in AUTOMATIC.
    - All four main feedwater flows start increasing with level in all four steam generators trending upwards.

    For information:
    - PT-1-33 is a Main steam header pressure transmitter
    - PT-3-1 is a Main feedwater header pressure transmitter

    Which ONE (1) of the following describes the instrument failure(s) that could have caused this transient?

    A. PT-1-33 has failed LOW or PT-3-1 has failed LOW.

    B. PT-1-33 has failed HIGH or PT-3-1 has failed LOW.

    C. PT-1-33 has failed HIGH or PT-3-1 has failed HIGH.

    D. PT-1-33 has failed LOW or PT-3-1 has failed HIGH.

53. Given the following plant conditions:
    - Unit 1 is operating at 100%
    - All control systems are normal in automatic.

Which ONE (1) of the following describes the plant response to a trip of Main Feed Pump turbine 1A?

A. The plant runs back to 80% load, the running Main Feedwater Pump accelerates to the high speed stop, Hotwell Pump 1A trips due to closing of Main Feedwater Pump 1A condenser isolation valves and Steam Generator levels control at 33%.

B. The plant runs back to 75% load, the running Main Feedwater Pump accelerates to the high speed stop, Hotwell Pump 1A trips due to closing of Main Feedwater Pump 1A condenser isolation valves, and Steam Generator levels control at 44%.

C. The plant runs back to 75% load, the running Main Feedwater Pump accelerates to the high speed stop, the Main Feed Pump 1A condenser isolation valves close, and Steam Generator levels control at 44%.

D. The plant runs back to 80% load, the running Main Feedwater Pump accelerates to the high speed stop, the Main Feed Pump 1A condenser isolation valves close, and Steam Generator levels control at 33%.

54. Which ONE (1) of the following describes the operation of the Unit 2 TDAFW (LCVs) following automatic actuation of the AFW system?

A. These valves go to the full open position and remain there until the S/G level reaches 33% Narrow Range, then the valves throttle to maintain 33% until operator action is taken.

B. These valves are controlled by a level controller that automatically positions the valves to maintain S/G level at 33%.

C. These normally open valves remain fully open until operator action is taken.

D. These normally closed valves go to the full open position and remain there until operator action is taken.

55. Given the following plant conditions:
    - Unit 1 is operating at 100% RTP
    - During a modification the 125 V DC breaker supplying power to the TDAFW pump Trip and Throttle valve was broken causing the breaker to open.
    - The breaker cannot be reclosed and maintenance estimates it will take 2 hours to replace the broken breaker.

Which ONE (1) of the following describes the effects on the TDAFW while repairs are in progress?

The pump will not auto start for an accident condition AND:

A. Control power will be automatically restored by auto transfer to the alternate supply.

B. Control power can be manually restored by manual transfer to the alternate supply by transfer switch located on 125 V DC Battery board # 1.

C. Control power can be manually restored by manual transfer to the alternate supply by transfer switch located on a panel just outside the TDAFW pump room.

D. Control power can be manually restored by manual transfer to the alternate supply by the Nor/Alt selector switch located in the Auxiliary Control Room (ACR).

56. Given the following plant conditions:
    - Waste condensate tank A release is in progress.
    - Waste condensate tank A activity is within technical specification limits.
    - Trip setpoint for radiation monitor RM-90-122 was adjusted based on tank samples.
    - During the release RM-90-122 setpoint is exceeded, however the alarm (0-RA-90-122A WDS LIQ EFF MON HIGH RAD) did not work and Radiation Control Valve RCV-77-43 failed to close.

Which ONE (1) of the following describes the effect of RCV-77-43 failing to automatically terminate this release?

A. The release WILL be terminated by the radwaste operator who continously monitors RM-90-122 during liquid radwaste releases.

B. The release WILL be terminated by the control room operator who continously monitors RM-90-122 during liquid radwaste releases.

C. 10CFR20 limits WILL NOT be exceeded for the nearest potable water or surface water supply in an unrestricted area.

D. 10CFR20 limits WILL be exceeded for the nearest potable water or surface water supply in an unrestricted area.

57. Given the following plant conditions:
    - A gas decay tank release is in progress.
    - 0-XA-55-12B, "0-RA-90-118A WDS GAS EFF MON INSTR MALFUNC" alarm just came in on 0-XA-55-12B.

Which ONE (1) of the following describes the effects of loss of power to 0-RM-90-118?

A. 0-RCV-90-119 will close, the ABGTS fan will stop, and 0-FIC-90-119 must be set to zero, at local panel 0-L-2, prior to reopening 0-RCV-90-119.

B. 0-RCV-90-119 must be manually closed at local panel 0-L-2 to terminate the release, the ABGTS fan will stop, and 0-FIC-90-119 must be set to zero prior to reopening 0-RCV-90-119.

C. 0-RCV-90-119 will close, the ABGTS fan will remain running, and 0-FIC-90-119 must be set to zero, at local panel 0-L-2, prior to reopening 0-RCV-90-119.

D. 0-RCV-90-119 must be manually closed at local panel 0-L-2 to terminate the release, the ABGTS fan will remain running, and 0-FIC-90-119 automatically resets to zero so 0-RCV-90-119 can be reopened.

58. Given the following plant conditions and information:
    - Unit 1 is at 210°F and is being cooled down for a refueling outage
    - RCDT pump A is being used to lower level in the RCDT
    - Alarm "1-RA-277A RCDT Hi Rad" just came in on panel 1-XA-55-30

    For information:
    - 1-RM-90-277 is "RCDT Post Accident Area Radiation Monitor"
    - 1-FCV-77-9 is " Train B, RCDT pumps discharge isolation valve"
    - 1-FCV-77-10 is "Train A, RCDT pumps discharge isolation valve"

Which ONE (1) of the following describes the effect of this alarm?

A. Both RCDT pumps discharge isolation valves will close to terminate flow out of the containment.

B. Both RCDT pumps discharge isolation valves will close to terminate flow to the Reactor Building Floor and Equipment drain sump.

C. Only one of the RCDT pumps discharge isolation valves will close to terminate flow out of the containment.

D. Only one of the RCDT pumps discharge isolation valves will close to terminate flow to the Reactor Building Floor and Equipment drain sump.

59. Given the following plant conditions:
    - Unit 1 is operating at 100% RTP
    - While transporting a container of radioactive liquid, a spill occurrs in the Auxiliary Building near the Unit 1 CCS heat exchanger
    - The spill was reported to the operating crew by Radcon
    - Radiation Monitor 1-RM-90-6 is trending up but has not yet alarmed

Which ONE (1) of the following describes the best method for the operating crew to determine 1-RM-90-6 alarm setpoint?

A. Use 0-SO-90-5, Area Radiation Monitors

B. Use Tech Spec section 3/4.3.3.3.1 Radiation Monitoring Instrumentation

C. Use Annunciator Response Manual 0-AR-M12-A

D. Call instrument maintenance personnel and have them look in the setpoint and scaling document.

60. Which ONE (1) of the following combinations represents the RCS leak detection systems that are required to be OPERABLE during Mode 3 operations?

1. Upper containment atmosphere gaseous radioactivity monitor
2. Vessel flange leakoff temperature monitor
3. Containment purge air radioactivity monitor
4. Containment pocket sump level monitor
5. Lower containment atmosphere gaseous radioactivity monitor
6. Lower containment atmosphere particulate radioactivity monitor

A. 1, 2 & 5

B. 1, 3 & 4

C. 2, 3 & 6

D. 4, 5 & 6

61. Given the following plant conditions:
    - Unit 2 was operating at 100% power
    - A large break LOCA occurred
    - Automatic reactor trip and Safety Injection occurred

Which ONE (1) of the following conditions would indicate an ECCS system misalignment during the injection phase?

A. The Charging Pump Injection Tank discharge valves FCV-63-25 and FCV-63-26 are OPEN.

B. Charging line isolation valves FCV-62-90 and FCV-62-91 are OPEN.

C. The Volume Control Tank outlet valves are CLOSED.

D. Charging pump mini-flow valves are CLOSED.

62. Given the following plant conditions:
    - All controls are in automatic
    - PT-68-322, PZR pressure transmitter, had previously failed and all actions of AOP-I.04 are complete
    - Pressure control is selected for PT-68-340 & 334
    - PT-68-340 fails high
    - The PZR Pressure Control System operates as designed after this failure

Which ONE (1) of the following describes the response of the PZR PORVs for this event? (Assume NO operator action.)

A. PCV-68-340 opens, then closes at 2315 psig actual PZR pressure, decreasing.

B. PCV-68-340 opens, then does not close at 2315 psig actual PZR pressure, decreasing.

C. PCV-68-340 and PCV-68-334 opens, then closes at 2315 psig actual PZR pressure, decreasing.

D. PCV-68-340 and PCV-68-334 opens, then does not close at 2315 psig actual PZR pressure, decreasing.

63. Given the following plant conditions:
    - All pressurizer control systems are in NORMAL configuration.
    - A failure in the pressurizer Level Control system results in the following conditions:
        - FCV-62-93 "charging flow control valve"- full open.
        - "PRZR LVL LOW HEATERS OFF & LETDOWN SECURED - alarm actuated.
        - PZR heaters - deenergized.
        - All orifice valves - closed.
        - Letdown isolation valve FCV-62-69 - open.
        - Letdown isolation valve FCV-62-70 - closed.

Which ONE (1) of the following failures would cause the above conditions?

A. Channel I Level Transmitter has failed low.

B. Channel II Level Transmitter has failed low.

C. A Channel I bistable failed to actuate.

D. A Channel II bistable failed to actuate.

64. Which ONE (1) of the following describes separtion of control/indication components from RPS/ESFAS components for pressurizer pressure transmitter instrument loop PT-68-340?

A. Starting at the transmitter, the RPS/ESFAS bistables are located first in the loop. Control/indication components are located downstream of isolation amplifiers to provide separation.

B. Starting at the transmitter, pressurizer control/indication components are located first in the loop. RPS/ESFAS bistables are located downstream of isolation amplifiers to provide separation.

C. Separation between control/indication and protective components is provided by having all components in this loop qualified to the RPS/ESFAS standards.

D. Separation between control/indication and protective components is provided by having a completely independent instrument loop for each that begins at the pressure transmitter.

65. Which ONE (1) of the following describes how positive reactivity addition is minimized during a continuous rod withdrawal event?

A. Increasing the Rod Insertion Limit (RIL) as power increases.

B. Adjusting the positive rate reactor trip set point well below Tech Spec allowable values.

C. Maintaining the controlling bank slightly above the RIL to provide immediate negative reactivity.

D. Keeping rods well out of the core and above the rod insertion limit.

66. Given the following plant conditions:

- The plant is operating at 10% power during a startup
- S/G level control is in automatic on bypass regulating valves
- A significant leak develops in the reference leg for LT-3-174, S/G level input to FCV-3-35A for #1 S/G
- The condensing pot is unable to keep up with the leak.

Which ONE (1) of the following describes the response of the plant (assuming no operator action)?

A. The #1 S/G level will increase but MFP speed will decrease to prevent going above the S/G Hi-Hi trip setpoint.

B. The #1 S/G level will decrease but MFP speed will increase to prevent going below the S/G Lo-Lo trip setpoint.

C. The reactor will trip on S/G Lo-Lo level.

D. The turbine will trip on S/G Hi-Hi level.

67. Given the following plant conditions:
    - LOCA inside containment has occurred
    - Containment pressure is 4.8 psid
    - Containment sump level is 52%
    - ECCS is operating in the Recirculation Mode
    - Both containment spray pumps are in service

Which ONE (1) of the following describes the design features that prevent debris from plugging containment spray nozzles?

A. Water entering the sump must flow over an elevated curb and containment spray pump discharge strainers located in the 690' pipe chase.

B. Containment spray pump discharge strainers located in the 690' pipe chase and screens covering the two 14 " drain holes in the refueling cavity (upper to lower containment drains).

C. Screens covering the two 14 " drain holes in the refueling cavity (upper to lower containment drains) and a sloping grated screen over the sump opening.

D. Water entering the sump must flow over an elevated curb and a sloping grated screen over the sump opening.

68. Given the following plant conditions:
    - Unit 1 is in Mode 4.
    - A containment purge is in progress in preparation for refueling.
    - During a maintenance activity, RM-90-130 was placed and held in the source check postion WITHOUT placing HS-90-136A1 in the RM-90-130 position.

Which ONE (1) of the following describes the response of the containment purge system to these conditions?

A. Only Train A containment purge isolation valves isolate.

B. Only Train B containment purge isolation valves isolate.

C. Neither Train A or B containment purge isolation valves isolate.

D. Both Train A and B containment purge isolation valves isolate.

69. Given the following plant conditions:
    - Refueling outage is in progress for Unit 2
    - Unit 2 core offload is complete
    - New fuel has been place in the Spent Fuel Pit (SFP) in preparation for core reload.

Which ONE (1) of the following would occur if the SFP was slowly diluted from a boron concentration of 2000 ppm boron to zero ppm boron?

A. Reduce SDM until criticality occurs in SFP.

B. Reduce SDM but criticality would not occur in SFP.

C. Increase Keff of SFP causing increased decay heat generation.

D. Increase Keff of SFP causing a neutron radiation hazard on the operating floor.

70. Given the following plant conditions:
    - Unit 1 is operating at 50% power
    - The # 1 SG controlling pressure transmitter fails HIGH

Which ONE (1) of the following describe the INITIAL feedwater flow response AND the correct operator action?

A. The feedwater flow would decrease due to the failure of the steam pressure input to the steam flow signal AND the operator should place the # 1 SG LCV in Man and restore feedflow to match steam flow.

B. The feedwater flow would increase due to the failure of the steam pressure input to the steam flow signal AND the operator should place the # 1 SG LCV in Man and restore feedflow to match steam flow.

C. The feedwater flow would decrease due to the failure of the steam pressure input to the steam flow signal AND the operator should leave the # 1 SG LCV in Auto because SG level is the dominant control signal and will restore feedflow to match steam flow.

D. The feedwater flow would increase due to the failure of the steam pressure input to the steam flow signal AND the operator should leave the # 1 SG LCV in Auto because SG level is the dominant control signal and will restore feedflow to match steam flow.

71. Given the following plant conditions:
    - Unit 1 is operating at 100% power.
    - The turbine building AUO is working with maintenance in the 2C MSR doghouse.
    - The 2C MSR doghouse is designated as an area sensitive to portable radio operation.

Which ONE (1) of the following describes a correct method of communication between the Main Control Room operator and the Turbine building AUO in the MSR doghouse?

A. A radio with a white antenna may be used for two way communication ONLY if it is >1 meter from sensitive equipment.

B. A radio with a black antenna may be used for two way communication ONLY if it is >1 meter from sensitive equipment.

C. A radio with a black antenna may be used for receiving ONLY.

D. A radio with a white antenna may be used for transmission ONLY.

72. Given the following plant conditions:
    - Unit 2 is at 60% power
    - Condenser vacuum pumps A and B are in service
    - Condenser vacuum pump C is in standby
    - Condenser inleakage is 17 SCFM
    - Condenser backpressure is 0.9 psia
    - Condenser vacuum pump B just tripped

Which ONE (1) on the following describes the effect of this pump trip on the condenser and unit operation?

A. Tripping B condenser vacuum pump will not have any effect on condenser operation, because this air inleakage is within the capacity of one condenser vacuum pump.

B. Condenser backpressure would increase and condenser vacuum pump C would automatically start.

C. Condenser backpressure would increase and XA-55-4A window E-6 "C-9 CONDENSER INTERLOCK" light will go out.

D. Condenser backpressure would increase, megawatt load will decrease and the turbine would trip on low vacuum.

73. Which ONE (1) of the following statements correctly describe the requirement(s) for safety grounds when used on plant equipment, in conjunction with a clearance?

A. Prior to being issued a clearance, the person responsible for the work MUST ensure all safety grounds have been placed and numbered ground discs attached as required.

B. After a clearance released, the person responsible for the work MUST ensure all safety grounds have been removed and numbered ground discs returned to their storage cabinet.

C. Operations personnel picking up a clearance on the 6.9 KV Unit Board are REQUIRED to open the compartment doors and verify removal of three phase ground wires.

D. Three-phase grounds require a disc on the ground side of each phase except where a single device provides a 3-phase ground.

74. Given that: EI-57-92 indicates amp flow for 125V DC Vital Battery # 1.

Which ONE (1) of the following describe the relationship between the Vital Battery # 1 and Vital Battery charger # 1?

A. Negative 20 amps indicated on EI-57-92 indicates amp flow into the battery from the charger.

B. Negative 20 amps indicated on EI-57-92 indicates amp flow out of the battery to the 125V DC Vital Battery Board # 1.

C. Positive 20 amps indicated on EI-57-92 indicates amp flow into the battery from the charger.

D. Direction of amp flow cannot be determined using EI-57-92 because amp flow is independent of direction.

75. Given the following plant conditions:
    - Unit 1 was operating at 100% power.
    - A Loss of Offsite Power occurred.
    - All four diesel generators started and connected to their shutdown boards.
    - 1A-A diesel generator automatic voltage regulator FAILS to respond as loads are sequenced on to the 1A-A shutdown board.

Which ONE (1) of the following describes the effects of this failure on ESF equipment powered from the 1A-A shutdown board?

A. Voltage adjustments WILL be made by the operator after selecting manual voltage control; no significant effect on ESF equipment.

B. The degraded voltage relays WILL NOT load shed ESF equipment because they are removed from service following an emergency start.

C. When voltage drops to degraded voltage relays setpoint, ESF equipment WILL load shed.

D. Shutdown board voltage WILL NOT drop to degraded voltage setpoint as long as DG load is maintained <4000 KW.

76. Given the following information:
    - Work is to be performed in a high radiation area.
    - Dose rate in the work area as 1.2 R/hr.
    - Worker's maximum dose is 200 mRem.

Which ONE (1) of the following describes the maximum work time for the workers without exceeding the their maximum dose?

A. 100 minutes

B. 10 minutes

C. 6 minutes

D. 1.67 minutes

77. Given the following plant conditions:
    - Both units were operating at 100% power.
    - A failure of Chickamaugea Dam locks causes river level at the plant to decrease to the 667' elevation.

Which ONE (1) of the following components will be lost and require procedural guidance to restore the feature?

Loss of cooling water :

A. to the auxiliary control air compressors.

B. to the ice condenser chiller packages.

C. control building electrical board room air conditioner units.

D. 480V Shutdown Board room 1A-A and 2A-A air conditioner units.

78. Given the following plant conditions:
    - Air receiver #1 pressure is 99 psi and steady
    - Air receiver #2 Pressure is 100 psi and steady
    - Service air receiver pressure is 78 psi and decreasing

Which ONE (1) of the following describes the cause of decreasing service air receiver pressure?

A. Loss of compressors C & D sequencer power.

B. Loss of compressors A & B unloader power.

C. Compressors A & B local control switches were placed in Safe Stop.

D. Loss of power to isolation valve 0-PCV-33-4.

79. Given the following plant conditions:
    - High pressure fire protection water spray was used to extinguish a fire in the turbine building.
    - During fire fighting activities, a large volume of water was sprayed directly on a 480V limit torque motor operated valve (MOV).

Which ONE (1) of the following is correct regarding water damage to this MOV?

A. No damage. Limit torque motors and valve position limit switches are in sealed water tight housings to prevent water from contacting electrical components.

B. No damage. Water may enter the housing that surround the motor and limit switches, however, electrical components are designed to operate submerged in water.

C. Potential damage. Valve position limit switches are in sealed water tight housings to prevent water from contacting electrical components, however, limit torque motors are not sealed and spray water contacting the motor windings could cause a short and damage the motor.

D. Potential damage. Limit torque motors are sealed to prevent water from contacting the motor, however, valve position limit switches are located outside the sealed housing and shorted out limit switches could cause inadvertent component operation.

80. Which ONE (1) of the following describes the method(s) used to cool the Pressurizer Relief Tank (PRT)?

A. Spray from Primary Water into the top of the PRT and drain to the Reactor Coolant Drain Tank (RCDT) pump suction line.

B. Spray from Primary Water into the bottom of the PRT and drain directly to the Reactor Coolant Drain Tank (RCDT).

C. Spray from CVCS charging line into the top of the PRT and drain to the Reactor Coolant Drain Tank (RCDT) pump suction line.

D. Spray from CVCS charging line into the bottom of the PRT and drain directly to the Reactor Coolant Drain Tank (RCDT).

81. Given the following plant conditions:
    - Unit 1 is operating at 100% power.
    - CCS surge tank level was increasing but is now stable.
    - "1-RA-90-123A CCS LIQ EFF MON HIGH RAD" Alarm is LIT.
    - Surge tank vent valve is closed.

Which ONE (1) of the following describes the control board indications that are consistent with the above conditions?

The thermal barrier containment isolation inlet and outlet valves:

A. to the affected RCP close (the non-affected RCPs isolation valves remain open), and the thermal barrier booster pumps trip.

B. to the affected RCP close (the non-affected RCPs isolation valves remain open), the inlet and outlet CCS valves to the RCP oil coolers close, and the thermal barrier booster pumps continue to run with miniflow valves open.

C. to all 4 RCPs close, the inlet and outlet CCS valves to the RCP oil coolers remain open, and the thermal barrier booster pumps trip.

D. to all 4 RCPs close, the inlet and outlet CCS valves to the RCP oil coolers are not affected, and the thermal barrier booster pumps continue to run with miniflow valves open.

82. Given the following plant conditions:
    - Unit 1 is in a refueling outage
    - Core unloading is in progress

Which ONE (1) of the following describes the movement of a fuel assembly from the reactor core to the Rx side upender?

A. The manipulator crane bridge travels South (right) until out of the core region. Then the trolley travels East(forward) to the cavity wall. Then the bridge travels South (right) to the upender.

B. The manipulator crane trolley travels South (right) until out of the core region. Then the bridge travels East (forward) to the cavity wall. Then the trolley travels South(right) to the upender.

C. The manipulator crane trolley moves East (forward) to cavity wall. Then the bridge travels South (right) to the upender.

D. The manipulator crane bridge travels South (right) until it aligns with the upender. Then the trolley travels East (forward) to the upender.

83. Given the following plant conditions:
    - Unit 1 is in Hot Standby following controlled shutdown.
    - Tavg is 547°F.
    - RCS pressure is 2235 psig.
    - Cooldown has been just been initiated using steam dumps in pressure mode.
    - One steam dump valve fails full open.
      Loop #2 S/G MSIV fails to close.
    - No other operator action is taken.

Which ONE (1) of the following describes the plant response as a result of these conditions?

A. An SI and Steamline isolation will be generated from a low steamline pressure signal (rate sensitive).

B. An SI and Steamline isolation will be generated from a high negative steamline pressure rate signal.

C. A Steamline isolation will be generated from a high negative steamline pressure rate signal.

D. A Steamline isolation signal will be generated on high steam flow coincident with low steamline pressure.

84. Given the following plant conditions and information:
- Unit 1 is at 16% power and a startup to 100% power is in progress.
- "GEN STATOR COOL SYS FAILURE" alarm just came in on panel 1-XA-M1-A.

For information:
- Turbine generator trips from the stator cooling system have a 15% built in load reference.

Which ONE (1) of the following describes the source of the load reference signal?

A. Generator full load amps.

B. Main turbine impulse pressure.

C. Auctioneered high NIS power range signal.

D. "B" LP Turbine steam inlet pressure.

85. Given the following plant conditions and information:
    - Unit 1 was operating at 100% power
    - A Safety Injection just occurred on Unit 1

    For information:
    - 0-FCV-67-152 is the CCS HX 0B1 and 0B2 outlet valve
    - 1-FCV-67-146 is the CCS HX 1A1 and 1A2 outlet valve

Which ONE (1) of the following describes the operation of the ERCW outlet valves from the CCS heat exchangers as a result of the SI signal?

A. 0-FCV-67-152 automatically goes to the full open position.
   1-FCV-67-146 automatically goes to the full open position.

B. 0-FCV-67-152 automatically goes to the 35% position.
   1-FCV-67-146 automatically goes to the 35% position.

C. 0-FCV-67-152 automatically goes to the 35% position.
   1-FCV-67-146 remains in it's current position.

D. 0-FCV-67-152 remains in it's current position.
   1-FCV-67-146 automatically goes to the 35% position.

86. Given the following plant conditions:
    - Both units were operating at 100% power.
    - A loss of offsite power occurred.
    - Both units automatically shutdown.
    - All four DG started and energized their respective shutdown boards.

Which ONE (1) of the following describes the required actions to restore the air system service?

A. No action is necessary, air compressors A, B, C, and D will be sequenced back on by the Blackout Sequencer.

B. Air compressors A, B, C, and D can be reset and started locally at any time.

C. Air compressors A and B can be reset and started locally at any time.

D. Air compressors A and B can be reset and started locally after the Blackout Relays are reset.

87. Which ONE (1) of the following describes the system isolation / component actuations that will occur upon MANUAL actuation of 2-HS-30-68A and 2-HS-30-68B, Phase B Actuation handswitches?

A. Main Steam Isolation Valves will close.

B. Emergency Gas Treatment Fans will start.

C. CVCS Excess Letdown out of containment will close.

D. Containment Spray Pump 2A-A Room Cooler will start.

88. Engineering has developed a graph of VCT Level versus VCT pressure that will be used as an Operator Aid.

Which ONE (1) of the following positions represents the MINIMUM level of approval for posting this as an operator aid?

A. Any individual holding a Senior Reactor Operator license.

B. Shift Manager

C. Operations Manager

D. Plant Manager

89. Given the following plant conditions:
    - Unit 1 Reactor Power is 13%
    - The main turbine is latched and ready for rolling
    - HP turbine inlet metal temperature is 160°F
    - LP turbine inlet metal temperature is 100°F

Which ONE (1) of the following describes the turbine-generator acceleration and loading restrictions?

A.
- 47 minutes to roll from 0 rpm up to 1800 rpm (± 2 min)
- 83 minutes hold at 5% load (± 2 min)
- 176 minutes to increase load from 5% to 100% (± 2 min)

B.
- 47 minutes to roll from 0 rpm up to 1800 rpm (± 2 min)
- 36 minutes hold at 5% load (± 2 min)
- 93 minutes to increase load from 5% to 100% (± 2 min)

C.
- 23 minutes to roll from 0 rpm up to 1800 rpm (± 2 min)
- 53 minutes hold at 5% load (± 2 min)
- 145 minutes to increase load from 5% to 100% (± 2 min)

D.
- 23 minutes to roll from 0 rpm up to 1800 rpm (± 2 min)
- 30 minutes hold at 5% load (± 2 min)
- 92 minutes to increase load from 5% to 100% (± 2 min)

90. Unit 1 is presently in a power ascension per 0-GO-5, "Normal Power Operation." The unit is at 40% load and condenser backpressure is at 4 psia. The Unit Supervisor has stated that "If condenser backpressure cannot be restored to < 2.7 psia within 5 minutes, then trip the reactor."

Which ONE (1) of the following correctly describes the basis for this statement?

A. To prevent high vibratory stresses and fatigue damage to the last stage turbine blading.

B. To ensure adequate heat sink.

C. To prevent the affects of #3 governor valve vibration.

D. To prevent exceeding turbine differential expansion limits

91. Which ONE (1) of the following describes the Main Generator output voltage for Units 1 and 2?

	Unit 1	Unit 2
A.	500KV	500KV
B.	161KV	500KV
C.	161KV	161KV
D.	500KV	161KV

92. Which ONE (1) of the following would require a TACF per SPP-9.5 "Temporary Alterations?"

A. An annunciator is temporarily disabled.

B. A temporary pressure indicator is installed on the discharge of the 1A CCP.

C. A temporary repair is made by furmanite on a steam valve near the MFPT.

D. A temporary scaffold is erected blocking a fire door in the auxiliary building.

93. Which ONE (1) of the following explains when a clearance may be released, by the SM, with persons still holding that clearance per SPP-10.2? "Clearance Program?"

A. Plant emergency conditions exist when immediate action is needed to protect the health and safety of the public and plant personnel.

B. The Radiological Emergency Plan is implemented and the Site Emergency Director authorizes the release.

C. A National Emergency exists as defined in 10 CFR 50.54.

D. The clearance is on a 161KV or 500KV breaker and the CLD can't be contacted.

94. Which ONE (1) of the following must authorize emergency dose limits in accordance with EPIP-15?

A. Radcon Superintendent

B. Shift Manager

C. Plant Manager

D. Site Emergency Director

95. Which ONE (1) of the following statements is correct concerning the SQN ALARA program?

A. The SQN Plant Manager must approve all lower containment entries inside the polar crane wall when the unit is in Mode 1.

B. The SQN Site Vice President must approve all lower containment entries inside the polar crane wall when the unit is in Mode 1 or 2.

C. The SQN Plant Manager must approve all lower containment entries inside the polar crane wall when the unit is in Mode 1 or 2.

D. The SQN Site Vice President must approve all lower containment entries inside the polar crane wall when the unit is in Mode 1.

96. 0-SO-30-3 contains the following precaution: "IF operating the containment purge system in Mode 5 or 6 WHILE the other unit is in MODES 1 through 4 THEN, an operator shall be available to stop the containment purge system in the event of an ABI."

Which ONE (1) of the following describes the basis for this precaution?

A. During containment purge system operation with the unit in MODE 5 or 6 its isolation function on a high rad condition is blocked and an operator is required to isolate the system.

B. The volume of air, that could pass from the unit being purged to the ABSCE via the containment purge fans and the open blast doors, would exceed the capacity and design basis of the EGTS.

C. The volume of air, that could pass from the unit being purged to the ABSCE via the containment purge fans and the open blast doors, would exceed the capacity and design basis of the ABGTS.

D. During MODE 5 and 6 operations the purge system dampers are blocked to prevent unnecessary automatic closure on spurious signals, the operator is required to shutdown the fans in the event of a valid isolation signal.

97. Which ONE (1) of the following symptoms would REQUIRE the initiation of a manual reactor trip AND safety injection if neither had occurred automatically?

A. Containment pressure = 1.0 psig and stable.

B. Steam generator pressure = 690 psig and stable, all SG levels = 25%.

C. Pressurizer pressure = 1850 psig and stable, pressurizer level = 40%.

D. High steam flow (> programmed setpoint) and LoLo Tavg on 2/4 RCS loops.

98. Given the following plant conditions:
    - Unit 1 was operating at 100% RTP
    - Manual reactor trip and SI due to a small-break LOCA
    - During performance of E-0, "Reactor trip or Safety Injection", a Phase B Isolation occurred at 2.81 psid containment pressure
    - RCPs are stopped
    - Adverse Containment values are used during the performance of E-1 and ES-1.2, "Post LOCA Cooldown".
    - Containment pressure is 1.9 psid and decreasing.
    - Containment spray system is placed in standby

Which ONE (1) of the following is the appropriate method to return to normal containment instrument values in the EOPs?

A. Whenever containment pressure decreases below 2.81 psid.

B. Whenever containment pressure decreases below 2.0 psid.

C. Use adverse containment values unless a TSC evaluation supports otherwise.

D. Use adverse containment values until transition to a normal plant operating procedure.

99. Given the following plant conditions:
    - Unit 2 is operating at 100% RTP.
    - Channel A annunciators are inoperable due to scheduled maintenance in the 3KVA annunciator inverter cabinet.
    - All other plant parameters are normal.
    - Window 32 "ANN DIAGNOSTIC ERROR" on 2-XA-55-6D is half lit.
    - All channel A annunciator windows are dark.
    - Two hours after shift change the OATC notices all lit channel B annunciator windows change to the dark condition.

Which ONE (1) response below describes the proper operating crew action which should be performed for the given conditions.

A. Perform AOP-P.O8, "Loss Of Control Room Annunciators."

B. Perform 2-AR-M6-D, "Annunciator Response", corrective actions, THEN GO TO AOP-P.08, "Loss Of Control Room Annunciators."

C. Perform 0-PI-OPS-301-001.0, "Plant Computer Point Disablement", section 6.1.2 step [6] to reset channel B annunciator system.

D. Perform 0-SO-55-1, "Annunciator System", section 8.2 for determination of channel failure.

100. Given the following plant conditions:
- Unit 2 is operating at 100% RTP
- Condenser Vacuum Pump air exhaust monitor high Radiation alarm come in
- PZR level chart recorder indicates a slight decrease in level trend, followed by a return to normal
- RCS leak calculation shows RCS leakage has increased by 9 gpm
- The affected SG has been identified

Which ONE (1) of the following describes the NEXT operation required by the crew?

A. Commence plant shutdown and be in HOT STANDBY within 10 hours.

B. Shut the MSIV on the affected S/G and commence plant shutdown.

C. Isolate blowdown from the affected S/G to prevent contamination and continue power operation.

D. Increase S/G blowdown from the affected S/G to remove any radioactivity accumulation and continue power operations.

Test Name: RO.TST
Test Date: Friday, June 16, 2000

		Question ID		Type	Pts	Answer(s) 0	1	2	3	4	5	6	7	8	9
1:	1	005 AK2.02	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	2	015 AA2.02	001	MC-SR	1	B	B	B	B	B	B	B	B	B	B
1:	3	W/E09 EK2.2	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	4	024 AA2.02	001	MC-SR	1	B	A	B	C	D	A	B	C	D	A
1:	5	026 AA2.01	001	MC-SR	1	A	A	A	A	A	A	A	A	A	A
1:	6	027 AA1.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	7	040 AK2.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	8	W/E08 EA1.1	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	9	051 AK3.01	001	MC-SR	1	B	B	B	B	B	B	B	B	B	B
1:	10	055 EK3.02	001	MC-SR	1	A	A	A	A	A	A	A	A	A	A
1:	11	057 AK3.01	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	12	062 AA1.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	13	067 AK1.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	14	069 AK2.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	15	074 EK2.05	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	16	076 AA2.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	17	001 AA2.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	18	003 AA2.03	001	MC-SR	1	D	B	C	D	A	B	C	D	A	B
1:	19	007 2.4.6	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
	20	008 AA2.13	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	21	009 2.4.16	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	22	W/E04 2.4.4	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	23	W/E03 EK3.1	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	24	W/E11 EA1.1	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	25	W/E02 EK2.2	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	26	022 2.1.20	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	27	025 AK1.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	28	032 AK1.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	29	037 AK3.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	30	038 EA2.13	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	31	W/E05 EK2.1	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	32	058 AA2.01	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	33	W/E16 EK3.3	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	34	028 AK1.01	001	MC-SR	1	A	A	A	A	A	A	A	A	A	A
1:	35	036 AK3.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	36	056 AA1.07	001	MC-SR	1	C	C	C	C	C	C	C	C	C	C
1:	37	001 K6.03	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	38	001 A3.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	39	003 K2.01	001	MC-SR	1	D	D	D	D	D	D	D	D	D	D
1:	40	003 K4.04	001	MC-SR	1	B	B	B	B	B	B	B	B	B	B
1:	41	004 K6.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
	42	004 A4.04	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	43	013 K2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	44	015 K3.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	45	017 A4.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A

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		Question ID		Type	Pts	Answer(s) 0	1	2	3	4	5	6	7	8	9
1:	46	022 K1.01	001	MC-SR	1	D	D	D	D	D	D	D	D	D	D
1:	47	022 2.2.11	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	48	025 K1.01	001	MC-SR	1	C	C	C	C	C	C	C	C	C	C
1:	49	025 A3.01	001	MC-SR	1	C	C	C	C	C	C	C	C	C	C
1:	50	056 A2.04	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	51	056 2.1.20	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	52	059 K1.04	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	53	059 A4.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	54	061 A1.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	55	061 A2.03	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	56	068 A2.04	001	MC-SR	1	C	C	C	C	C	C	C	C	C	C
1:	57	071 A2.05	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	58	072 A1.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	59	072 A4.01	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	60	002 A3.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	61	006 K4.24	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	62	010 A4.03	001	MC-SR	1	B	B	B	B	B	B	B	B	B	B
1:	63	011 A2.11	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	64	012 K4.09	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
	65	014 A1.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	66	016 K3.12	001	MC-SR	1	C	C	C	C	C	C	C	C	C	C
1:	67	026 K4.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	68	029 A3.01	001	MC-SR	1	A	A	A	A	A	A	A	A	A	A
1:	69	033 K4.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	70	035 A2.04	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	71	039 2.1.16	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	72	055 K3.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	73	062 2.2.13	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	74	063 A4.03	002	MC-SR	1	A	D	A	B	C	D	A	B	C	D
1:	75	064 K3.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	76	073 K5.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	77	075 A2.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	78	079 K1.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	79	086 K5.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	80	007 K4.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	81	008 K1.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	82	034 K4.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	83	041 K3.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	84	045 A3.04	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	85	076 A1.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	86	078 K2.01	001	MC-SR	1	C	A	B	C	A	B	C	A	B	C
	87	103 K4.06	001	MC-SR	1	D	D	D	D	D	D	D	D	D	D
1:	88	G2.1.1	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	89	G2.1.25	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	90	G2.1.32	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B

Test Name: RO.TST
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		Question ID		Type	Pts	Answer(s) 0	1	2	3	4	5	6	7	8	9
1:	91	G2.2.3	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	92	G2.2.11	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	93	G2.2.13	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	94	G2.3.1	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	95	G2.3.2	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	96	G2.3.9	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	97	G2.4.2	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	98	G2.4.17	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	99	G2.4.32	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	100	G2.4.47	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information	
Name:	Region: II
Date:	Facility/Unit: TVA Sequoyah
License Level: SRO	Reactor Type: W
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____
Applicant's Signature

Results	
Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

1. Given the following plant conditions:
   - Unit 1 at 95% power and is responding to continuous rod withdrawal.
   - AOP-C.01 was entered and the crew transitioned to AOP-C.02.
   - AOP-C.02 directs the control room operator to check for evidence of boration flow.

   Which ONE (1) of the following will provide indications of flow through emergency borate valve (FCV-62-138)?

   -Flow indicated on emergency borate flow indicator, FI-62-137A AND:

   A. -Red light on handswitch for FCV-62-138 on Panel M-6, LIT
      -Flow indicated on emergency borate flow indicator, FI-62-137B

   B. -Red light on handswitch for FCV-62-138 on Panel M-6, LIT
      -NO flow indicated on emergency borate flow indicator, FI-62-137B

   C. -Green light on handswitch for FCV-62-138 on Panel M-6, LIT
      -Flow indicated on emergency borate flow indicator, FI-62-137B

   D. -Green light on handswitch for FCV-62-138 on Panel M-6, LIT
      -NO flow indicated on emergency borate flow indicator, FI-62-137B

2. Given the following plant conditons:
   - Unit 1 is operating at 68% RTP.
   - The control rods are in manual
   - The crew is responding to a "Full Length Rods on Bottom" alarm
   - Control rod M4 RPI indicates zero
   - The reactor did not trip

   Which ONE (1) of the following sets of parameters describes the effect of this malfunction?

   A. Delta I for N41 will change from +1% to -2%, QPTR will remain the same, and Delta T for all loops will decrease from 68% to 64% and remain at 64%.

   B. Delta I for N41 will change from +1% to -2%, QPTR will remain the same, and Delta T for all loops will not change.

   C. Delta I for all NIS channels will not change, QPTR will change from 1.001 to 1.015, and Delta T for all loops will decrease from 68% to 64% and remain at 64%.

   D. Delta I for all NIS channels will not change, QPTR will change from 1.001 to 1.015, and Delta T for all loops will decrease from 68% to 64% and return to 68%.

3. Given the following plant conditions:
   - Unit 2 is operating at 95% reactor power.
   - The crew is recovering from a control rod misalignment.
   - Control rod M8 is 15 steps lower than the other rods in control bank D.
   - M8 rod has been misaligned for 20 minutes
   - Reactor engineering has determined that no restrictions exist on realignment of M8 rod.
   - The decision has been made to realign control rod M8 with control bank D.

   Which ONE (1) of the following describes the required crew actions in preparation for realignment?

   Disconnect the lift coil(s) for:

   A. the affected GROUP (except M8) and adjust the affected GROUP step counter to the misaligned rod position.

   B. the affected BANK (except M8) and adjust the affected GROUP step counter to the misaligned rod position.

   C. control rod M8 and adjust the affected GROUP step counter to the misaligned rod position.

   D. control rod M8 and adjust both control BANK D step counters to the misaligned rod position.

4. Given the following plant conditions:
   - Unit 1 is in MODE 4 and stable with RHR in service for shutdown cooling.
   - Both trains of RHR are aligned to all 4 loops.
   - A LOCA occurs.
   - RCS subcooling is 55°F.
   - PZR level is 25% and decreasing.
   - RWST level is 55%.

   With regard to RHR, which ONE (1) of the following is correct per AOP-R.02 "Shutdown LOCA"?

   A. Maintain RHR in service and realign RHR suction to the RWST.

   B. Maintain RHR in current alignment, pumps should be stopped only if cavitation occurs.

   C. Immediately stop both RHR pumps until suction can be realigned to RWST.

   D. Immediately realign RHR to the containment sump.

5. Given the following plant conditions:
   - Unit 2 is operating at 100% power when a LOCA outside containment is recognized.
   - The operators initiated safety injected.

   Which ONE (1) of the following best describes the procedure methodology to mitigate this condition?

   A. Once the RWST empties the operator should transfer ECCS pumps to the containment sump.

   B. If the LOCA can not be isolated then transition to the Loss of RHR Sump Recirculation procedure.

   C. Guidance is provided to identify which train of SIS has the LOCA.

   D. If the LOCA can not be isolated then transition to E-1.

6. Given the following plant conditions:
   - Unit #1 has experienced a Reactor Trip and SI.
   - The crew has transitioned to and performed the proper procedures and are currently performing ES-1.1 "SI Termination."
   - The CRO notices that the pressure in #2 Steam Generator is decreasing rapidly out of control and notifies the SRO.

   Which ONE (1) of the following describes the direction the SRO should give the crew?

   A. Close all MSIVs, SG PORVs and isolate Main Feedwater, Auxiliary Feedwater, and S/G blowdown lines.

   B. Transition to E-2, "Faulted Steam Generator Isolation" from the Fold Out Page.

   C. Transition to E-1, "Loss of Reactor or Secondary Coolant" from the Fold Out Page.

   D. Verify all Steam Dumps and Steam Generator PORVs are closed, then close all MSIVs.

7. Given the following plant conditions:
   - Unit 2 is operating at 60% RTP

Which ONE (1) of the following is required following a sustained loss of CCS flow to the RCPs?

A. To continue operation, restore CCS flow within five minutes to the affected Unit.

B. Trip the reactor and all reactor coolant pumps within two minutes

C. Trip the reactor and the affected reactor coolant pumps when motor bearing temperature exceeds $180^{O}F$.

D. Reduce CCS loads and increase seal injection flow if power is greater than 10%.

8. Given the following plant conditions:
   - A reactor trip has occurred on Unit 1 due to a loss of offsite power.
   - The crew is performing the actions of ES-0.2, Natural Circulation Cooldown.
   - When adjusting steam dumping rate to control natural circulation, the operators also adjust AFW flow to all of the S/Gs.

Which ONE (1) of the following explains why narrow range level is maintained in all S/Gs?

A. To maintain symmetric cooling of the RCS for decay heat removal.

B. To flood all SGs for subsequent entry into Mode 5.

C. SG wide range level indication is lost on loss of offsite power.

D. Top of SG tubes on all SGs must be covered for natural circulation to occur.

9. Given the following plant conditions:
   - The operating crew is responding to a reactor trip without Safety Injection using appropriate emergency procedures.
   - Reactor coolant pumps are running
   - Core burnup is 15,000 MWD/MTU

Which ONE (1) of the following describes conditions that require Emergency Boration?

A. Tavg is 544 degrees and decreasing following closure of the steam dump and atmospheric relief valves.

B. Tavg is 537 degrees and continuing to decrease with all rods fully inserted.

C. Control rod C5 RPI is indicating 90 steps withdrawn and control rod M8 RPI is indicating 11 steps withdrawn. All other RPIs indicate zero steps.

D. Control rod H4 RPI is indicating 224 steps withdrawn. All other RPIs indicate zero steps.

10. Given the following plant conditions:
    - Unit 2 in MODE 3 for maintenance
    - Panel 0-XA-55-27B-D Annunciator A-4, MISC EQUIPM SUPPLY HEADER FLOW LOW, starts alarming
    - Panel 0-XA-55-27B-D Annunciator A-6, LETDOWN HX OUTLET FLOW/TEMP ABNORMAL, starts alarming

    Which ONE (1) of the following events could cause both alarms to actuate?

    A. CCS supply header rupture.

    B. Letdown HX tube rupture.

    C. Loss of seal injection.

    D. Loss of charging flow.

11. Given the following plant conditions:
    - Unit 2 was stable at 81% power
    - The following Panel XA-55-5C annunciators have just illuminated:
        - Window A-6 TS-68-2M/N RC LOOPS T AVG/AUCT T AVG DEVN HIGH-LOW
        - Window B-6 TS-68-2/A/B REACTOR COOLANT LOOPS DELTA T DEVN HIGH-LOW
        - Window C-6 TS-68-2P/Q REAC COOL LOOPS T REF T AUCT HIGH-LOW

    Which ONE (1) of the following plant transients could cause these three annunciators to begin alarming at the same time?

    A. Steam line break.

    B. Dropped control rod.

    C. Continuous rod withdrawal.

    D. Turbine runback

12. Unit 1 operators are currently performing FR-S.1 "Nuclear Power Generation/ATWS." The crew is performing step #10 which has them stop any uncontrolled or controlled cooldown.

    Which ONE (1) of the following correctly describes the reason for stopping any cooldown?

    A. To prevent a positive reactivity addition due to a increase in the void content of the reactor coolant system.

    B. To prevent a density decrease in the moderator due to a decrease in reactor coolant temperature.

    C. To prevent a pressure decrease in the moderator due to a decrease in the reactor coolant temperature.

    D. To prevent a positive reactivity addition due to a decrease in reactor coolant temperature.

13. Given the following plant conditions:
    - A LOCA has occurred on Unit 1 and the operating crew has implemented the EOPs.
    - The crew is currently performing E-1, "Loss of Reactor or Secondary Coolant"
    - The STA reports a RED path for FR-P.1, "Pressurized Thermal Shock".

    Which ONE (1) of the following correctly describes the parameter the STA used to make his determination and the reason it was used?

    A. Tcold temperature since it most closely reflects the temperature in the beltline region of the reactor vessel.

    B. Tcold temperature since it most closely reflects the temperature in the core.

    C. Incore thermocouple temperature since it most closely reflects the temperature in the beltline region of the reactor vessel.

    D. Incore thermocouple temperature since it reflects the temperature in the core.

14. Given the following plant conditions:
    - Condenser pressure is at 2.6 psia and steadily increasing.
    - Turbine load is 75%.

Which ONE (1) of the following would be the FIRST to occur OR be procedurally required?

A. Automatic trip of both Main Feedwater pumps.

B. Loss of Steam dump capability.

C. "Condenser Vacuum Low" annunicator lit, requiring a manual turbine trip.

D. Automatic trip of the main turbine.

15. Given the following plant conditions:
    - Units 1 and 2 have experienced a Loss of All AC Power
    - ECA-0.0, "Loss of All AC Power" has been implemented
    - Step 13 directs the crew to place selected equipment in PULL TO LOCK or OFF

    Which ONE (1)of the following describes the reason for placing the equipment in PULL-TO-LOCK or OFF position?

    A. To prevent potential overload of the Shutdown Boards when they are re-energized.

    B. To prevent ECCS pump starting and thermal shock to RCS penetrations.

    C. To prevent ESF pump starts without proper cooling water and auxiliary support equipment available.

    D. To prevent RWST inventory depletion.

16. Given the following plant conditions:
    - Unit 1 has experienced a loss of 120V AC Vital Instrument Power Board 1-I.
    - The operators enter AOP-P.03.

Which ONE (1) of the following correctly identifies actions to be taken per AOP-P.03.

A. Check to see if the Reactor is Tripped. If not THEN continue with AOP-P.03

B. ENSURE the reactor tripped and continue with AOP-P.03

C. Immediately place 1-FIC-3-103 , Main FW Reg Valve, in MANUAL

D. ENSURE the reactor tripped AND GO TO E-0 WHILE continuing in AOP-P.03

17. Which ONE (1) of the following correctly describes the immediate biological effects to a member of the public after an accidental liquid radwaste release.

A. Somatic

B. Genetic

C. Teratogenic

D. Acute

18. Given the following plant conditions:
    - Unit #1 is operating at 100%.
    - All systems aligned normal.
    - Loss ERCW Supply header 2A occurs due to a rupture in the yard.

    Which ONE (1) of the following describes indications the Unit 1 operator would see in the main control room in this event? (Assume no operator actions)

    A. Ice condenser chillers trip.

    B. Containment temperature decreasing.

    C. General ventilation chillers trip.

    D. CCS surge tank level increasing with auto makeup valve closed.

19. Given the following plant conditions:
    - Unit 1 is at 100% power.
    - Unit 2 is in a refueling outage.
    - The shift is fully staffed.

An outage contract worker reports that a Class B fire has just started in the Auxiliary Building.

Which ONE (1) of the following types of fire should the Fire Brigade expect to fight upon arrival at the scene?

A. A fire which involves flammable liquid, oils, or grease.

B. A fire which involves combustible metals.

C. A fire which involves electrical equipment.

D. A fire which involves wood, paper, or cloth.

20. Given the following plant conditions:
    - Unit 1 is at 100% RTP when a decision was made to enter AOP-C.04 "Control Room Inaccessibility".
    - The Reactor Protection System manual handswitches in the Control Room are operated in an attempt to trip the Reactor per Step #1 of AOP-C.04.

Which ONE (1) of the following describes how the Reactor Trip Breaker's trip coils should respond to operation of the manual Reactor-Trip handswitch?

A. The SSPS undervoltage trip coils and the 125V-DC shunt trip coils both deenergize to trip the Reactor.

B. The SSPS undervoltage trip coils deenergize, while the 125V-DC shunt trip coils energize to trip the Reactor.

C. The SSPS undervoltage coils will deenergize and the 125V-DC shunt trip coils are unaffected.

D. The 125V-DC shunt trip coils will energize, while the SSPS undervoltage coils will be unaffected.

21. Which ONE (1) of the following conditions represents a loss of containment integrity per Technical Specifications 3.6.1.1, Containment Integrity?

A. With the reactor at 100% power, an electrician opens the outer airlock door.

B. With the RCS average coolant temperature 250°F, an inspection of the equipment hatch determines that the hatch is NOT sealed.

C. During an operability test of two normally open, redundant containment isolation valves at 100% power, one of the valves fails to close.

D. During an Integrated Leakage Rate Test in Mode 5, containment leakage exceeds the maximum allowable Technical Specification leakage rate.

22. The operating crew entered procedure FR-C.1, "Inadequate Core Cooling." All attempts to establish high pressure Safety Injection flow were unsuccessful. RVLIS lower range level is 28% and dropping slowly, Core Exit Thermocouples are reading 820 degrees F and slowly increasing. Reactor Coolant pumps have been secured.

    Which ONE (1) of the following methods would be the NEXT step in mitigating the core cooling challenge?

    A. Enter the Severe Accident Management Guidelines (SAMGs).

    B. Open available pressurizer PORVs to allow RCS depressurization to the SI accumulator and SI injection pressures.

    C. Depressurize all intact steam generators using Steam dumps or ARVs to 125 psig to allow RCS depressurization to the SI accumulator and SI injection pressures.

    D. Restart one RCP in an idle loop to provide forced two-phase flow through the core.

23. Given the following plant conditions:
    - Unit 1 has operated at 90% RTP for 45 days.
    - Chem lab has been sampling RCS for Iodine every 4 hours for the past 20 hrs.
    - Last RCS activity sample (1 hour ago) was 1.5 microcuries/gram Dose Equivalent Iodine.
    - AOP-R.06 "High RCS Activity" was entered 20 hrs ago.

    Which ONE (1) of the following actions describe the expected recommendation from the chem lab?

    A. Place mixed beds and cation bed demins in service.

    B. Divert letdown flow to Holdup Tank.

    C. Isolate letdown flow.

    D. Reduce power by 15% within one hour and sample for reduced Iodine activity.

24. Given the following plant conditions:
    - Unit 1 is experiencing a degraded core cooling condition.
    - The crew is performing FR-C.2 "Degraded Core Cooling".
    - The operator is directed to check RVLIS indication.

Which ONE (1) of the following best describes the purpose of checking RVLIS.

A. To determine the effectiveness of the safety injection in restoring RCS inventory.

B. The determine if a RCP can be started to provide forced flow.

C. To determine the extent of upper head voiding.

D. To determine if a transition to FR-C.1 is required.

25. Given the following plant conditions:
    - Unit 1 Reactor tripped from 100% power.
    - The crew completed the first 4 steps of E-0 and transitioned to ES-0.1.
    - SI occurred and crew transitioned back to E-0.
    - US is in E-0 at step 9, "Monitor containment spray not actuated".
    - The STA informs the US of a RED PATH on Heat Sink.

Which ONE (1) of the following describes the actions required by the US?

A. Transition immediately to FR-H.1, "Response to Loss of Secondary Heat Sink".

B. Continue with E-0 through the event diagnostic steps and enter FR-H.1 when directed to transition to E-1, E-2, or E-3.

C. Review all CSF's to determine if any higher priority RED paths exist, then immediately transition to highest priority procedure.

D. Transition to FR-H.1 when directed in E-0 at step 14, "determine if secondary HEAT SINK available".

26. Given the following conditions:
    - An automatic reactor trip and safety injection occurred on Unit 2 as a result of decreasing RCS pressure
    - Pressurizer pressure dropped prior to and following the SI
    - RCS average temperature was stable prior to and following the SI
    - Pressurizer level rose prior and following the SI
    - CCP Amp meter indicated decreasing amps and CCP flow meter indicated decreasing flow prior to the SI
    - Reactor power was stable prior to the reactor trip and dropped following the reactor trip

Which ONE (1) of the following accidents would result in these conditions?

A. Steamline break

B. Double-ended hot leg break

C. Stuck open pressurizer safety valve

D. 3 inch break on a RCS cold leg

27. A small break LOCA has occurred and operators have implemented E-0, "Reactor Trip or Safety Injection".

Which ONE (1) of the below statements indicates the basis for tripping the RCPs if minimum RCS pressure is lost and SI flow has been established?

A. Prevent excessive depletion of RCS inventory through a small break leading to severe core uncovery if the RCPs were later tripped.

B. Prevent damage to the RCP seal packages due to possibility of two-phase flow in RCS.

C. Prevent damage to RCP impeller due to cavitation and pitting.

D. To further decrease RCS pressure, enhancing ESF systems ability to inject borated liquid into RCS.

28. During the performance of ES-1.2, "Post-LOCA Cooldown and Depressurization," it is desirable to have only one RCP running.

Which ONE (1) of the following describes the reason for having only one RCP in service?

A. One RCP provides the DELTA-P required to provide letdown. Additional RCPs would add unnecessary heat load.

B. One RCP is desired for spray and RCS heat transport to the SGs. Additional RCPs would add unnecessary heat load.

C. One RCP is needed for RCS heat transport to the SGs. Additional RCPs could overload the electrical power supply.

D. One RCP is desired for spray and RCS mixing. Additional RCPs would strain the plant electrical power supply in the post-LOCA condition.

29. While performing the actions for a Loss RHR Sump Recirculation, a RED path condition is identified for the Containment Status Tree.

    Which ONE (1) of the following reasons describes why the Containment Spray Pumps are operated within the guidelines of ECA-1.1, "Loss of RHR Sump Recirculation" instead of using the guidelines contained in FR-Z.1, "High Containment Pressure."

    A. Ensures that the maximum heat removal system capacity that is available is used to reduce the containment pressure.

    B. ECA-1.1 pump operating criteria is more restrictive, ensuring continuous containment spray system operation to reduce containment pressure.

    C. ECA-1.1 pump operating criteria is less restrictive, permitting reduced containment spray operation to conserve RWST inventory.

    D. Provide a more rapid means of verifying automatic actuation of the containment spray system.

30. Unit 1 control room operators are investigating a possible malfunction of the Reactor Coolant Makeup system based on abnormal indications following an RCS makeup evolution. The RO suspects the controller setting for 1-FC-62-139, Boric Acid Blender Flow Control, may have been set wrong.

Desired boron concentration is 500 ppm
BAT boron concentration at 6820 ppm
Primary water flowrate of 70 gpm
Primary Water boron concentration of 10 ppm
(BAT conc - Desired conc)xRequired B.A. flow = (Desired conc - PW conc)xPW flow

Which ONE (1) of the following would be the most correct setting for 1-FC-62-139?

A. 2.7

B. 5.4

C. 8.7

D. 11.0

31. Which ONE (1) of the following is an indication of vortexing at the suction of the RHR pump during reduced inventory conditions?

A. Erratic pump amps

B. RHR suction relief lifting

C. RHR flow decrease and stable at the lower value

D. Constant pump discharge pressure

32. With the Pressurizer Pressure Control System selected for PT-68-340, Channel I pressure transmitter fails LOW. The operator swaps the Pressure Control Channel Selector Switch (XS-68-340D) to operable channels per the AOP.

Which ONE (1) of the following correctly describes which is the controlling channel and which channel is selected as the backup channel?

A. Channel II (334) is controlling; channel III (323) is backup.

B. Channel II (334) is controlling; channel IV (322) is backup.

C. Channel III (323) is controlling; channel II (334) is backup.

D. Channel III (323) is controlling; channel IV (322) is backup.

33. Which ONE (1) of the following describes the effects on Source Range Monitor (SRM) output as detector voltage BEGINS to drift from the optimum of 870v?

The SRM detectors operate in the:

A. proportional region and detector output counts increase as detector voltage drifts high.

B. proportional region and the output counts decrease as detector voltage drifts low.

C. ionization region and the output increases as detector voltage drifts high.

D. ionization region and the output remains constant as detector voltage drifts high.

34. Given the following plant conditions:
    - The operating crew has identified a S/G tube leak.
    - AOP-R.01 has been implemented.
    - Letdown flow = 75 gpm.
    - 1 CCP is in service with charging valves FCV 62-93 and 89 full open.
    - Charging flow = 160 gpm.
    - Pressurizer level is stable at 58%.
    - All other parameters are normal

    Which ONE (1) of the following best estimates the total primary to secondary leak rate?

    A. 55 gpm.

    B. 75 gpm.

    C. 85 gpm.

    D. 150 gpm.

35. During operation at power steam generator tube leakage is detected and estimated at 250 gpm by the reactor operator. The following plant indications existed at that time:

    - RCS pressure – 2200 psig and decreasing
    - SG Pressures – 1000 psig

    The unit is tripped and plant parameters following the trip are:

    - RCS pressure – 1700 psig and decreasing
    - SG Pressures – 1100 psig

    Using the provided equation sheet, determine which ONE (1) of the below describes the leakage following the trip.

    A. one half of the initial leak rate or about 125 gpm.

    B. essentially equal to the initial leak rate or about 250 gpm.

    C. approximately 70% of the initial leak rate or about 175 gpm.

    D. One third of the initial leak rate or about 83 gpm.

36. Procedure FR-H.1, "Loss of Secondary Heat Sink", directs operators to stop all RCPs if actions to restore AFW flow are not successful.

Which ONE (1) of the following is the reason the RCPs are stopped in this situation?

A. Minimize the possibility of a tube rupture when AFW is eventually restored to the steam generators.

B. Conserve reactor coolant inventory by reducing seal leakoff.

C. Obtain increased safety injection flow by decreasing RCS cold leg pressure.

D. Conserve steam generator inventory by reducing RCS heat input.

37. Given the following plant conditions:
    - Both units are at 100% power
    - All systems are aligned normal

    - Window A-5 is "125V DC VITAL BAT BD I ABNORMAL"
    - Window A-4 is "125 V DC VITAL CHGR I FAILURE OR VITAL BAT I DISCHARGE"
    - Window E-2 is "125V DC VITAL SPARE CHGR 1 FAILURE"

    Which ONE (1) of the following sets of conditions would be indicative of a loss of a 125V DC Vital battery charger with the 125V DC battery supplying the board?

    A. Annuciator window 1-XA-55-1C A-5 lit and 125V DC Volt meter selected to Batt I and indicating downscale to 75 Volts.

    B. Annuciator window 1-XA-55-1C A-4 lit and EI-57-92 (Batt BD I AMPS) is indicating upscale from zero.

    C. Annuciator window 1-XA-55-1C A-4 is lit and EI-57-92 (Batt BD I AMPS) is indicating downscale from zero.

    D. Annuciator window 1-XA-55-1C E-2 is lit with 125V DC Voltmeter selected to Batt Bd I and indicating 129 Volts.

38. Which ONE (1) of the following is the maximum expected dose at the exclusion boundary that could be received by a person following an inadvertent release from a Waste Gas Decay tank?

A. A total body exposure of 0.2 rem.

B. Not more than the 10 CFR 100 "Reactor Site Criteria" iodine limit over a one hour period.

C. Not more than the 10 CFR 20 "Standards for Protection against Radiation" iodine limit over a two hour period.

D. A total body exposure of 0.5 rem.

39. Given the following plant conditions?
    - "1-RA-90-1C AREA RAD MON INSTR MALFUNC" alarm just came in on 0-XA-55-12A panel

Which ONE (1) of the following describes combinations of failures or operator actions that could cause this alarm?

A. -Instrument power failure OR
-MCR module placed in Source Check position OR
-Instrument down scale failure

B. -Instrument power failure OR
-MCR module placed in Source Check position OR
-MCR module placed in Trip Adjust position

C. -Instrument power failure OR
-MCR module placed in Trip Adjust position OR
-Instrument down scale failure

D. -Instrument down scale failure OR
-MCR module placed in Source Check position OR
-MCR module placed in Trip Adjust position

40. Given the following plant conditions:
    - Unit 1 is responding to a LOCA
    - ES-1.3 was completed and containment recirculation cooling is in progress
    - The STA has identified an orange path on containment radiation

Which ONE (1) of the following best describes a high level action in FR-Z.3, High Containment Radiation?

A. VERIFY Containment Vent Isolation (CVI) operation.

B. VERIFY ABGTS operation.

C. VERIFY Phase A isolation.

D. NOTIFY chem lab to sample the containment sump.

41. Given the following plant conditions:
    - The Reactor is at 100% power.
    - Pressurizer Level Transmitter 1-LI-68-339 is selected for control.
    - All other systems are lined up for normal operation and in automatic.
    - The REFERENCE LEG for 1-LI-68-339 is develops a leak.

Which ONE (1) of the following describes the short term (25 to 30 min.) response to this condition?

	1-LI-68-339 level Indication Will	1-LI-68-335 & 320 level Indication Will	VCT level Indication Will
A.	Increase	Decrease	Increase
B.	Decrease	Increase	Increase
C.	Increase	Decrease	Decrease
D.	Decrease	Increase	Decrease

42. Which ONE (1) of the following describes the function of the SFP bridge crane hoist "lower" limit GEAR OPERATED switch?

A. Stops downward travel before the crane hook enters the water.

B. Stops downward travel before the fuel assembly reaches the bottom of the fuel cell.

C. Automatically changes hoist speed from fast to slow while the fuel assembly is in the fuel cell boundary.

D. Prevents bridge travel when the fuel assembly is within the fuel cell boundary.

43. Given the following plant conditions:
    - The plant is at 100% power.
    - The ERCW System is in a normal alignment.
    - J-A ERCW pump is in service, in Auto, and selected for preferred start (Selector Switch 0-XS-67-225).
    - Offsite power is lost to 6.9KV Start Bus 1B.
    - 1A-A D/G responds to the event as designed
    - Offsite power is now available to Start Bus 1B
    - BO relays reset

Which ONE (1) of the following describes the operation of the J-A ERCW pump after the loss of power?

The pump breaker:

A. will trip and immediately reclose, the pump will start when D/G energizes the SD board. The pump can be normally shutdown at any time.

B. stays connected to the bus, the pump will start when the D/G energizes the board. The pump can be normally shutdown ONLY after the SD board is paralleled to offsite power.

C. will trip, the pump will start 15 seconds after the D/G energizes the SD board. The pump can be normally shutdown.

D. will trip, the pump will start 15 seconds after the D/G energizes the SD board. The pump can be shutdown ONLY after Q-A ERCW pump is selected for preferred start (Selector Switch 0-XS-67-225).

44. Given the following plant conditions:
    - Unit 1 was operating at 80% power when a reactor trip occurred.
    - Reactor trip breaker "A" will not open.
    - PT-1-72, Turbine impulse pressure, has failed at 80% (as is)
    - The Steam Dump Mode Select Switch is in the Tavg position

Which ONE (1) of the following describes the response of the Steam Dumps and Atmospheric Relief valves to these conditions?

	Atmospheric Relief valves	Steam Dump valves
A.	Opened	Opened
B.	NOT Opened	Opened
C.	Opened	Not Opened
D.	Not Opened	Not Opened

45. Given the following plant conditions:
    - Unit 1 is at 30% power
    - 1B Start Bus trips out on differential relay actuation

Which ONE (1) of the following describes effect on the plant?

A. 1B-B diesel generator starts and connects to the 1B-B 6.9 kV shutdown board.

B. Control rods insert.

C. CVCS letdown isolates.

D. Reactor trips.

46. Given the following plant conditions:
    - Unit 1 is increasing power from 50% to 100% power
    - Boron concentration has been reduced from 1070 ppm to 1020 ppm
    - Full load boron concentration has been calculated to be 1005 ppm

Which ONE (1) of the following describes the boron concentration differential limit between the RCS and the Pressurizer, and operator actions required to stay below this limit when changing the RCS boron concentration?

The differential limit is less than or equal to:

A. 10 ppm. It is maintained by turning on a PZR backup heater and allowing the PZR sprays to maintain RCS pressure.

B. 50 ppm. It is maintained by turning on a PZR backup heater and allowing the PZR sprays to maintain RCS pressure.

C. 10 ppm. It is maintained by "cracking open" a PZR spray valve and allowing the PZR backup heaters to cycle to maintain RCS pressure.

D. 50 ppm. It is maintained by "cracking open" a PZR spray valve and allowing the PZR backup heaters to cycle to maintain RCS pressure.

47. Given the following plant conditions:
    - Unit 1 is performing a startup from Hot Standby to 100% power.
    - Reactor power is 25% with RCS boron concentration of 520 ppm.

Which ONE (1) of the following describes the number of gallons of primary water needed to dilute the RCS by 75 ppm?

A. 9968 gallons ±10

B. 9938 gallons ±10

C. 9569 gallons ±10

D. 9272 gallons ±10

48. Which ONE (1) of the following supplies voltage for OPERATION of the SLAVE RELAYS in the SSPS output cabinets?

A. 15V DC from redundant power supplies in the SSPS cabinets.

B. 48V DC from a power distrubution bus in the SSPS cabinets.

C. 120V AC from redundant inverters in the SSPS cabinets.

D. 120V AC Vital Instrument Power from a distribution bus in the SSPS cabinets.

49. Which ONE (1) of the following describes how positive reactivity addition is minimized during a continuous rod withdrawal event?

A. Increasing the Rod Insertion Limit (RIL) as power increases.

B. Adjusting the positive rate reactor trip set point well below Tech Spec allowable values.

C. Maintaining the controlling bank slightly above the RIL to provide immediate negative reactivity.

D. Keeping rods well out of the core and above the rod insertion limit.

50. Given the following plant conditions:
    - Unit 1 is conducting refueling operations with core atlerations in progress
    - Source Range Monitors N-31 and N-32 are reading 10 cps.
    - BOTH Intermediate Range Monitors are off scale LOW.
    - Power Range Monitor N-41 is OOS with all appropriate BISTABLES TRIPPED.
    - Power Range Monitor N-42 = 0%.
    - Power Range Monitor N-43 = 0%.
    - Power Range Monitor N-44 = 0%.

Which ONE (1) of the following describes the required actions if Power Range Monitor N-44 fails high?

A. Notify IMs to investigate the power range instrument failure and continue with core alterations.

B. Immediately stop all core alterations or positive reactivity changes and determine the boron concentration of the RCS at least once per 12 hours.

C. Ensure NR-45 recorder is selected to the intermediate range channels and continue with core alterations.

D. Immediately stop all core alterations and emergency borate per EA-68-4, "Emergency Boration".

51. Which ONE (1) of the following describes the annunciation "Reactor Coolant Saturation Margin Trouble"?

The annunciator will:

A. alarm if Reactor Coolant System pressure decreases by 40 psig while Reactor power is > 10% of rated thermal power.

B. alarm if RCS pressure decreases to 2205 psig and Reactor power is < 10% of rated thermal power.

C. alarm if RCS saturation margin is < 50 degrees and Reactor power is < 10% of rated thermal power.

D. alarm if RCS saturation margin is < 40 degrees and Reactor power is < 10% of rated thermal power.

52. During outages the CRDM motor power supply may be temporarily realigned to supply receptacle power in the lower containment.

Which ONE (1) of the following describe how this condition is controlled?

With the motor breaker racked out:

A. the motor leads are lifted and re-landed on the receptacle power pack. A TACF is placed on the breaker to identify this temporary condition.

B. the motor leads are lifted and re-landed on the receptacle power pack. A Caution Order is placed on the breaker to identify this temporary condition.

C. a transfer switch is aligned to supply power to the receptacle power pack. A TACF is placed on the breaker to identify this temporary condition.

D. a transfer switch is aligned to supply power to the receptacle power pack. A Caution Order is placed on the breaker to identify this temporary condition.

53. Given the following plant conditions:
    - Unit 2 is in Mode 5 for repair of an RCP motor
    - Containment purge is in service to the Upper and Lower compartments
    - Containment equipment hatch is closed
    - Upper and Lower containment personnel airlocks are closed

Which ONE (1) of the following describes the affect on the plant if the Lower Containment Personnel Airlock was breached to carry equipment into containment?

A. Auxiliary Building pressure will increase above the Tech Spec limit due to air flow out of containment.

B. Auxiliary Building Gas Treatment System will automatically start to limit Auxiliary Building pressure increase due to air flow out of containment.

C. The Ice Condenser lower inlet doors may come open due to a pressure imbalance.

D. The Ice Condenser upper deck doors may come open due to a pressure imbalance.

54. Given the following plant conditions:
    - LOCA inside containment has occurred
    - Containment pressure is 4.8 psid
    - Containment sump level is 52%
    - ECCS is operating in the Recirculation Mode
    - Both containment spray pumps are in service

Which ONE (1) of the following describes the design features that prevent debris from plugging containment spray nozzles?

A. Water entering the sump must flow over an elevated curb and containment spray pump discharge strainers located in the 690' pipe chase.

B. Containment spray pump discharge strainers located in the 690' pipe chase and screens covering the two 14 " drain holes in the refueling cavity (upper to lower containment drains).

C. Screens covering the two 14 " drain holes in the refueling cavity (upper to lower containment drains) and a sloping grated screen over the sump opening.

D. Water entering the sump must flow over an elevated curb and a sloping grated screen over the sump opening.

55. Given the following plant conditions:
    - Unit 2 is starting up from cold shutdown conditions
    - Condensate and feedwater systems are shutdown

Which ONE (1) of the following describes the Caution in 2-SO-2/3-1 and basis for throttling the pump discharge valve prior to starting the first Hotwell pump?

The discharge valve is turned 25 turns from the fully:

A. open position to prevent damage to piping and hangers.

B. open position to prevent pump runout.

C. closed position to prevent damage to piping and hangers.

D. closed position to prevent pump runout.

56. Given the following plant conditions:
    - Unit 1 is operating at 100%
    - All control systems are normal in automatic.

Which ONE (1) of the following describes the plant response to a trip of Main Feed Pump turbine 1A?

A. The plant runs back to 80% load, the running Main Feedwater Pump accelerates to the high speed stop, Hotwell Pump 1A trips due to closing of Main Feedwater Pump 1A condenser isolation valves and Steam Generator levels control at 33%.

B. The plant runs back to 75% load, the running Main Feedwater Pump accelerates to the high speed stop, Hotwell Pump 1A trips due to closing of Main Feedwater Pump 1A condenser isolation valves, and Steam Generator levels control at 44%.

C. The plant runs back to 75% load, the running Main Feedwater Pump accelerates to the high speed stop, the Main Feed Pump 1A condenser isolation valves close, and Steam Generator levels control at 44%.

D. The plant runs back to 80% load, the running Main Feedwater Pump accelerates to the high speed stop, the Main Feed Pump 1A condenser isolation valves close, and Steam Generator levels control at 33%.

57. Which ONE (1) of the following describes the operation of the Unit 2 TDAFW (LCVs) following automatic actuation of the AFW system?

A. These valves go to the full open position and remain there until the S/G level reaches 33% Narrow Range, then the valves throttle to maintain 33% until operator action is taken.

B. These valves are controlled by a level controller that automatically positions the valves to maintain S/G level at 33%.

C. These normally open valves remain fully open until operator action is taken.

D. These normally closed valves go to the full open position and remain there until operator action is taken.

58. Given the following plant conditions:
    - Unit 1 is operating at 100% RTP
    - During a modification the 125 V DC breaker supplying power to the TDAFW pump Trip and Throttle valve was broken causing the breaker to open.
    - The breaker cannot be reclosed and maintenance estimates it will take 2 hours to replace the broken breaker.

Which ONE (1) of the following describes the effects on the TDAFW while repairs are in progress?

The pump will not auto start for an accident condition AND:

A. Control power will be automatically restored by auto transfer to the alternate supply.

B. Control power can be manually restored by manual transfer to the alternate supply by transfer switch located on 125 V DC Battery board # 1.

C. Control power can be manually restored by manual transfer to the alternate supply by transfer switch located on a panel just outside the TDAFW pump room.

D. Control power can be manually restored by manual transfer to the alternate supply by the Nor/Alt selector switch located in the Auxiliary Control Room (ACR).

59. Given that: EI-57-92 indicates amp flow for 125V DC Vital Battery # 1.

Which ONE (1) of the following describe the relationship between the Vital Battery # 1 and Vital Battery charger # 1?

A. Negative 20 amps indicated on EI-57-92 indicates amp flow into the battery from the charger.

B. Negative 20 amps indicated on EI-57-92 indicates amp flow out of the battery to the 125V DC Vital Battery Board # 1.

C. Positive 20 amps indicated on EI-57-92 indicates amp flow into the battery from the charger.

D. Direction of amp flow cannot be determined using EI-57-92 because amp flow is independent of direction.

60. Given the following plant conditions:
    - Waste condensate tank A release is in progress.
    - Waste condensate tank A activity is within technical specification limits.
    - Trip setpoint for radiation monitor RM-90-122 was adjusted based on tank samples.
    - During the release RM-90-122 setpoint is exceeded, however the alarm (0-RA-90-122A WDS LIQ EFF MON HIGH RAD) did not work and Radiation Control Valve RCV-77-43 failed to close.

Which ONE (1) of the following describes the effect of RCV-77-43 failing to automatically terminate this release?

A. The release WILL be terminated by the radwaste operator who continously monitors RM-90-122 during liquid radwaste releases.

B. The release WILL be terminated by the control room operator who continously monitors RM-90-122 during liquid radwaste releases.

C. 10CFR20 limits WILL NOT be exceeded for the nearest potable water or surface water supply in an unrestricted area.

D. 10CFR20 limits WILL be exceeded for the nearest potable water or surface water supply in an unrestricted area.

61. Given the following plant conditions:
    - A gas decay tank release is in progress.
    - 0-XA-55-12B, "0-RA-90-118A WDS GAS EFF MON INSTR MALFUNC" alarm just came in on 0-XA-55-12B.

Which ONE (1) of the following describes the effects of loss of power to 0-RM-90-118?

A. 0-RCV-90-119 will close, the ABGTS fan will stop, and 0-FIC-90-119 must be set to zero, at local panel 0-L-2, prior to reopening 0-RCV-90-119.

B. 0-RCV-90-119 must be manually closed at local panel 0-L-2 to terminate the release, the ABGTS fan will stop, and 0-FIC-90-119 must be set to zero prior to reopening 0-RCV-90-119.

C. 0-RCV-90-119 will close, the ABGTS fan will remain running, and 0-FIC-90-119 must be set to zero, at local panel 0-L-2, prior to reopening 0-RCV-90-119.

D. 0-RCV-90-119 must be manually closed at local panel 0-L-2 to terminate the release, the ABGTS fan will remain running, and 0-FIC-90-119 automatically resets to zero so 0-RCV-90-119 can be reopened.

62. Given the following plant conditions:
    - Unit 1 is operating at 100% RTP
    - While transporting a container of radioactive liquid, a spill occurrs in the Auxiliary Building near the Unit 1 CCS heat exchanger
    - The spill was reported to the operating crew by Radcon
    - Radiation Monitor 1-RM-90-6 is trending up but has not yet alarmed

Which ONE (1) of the following describes the best method for the operating crew to determine 1-RM-90-6 alarm setpoint?

A. Use 0-SO-90-5, Area Radiation Monitors

B. Use Tech Spec section 3/4.3.3.3.1 Radiation Monitoring Instrumentation

C. Use Annunciator Response Manual 0-AR-M12-A

D. Call instrument maintenance personnel and have them look in the setpoint and scaling document.

63. Which ONE (1) of the following combinations represents the RCS leak detection systems that are required to be OPERABLE during Mode 3 operations?

1. Upper containment atmosphere gaseous radioactivity monitor
2. Vessel flange leakoff temperature monitor
3. Containment purge air radioactivity monitor
4. Containment pocket sump level monitor
5. Lower containment atmosphere gaseous radioactivity monitor
6. Lower containment atmosphere particulate radioactivity monitor

A. 1, 2 & 5

B. 1, 3 & 4

C. 2, 3 & 6

D. 4, 5 & 6

64. Given the following plant conditions:
    - Unit 2 was operating at 100% power
    - A large break LOCA occurred
    - Automatic reactor trip and Safety Injection occurred

Which ONE (1) of the following conditions would indicate an ECCS system misalignment during the injection phase?

A. The Charging Pump Injection Tank discharge valves FCV-63-25 and FCV-63-26 are OPEN.

B. Charging line isolation valves FCV-62-90 and FCV-62-91 are OPEN.

C. The Volume Control Tank outlet valves are CLOSED.

D. Charging pump mini-flow valves are CLOSED.

65. Given the following plant conditions:
    - All controls are in automatic
    - PT-68-322, PZR pressure transmitter, had previously failed and all actions of AOP-I.04 are complete
    - Pressure control is selected for PT-68-340 & 334
    - PT-68-340 fails high
    - The PZR Pressure Control System operates as designed after this failure

    Which ONE (1) of the following describes the response of the PZR PORVs for this event? (Assume NO operator action.)

    A. PCV-68-340 opens, then closes at 2315 psig actual PZR pressure, decreasing.

    B. PCV-68-340 opens, then does not close at 2315 psig actual PZR pressure, decreasing.

    C. PCV-68-340 and PCV-68-334 opens, then closes at 2315 psig actual PZR pressure, decreasing.

    D. PCV-68-340 and PCV-68-334 opens, then does not close at 2315 psig actual PZR pressure, decreasing.

66. Given the following plant conditions:

- The plant is operating at 10% power during a startup
- S/G level control is in automatic on bypass regulating valves
- A significant leak develops in the reference leg for LT-3-174, S/G level input to FCV-3-35A for #1 S/G
- The condensing pot is unable to keep up with the leak.

Which ONE (1) of the following describes the response of the plant (assuming no operator action)?

A. The #1 S/G level will increase but MFP speed will decrease to prevent going above the S/G Hi-Hi trip setpoint.

B. The #1 S/G level will decrease but MFP speed will increase to prevent going below the S/G Lo-Lo trip setpoint.

C. The reactor will trip on S/G Lo-Lo level.

D. The turbine will trip on S/G Hi-Hi level.

67. Given the following plant conditions:
    - Unit 1 is responding to a LOCA using E-1 procedure
    - RCS dose equivalent Iodine-131 activity is 290 micro curies per gram

Which ONE (1) of the following describes a method or design feature used to reduce the iodine-131 concentration in the containment atmosphere AND reduce the potential for inadvertent release of Iodine from the containment?

A. When containment iodine exceeds Tech Spec limits, E-1 directs the venting of the containment to reduce the concentration to within limits

B. When containment iodine exceeds Tech Spec limits, E-1 directs the purging of the containment to reduce the concentration to within limits.

C. Containment spray water from the RWST will absorb the iodine and ensure that it stays in solution.

D. A sodium tetra borate additive in the ice ensures the iodine stays in solution.

68. Given the following plant conditions:
    - Unit 2 has operated at 100% power for the last 120 days
    - A large LOCA occurred with resultant RX trip and SI
    - Containment hydrogen concentration is increasing

    Which ONE (1) of the following describes the method of containment hydrogen removal?

    A. The hydrogen is burned by electrically heating the air mixture to a ignition temperature.

    B. Hydrogen Recombiners should be placed in service after hydrogen analyzers have been operating for 30 minutes OR Hydrogen analyzer reading has been verified by chem lab results.

    C. Hydrogen Recombiner operation is acceptable up to 6% hydrogen concentration, TSC approval must be obtained to operate above 6%.

    D. Containment Purge fans must be operated first to reduce containment hydrogen concentrations to less than 4% before operating the Hydrogen Recombiners.

69. Given the following plant conditions:
    - Unit 1 is in Mode 4.
    - A containment purge is in progress in preparation for refueling.
    - During a maintenance activity, RM-90-130 was placed and held in the source check postion WITHOUT placing HS-90-136A1 in the RM-90-130 position.

Which ONE (1) of the following describes the response of the containment purge system to these conditions?

A. Only Train A containment purge isolation valves isolate.

B. Only Train B containment purge isolation valves isolate.

C. Neither Train A or B containment purge isolation valves isolate.

D. Both Train A and B containment purge isolation valves isolate.

70. Given the following plant conditions:
    - Unit 1 is in a refueling outage
    - Core unloading is in progress

Which ONE (1) of the following describes the movement of a fuel assembly from the reactor core to the Rx side upender?

A. The manipulator crane bridge travels South (right) until out of the core region. Then the trolley travels East(forward) to the cavity wall. Then the bridge travels South (right) to the upender.

B. The manipulator crane trolley travels South (right) until out of the core region. Then the bridge travels East (forward) to the cavity wall. Then the trolley travels South(right) to the upender.

C. The manipulator crane trolley moves East (forward) to cavity wall. Then the bridge travels South (right) to the upender.

D. The manipulator crane bridge travels South (right) until it aligns with the upender. Then the trolley travels East (forward) to the upender.

71. Given the following plant conditions:
    - Unit 1 is operating at 50% power
    - The # 1 SG controlling pressure transmitter fails HIGH

Which ONE (1) of the following describe the INITIAL feedwater flow response AND the correct operator action?

A. The feedwater flow would decrease due to the failure of the steam pressure input to the steam flow signal AND the operator should place the # 1 SG LCV in Man and restore feedflow to match steam flow.

B. The feedwater flow would increase due to the failure of the steam pressure input to the steam flow signal AND the operator should place the # 1 SG LCV in Man and restore feedflow to match steam flow.

C. The feedwater flow would decrease due to the failure of the steam pressure input to the steam flow signal AND the operator should leave the # 1 SG LCV in Auto because SG level is the dominant control signal and will restore feedflow to match steam flow.

D. The feedwater flow would increase due to the failure of the steam pressure input to the steam flow signal AND the operator should leave the # 1 SG LCV in Auto because SG level is the dominant control signal and will restore feedflow to match steam flow.

72. Given the following plant conditions:
    - Unit 1 is operating at 100% power.
    - The turbine building AUO is working with maintenance in the 2C MSR doghouse.
    - The 2C MSR doghouse is designated as an area sensitive to portable radio operation.

Which ONE (1) of the following describes a correct method of communication between the Main Control Room operator and the Turbine building AUO in the MSR doghouse?

A. A radio with a white antenna may be used for two way communication ONLY if it is >1 meter from sensitive equipment.

B. A radio with a black antenna may be used for two way communication ONLY if it is >1 meter from sensitive equipment.

C. A radio with a black antenna may be used for receiving ONLY.

D. A radio with a white antenna may be used for transmission ONLY.

73. Which ONE (1) of the following statements correctly describe the requirement(s) for safety grounds when used on plant equipment, in conjunction with a clearance?

A. Prior to being issued a clearance, the person responsible for the work MUST ensure all safety grounds have been placed and numbered ground discs attached as required.

B. After a clearance released, the person responsible for the work MUST ensure all safety grounds have been removed and numbered ground discs returned to their storage cabinet.

C. Operations personnel picking up a clearance on the 6.9 KV Unit Board are REQUIRED to open the compartment doors and verify removal of three phase ground wires.

D. Three-phase grounds require a disc on the ground side of each phase except where a single device provides a 3-phase ground.

74. Given the following plant conditions:
    - Unit 1 was operating at 100% power.
    - A Loss of Offsite Power occurred.
    - All four diesel generators started and connected to their shutdown boards.
    - 1A-A diesel generator automatic voltage regulator FAILS to respond as loads are sequenced on to the 1A-A shutdown board.

Which ONE (1) of the following describes the effects of this failure on ESF equipment powered from the 1A-A shutdown board?

A. Voltage adjustments WILL be made by the operator after selecting manual voltage control; no significant effect on ESF equipment.

B. The degraded voltage relays WILL NOT load shed ESF equipment because they are removed from service following an emergency start.

C. When voltage drops to degraded voltage relays setpoint, ESF equipment WILL load shed.

D. Shutdown board voltage WILL NOT drop to degraded voltage setpoint as long as DG load is maintained <4000 KW.

75. Given the following information:
    - Work is to be performed in a high radiation area.
    - Dose rate in the work area as 1.2 R/hr.
    - Worker's maximum dose is 200 mRem.

Which ONE (1) of the following describes the maximum work time for the workers without exceeding the their maximum dose?

A. 100 minutes

B. 10 minutes

C. 6 minutes

D. 1.67 minutes

76. Given the following plant conditions:
    - Both units were operating at 100% power.
    - A failure of Chickamaugea Dam locks causes river level at the plant to decrease to the 667' elevation.

Which ONE (1) of the following components will be lost and require procedural guidance to restore the feature?

Loss of cooling water :

A. to the auxiliary control air compressors.

B. to the ice condenser chiller packages.

C. control building electrical board room air conditioner units.

D. 480V Shutdown Board room 1A-A and 2A-A air conditioner units.

77. Given the following plant conditions:
    - Air receiver #1 pressure is 99 psi and steady
    - Air receiver #2 Pressure is 100 psi and steady
    - Service air receiver pressure is 78 psi and decreasing

Which ONE (1) of the following describes the cause of decreasing service air receiver pressure?

A. Loss of compressors C & D sequencer power.

B. Loss of compressors A & B unloader power.

C. Compressors A & B local control switches were placed in Safe Stop.

D. Loss of power to isolation valve 0-PCV-33-4.

78. Given the following plant conditions:
    - High pressure fire protection water spray was used to extinguish a fire in the turbine building.
    - During fire fighting activities, a large volume of water was sprayed directly on a 480V limit torque motor operated valve (MOV).

Which ONE (1) of the following is correct regarding water damage to this MOV?

A. No damage. Limit torque motors and valve position limit switches are in sealed water tight housings to prevent water from contacting electrical components.

B. No damage. Water may enter the housing that surround the motor and limit switches, however, electrical components are designed to operate submerged in water.

C. Potential damage. Valve position limit switches are in sealed water tight housings to prevent water from contacting electrical components, however, limit torque motors are not sealed and spray water contacting the motor windings could cause a short and damage the motor.

D. Potential damage. Limit torque motors are sealed to prevent water from contacting the motor, however, valve position limit switches are located outside the sealed housing and shorted out limit switches could cause inadvertent component operation.

79. Which ONE (1) of the following describes the system isolation / component actuations that will occur upon MANUAL actuation of 2-HS-30-68A and 2-HS-30-68B, Phase B Actuation handswitches?

A. Main Steam Isolation Valves will close.

B. Emergency Gas Treatment Fans will start.

C. CVCS Excess Letdown out of containment will close.

D. Containment Spray Pump 2A-A Room Cooler will start.

80. Which ONE (1) of the following describes the method(s) used to cool the Pressurizer Relief Tank (PRT)?

A. Spray from Primary Water into the top of the PRT and drain to the Reactor Coolant Drain Tank (RCDT) pump suction line.

B. Spray from Primary Water into the bottom of the PRT and drain directly to the Reactor Coolant Drain Tank (RCDT).

C. Spray from CVCS charging line into the top of the PRT and drain to the Reactor Coolant Drain Tank (RCDT) pump suction line.

D. Spray from CVCS charging line into the bottom of the PRT and drain directly to the Reactor Coolant Drain Tank (RCDT).

81. Given the following plant conditions:
    - Unit 1 is operating at 100% power.
    - CCS surge tank level was increasing but is now stable.
    - "1-RA-90-123A CCS LIQ EFF MON HIGH RAD" Alarm is LIT.
    - Surge tank vent valve is closed.

Which ONE (1) of the following describes the control board indications that are consistent with the above conditions?

The thermal barrier containment isolation inlet and outlet valves:

A. to the affected RCP close (the non-affected RCPs isolation valves remain open), and the thermal barrier booster pumps trip.

B. to the affected RCP close (the non-affected RCPs isolation valves remain open), the inlet and outlet CCS valves to the RCP oil coolers close, and the thermal barrier booster pumps continue to run with miniflow valves open.

C. to all 4 RCPs close, the inlet and outlet CCS valves to the RCP oil coolers remain open, and the thermal barrier booster pumps trip.

D. to all 4 RCPs close, the inlet and outlet CCS valves to the RCP oil coolers are not affected, and the thermal barrier booster pumps continue to run with miniflow valves open.

82. Given the following plant conditions and information:
    - Unit 1 was operating at 100% power
    - A Safety Injection just occurred on Unit 1

    For information:
    - 0-FCV-67-152 is the CCS HX 0B1 and 0B2 outlet valve
    - 1-FCV-67-146 is the CCS HX 1A1 and 1A2 outlet valve

Which ONE (1) of the following describes the operation of the ERCW outlet valves from the CCS heat exchangers as a result of the SI signal?

A. 0-FCV-67-152 automatically goes to the full open position.
   1-FCV-67-146 automatically goes to the full open position.

B. 0-FCV-67-152 automatically goes to the 35% position.
   1-FCV-67-146 automatically goes to the 35% position.

C. 0-FCV-67-152 automatically goes to the 35% position.
   1-FCV-67-146 remains in it's current position.

D. 0-FCV-67-152 remains in it's current position.
   1-FCV-67-146 automatically goes to the 35% position.

83. Given the following plant conditions:
    - Both units were operating at 100% power.
    - A loss of offsite power occurred.
    - Both units automatically shutdown.
    - All four DG started and energized their respective shutdown boards.

    Which ONE (1) of the following describes the required actions to restore the air system service?

    A. No action is necessary, air compressors A, B, C, and D will be sequenced back on by the Blackout Sequencer.

    B. Air compressors A, B, C, and D can be reset and started locally at any time.

    C. Air compressors A and B can be reset and started locally at any time.

    D. Air compressors A and B can be reset and started locally after the Blackout Relays are reset.

84. Given the following plant conditions:
    - Unit 1 is in Mode 4.
    - Shift turnover is in progress.
    - Unit 2 is at 100% and the on coming staffing will meet Tech Specs.
    - You are the oncoming SM.
    - One of your Unit 1 operators has called and will be one hour late.
    - The operators in the offgoing crew have all worked 16 hours.

    One licensed Senior Reactor Operator, and One certified (non-licensed) UO are present for the oncoming Unit 1 crew.

    Which ONE (1) of the following is the necessary course of action for staffing Unit 1 in accordance with Technical Specifications (TS)?

    A. No action required because only two ROs are required in the Control Room for these conditions.

    B. No action required because three RO's are required for Mode 4 but TS allow the crew to be short one RO for up to two hours to account for unexpected absences.

    C. Have the Plant Manager authorize performance of BOP duties by a certified UO (non-licensed) until the late licensed RO arrives.

    D. Obtain Plant Manager authorization to hold one RO over from the offgoing crew because three RO's are required for these conditions.

85. Unit 1 is steady at 100% RTP. One RPS PressurizerLevel channel has just failed high and been declared inoperable. All other channels are operable.

Which ONE (1) of the following Technical Specification actions apply in this event?

A. Place the failed channel in TRIP within 1 hour.

B. Place the failed channel in TRIP within 6 hours.

C. Be in at least Hot Standby within 1 hour.

D. Be in at least Hot Standby within the next 6 hours.

86. Which ONE (1) of the following describe an INCORRECT use of the Safety Parameters Display System (SPDS)?

A. The SPDS may be used during normal plant operations for trending or displaying plant data.

B. The SPDS may be used during accident conditions as an operator aid for evaluating the status of the plant.

C. The SPDS may be used during plant heatup or cooldown as an aid for monitoring vessel fracture toughness requirements.

D. The SPDS may be used during an accident to verify that a Critical Safety Function restoration instruction is required to be used.

87. When restarting the unit after a trip, a NOTE in 0-GO-2 gives specific guidance about when the operations staff is to declare mode 2.

Which ONE (1) of the following is the correct time to declare MODE 2 per this procedure?

The unit enters mode 2 administratively when:

A. the control banks are first withdrawn.

B. the shutdown banks are first withdrawn.

C. the Keff is > .99 and RCS Temperature is > 350°F with Reactor Power less than 5%.

D. reactor power is greater than or equal to 1% and RCS Temperature is > 540°F.

88. Which ONE (1) of the following describes the Steady State Activity/Chemistry Limits for the RCS in MODE 1?

A. Dose Equivalent 1-131 - 1.0 *u*ci/gm
Chloride and Fluoride - 0.15 ppm
Dissolved Oxygen - 0.10 ppm

B. Dose Equivalent 1-131 - 1.0, *u*ci/gm
Chloride and Fluoride - 0.15 ppm
Dissolved Oxygen - 1.0 ppm

C. Dose Equivalent 1-131 - .35 *u*ci/gm
Chloride and Fluoride - 1.5 ppm
Dissolved Oxygen - 1.0 ppm

D. Dose Equivalent 1-131 - .35 *u*ci/gm
Chloride and Fluoride - 0.15 ppm
Dissolved Oxygen - 0.10 ppm

89. Given the following plant conditions:
    - A plant change request form is in the approval process.
    - The proposed modification will alter nuclear safety related structures, systems, and components.

Which ONE (1) of the following describes who must approve the change prior to implementation?

A. Maintenance and MODs Manager

B. Site Vice President

C. Plant Manager

D. Engineering and Support Manager

90. Given the following plant conditions:
    - A special test of plant equipment has been proposed/
    - You have been asked to determine if an Unresolved Saftey Question (USQ) might be caused by this special test

Which ONE (1) of the following describes combinations that would indicate a USQ exist?

A. -Increased probability of an accident previously evaluated in the SAR
OR
-Increased consequences of an accident previously evaluated in the SAR
OR
-Reduced safety margin as defined in the basis of any Tech Spec

B. -Increased probability of an accident previously evaluated in the SAR.
OR
-Increased consequences of an accident previously evaluated in the SAR.
OR
-Increased probability of failure of non-safety related equipment needed for full load operation.

C. -Increased consequences of an accident previously evaluated in the SAR.
OR
-Reduced safety margin as defined in the basis of any Tech Spec.
OR
-Increased probability of an injury to plant personnel.

D. -Increased consequences of an accident previously evaluated in the SAR
OR.
-Increased probability of an injury to plant personnel.
OR
-Increased probability of failure of non-safety related equipment needed for full load operation.

91. Given the following plant conditions:
    - Unit is shutdown for refueling.
    - Containment Spray (CS) Pump 1B-B is out of service and tagged for maintenance.
    - CS pump 1B-B discharge valve,1-FCV-72-39, was discovered to be leaking through and had to be hand-tightened 1.5 turns using the handwheel.
    - A cheater was NOT used on the discharge valve handwheel.

    Which ONE (1) of the following is required because the valve was manually tightened?

    A. The valve remains OPERABLE because a cheater was not required to manually seat the valve.

    B. The valve must be declared INOPERABLE until the valve is stroked open then closed using the motor.

    C. The valve is to be declared and remain INOPERABLE until the handwheel can be rotated 1.5 turns in the open direction after maintenance is complete.

    D. The valve is to be declared and remain INOPERABLE until Systems Engineering develops an action plan to restore operability.

92. Given the following plant conditions:
    - Unit 1 is in Mode 3. Unit 2 is in Mode 1.
    - 1A-A CCP is in service for normal charging
    - 1B-B CCP is in standby.
    - Both trains of RHR are aligned normal.
    - 1B-B DG is inoperable and tagged for a 1 hour repair.
    - Maintenance has requested 1-FCV-74-35 (1B RHR crosstie valve) be closed so minor maintenance can be performed.

    Which ONE (1) of the following would be the correct response to this maintenance request?

    A. Allow the work since Tech Specs allows 72 hours for this maintenance.

    B. Allow the work since 1B-B RHR is inop due to the DG being inoperable.

    C. Do NOT allow the work since the 1B-B DG is inoperable.

    D. Do NOT allow the work since both trains of RHR would be inoperable.

93. Due to conditions causing Control Room Inaccessibility, the main control room has been abandoned and all checklists are complete. Hot Standby conditions are being maintained from the Auxiliary Control Room when 2B-B 6.9-kV S/D Bd. experiences a loss of voltage.

Which ONE (1) of the following is the expected response by the operating staff for this condition?

A. Check Diesel Generators running and all auto-connected to the 6.9-kV S/D Boards.

B. Ensure Diesel Generators running and dispatch personnel to manually close the 2B-B 6.9-kV S/D Board Emergency Feeder Bkr. Verify 2B-B D/G connected to 2B-B 6.9-kV S/D Bd.

C. Verify Diesel Generators running and dispatch personnel to manually close all 6.9-kV S/D Bd. Emergency Feeder Breakers. Verify all D/Gs connected to the 6.9-kV S/D Boards.

D. Verify D/Gs running and 2B-B D/G auto-connected to the 2B-B 6.9-kV S/D Board.

94. Given the following plant conditions:
    - A General Emergency has been declared on Unit 1 due to a LOCA in the El. 653 pipe chase
    - An offsite release is in progress due to this leak
    - A worker isolating the leak suffered a heart attack
    - An emergency responder has volunteered to go in to remove the injured worker
    - The volunteer has a current year-to-date exposure of 3 rem

Which ONE of the following describes the MAXIMUM dose the emergency responder could be allowed to receive for this activity?

A. 10 rem TEDE

B. 7 rem TEDE

C. 25 rem TEDE

D. 22 rem TEDE

95. Given the following plant conditions:

An AUO is required to perform a valve checklist in the 690 pipe chase. The following conditions exist:

- area dose rate = 20 mrem/hr
- some airborne radioactivity present
- working with respirator = 1 hr to complete
- working without respirator = 1/2 hr to complete
- working without respirator = 1.3 DAC hrs internal exposure
- 1 DAC-hr = 2.5 mrem

Which ONE (1) of the following is correct concerning this situation?

A. The AUO should complete the work WITH a respirator in order to receive the smaller TEDE.

B. The AUO should complete the work WITHOUT a respirator in order to receive the smaller TEDE.

C. The TEDE would be the same WITH or WITHOUT a respirator.

D. The AUO should require another person to enter the area to assist with the checklist and NEITHER would wear a respirator.

96. Given the following plant conditions:
    - Unit 2 is operating at 100% RTP
    - Chemistry reports RCS specific activity has increased 100 / E-bar microcuries/gm
    - The SM directs the crew to shut down the reactor to HOT STANDBY with T-avg <500 degrees within the next 6 hours.

Which ONE (1) of the following is the reason for reducing T-avg below 500 degrees F?

A. Prevent additional fuel cladding oxidation and pellet-cladding interaction.

B. Prevent the release of activity if a Steam Generator Tube Rupture occurs.

C. Enhance the ability of the mixed-bed demineralizers to remove ionic fission products.

D. Minimize the deposition of particulate fission and activation products on surfaces within the core.

97. Given the following plant conditions:
    - Unit 2 is experiencing a degraded core cooling condition and the crew is progressing thru FR-C.2.
    - FR-C.2 directs the operator stop all RCPs.
    - After stopping all RCPs, the STA identifies a red condition for Core Cooling.

Which ONE (1) of the following best describes the RED condition on Core Cooling.

A. The operators should restart one RCP and continue in FR-C.2.

B. The operators should restart all RCPs and continue in FR-C.2.

C. The red condition was caused when the RCPs were removed from service, a previous step exempts transition to FR-C.1.

D. The red condition was caused when the RCPs were removed from service and the crew should transition to FR-C.1.

98. Given conditions of a Control Room Inaccessibility, which ONE (1) of the following is correct concerning Unit 1 OATC duties after leaving the main control room?

A. If offsite power is lost during this emergency, closes running Diesel Generators breaker to energize the 6.9-KV Shutdown Boards.

B. Calculates from unit boration tables the amount of boron required to achieve adequate shutdown margin for cold shutdown.

C. Distribute all Checklist and Appendix A.

D. Places all transfer switches on Auxiliary Control Room panels 1-L-11A and 1-L-11B in the AUX position according to Checklist.

99. Given the following plant conditions:
    - Unit 1 is operating at 95% RTP
    - Unit 2 is in Mode 6 with core alterations in progress
    - At 0435 hours the OATC notices all Unit 2 annunciators windows change to dark condition
    - The US is able to return Channel B annunciators to operable condition at 0500 hours

    The SM stops all Core Alterations at 0440.

    Which ONE (1) response below describes the required REP classification for the given conditions.

    A. No Emergency Action Level (EAL) exceeded

    B. Notification Of Unusual Event

    C. Alert

    D. Site Area Emergency

100. Given the following plant conditions:
- Unit 2 is operating at 100% RTP
- Condenser Vacuum Pump air exhaust monitor high Radiation alarm come in
- PZR level chart recorder indicates a slight decrease in level trend, followed by a return to normal
- RCS leak calculation shows RCS leakage has increased by 9 gpm
- The affected SG has been identified

Which ONE (1) of the following describes the NEXT operation required by the crew?

A. Commence plant shutdown and be in HOT STANDBY within 10 hours.

B. Shut the MSIV on the affected S/G and commence plant shutdown.

C. Isolate blowdown from the affected S/G to prevent contamination and continue power operation.

D. Increase S/G blowdown from the affected S/G to remove any radioactivity accumulation and continue power operations.

INITIAL SUBMITTAL

INITIAL SUBMITTAL

OPERATING TEST SIMULATOR SCENARIOS

SEQUOYAH EXAM
50-327, 328/2000-301

AUGUST 7 - 21, 2000

Facility: Sequoyah **Scenario No.:** 1 **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

Objectives: To evaluate the applicants' ability to perform normal operations and to lower reactor power in accordance with plant procedures; to respond to a Pressurizer Level channel failing high; to respond to a blocked Letdown Line filter; to respond to an Impulse Pressure Transmitter failing high; to respond to a Main Feed Regulating Valve failing as-is; and to evaluate the applicants' in using the "Reactor Trip or Safety Injection" and "Loss of Reactor or Secondary Coolant" EOPs with transition to FR-Z.1 "High Containment Pressure" and eventual transition to ES-1.3, "Transfer to RHR Containment Sump" in response to a Rod Ejection accident and associated ERCW system failures.

Initial Conditions: Reactor is operating at 100% power. SG 2 has a 4 gph tube leak. Severe thunderstorm warnings are in effect for Hamilton and Rhea counties for the next 2 hours. [B] = 976 ppm. The Train week is "A". The following equipment out of service: 1A-A AFW pump, 1A-A SI pump.

Turnover: Swap the controlling channel of pressurizer pressure control from 68-340 to 68-334 per 1-SI-ICC-068-340.1, in preparation for instrument calibration of 68-340 by the IMs. Following that, lower reactor power to 65% in preparation for removing 1B MFWP from service due to vibration problems.

EVENT 1, P1 Initial
EVENT 3, P1
EVENT 4, P2
EVENT 5, P1
EVENT 7, P4
P5
P5
P5

Event No.	Malf. No.	Event Type*	Event Description
			Set up simulator to IC-88.
Preinsert	RW11A 80%	C	ERCW pump Q-A swing check valve fails partially open. Line is 80% blocked.
Preinsert		C	"E" ERCW PUMP N-B, "B" ERCW PUMP K-A, and "F" ERCW PUMP P-B all fail to receive a start signal. Can be started manually at the control s
Preinsert		C	ERCW supply valves for 1A-A D/G will not open. Attempts to open the alternate ERCW supply valve will not be successful.
Preinsert	RP16K643A	C	Containment Spray pump 1A-A fails to auto start on Phase B actuation.
1	-	N (RO)	Swap pressurizer pressure control channel.
2	-	R (RO, BOP)	Reduce power to 65 % from 100%.

Event No.	Malf. No.	Event Type*	Event Description
3	RX05A	I (RO)	PZR Level Channel 1 - 68-339 transmitter fails HIGH
4	CV05	C (RO)	Letdown Line filter failure (reactor coolant filter) due to blockage. Place Excess Letdown in service and secure Normal Letdown.
5	RX11B	I (BOP)	Impulse Pressure Transmitter 1-73 fails HIGH.
6	FW19C	C (BOP)	Main Feedwater Regulating Valve FCV-3-90 (LOOP 3) Fails AS-IS. (Failure is in place as power reduction begins following previous failure)
7	RD06	M (All)	Rod ejection/Small break LOCA.
			ERCW pump J-A swing check valve fails. Flow is 80 % blocked. (See above.)
			"E" ERCW PUMP N-B, "B" ERCW PUMP K-A, and "F" ERCW PUMP P-B all fail to receive a start signal. (See above.)
			ERCW supply valves for the 1A-A D/G will not have opened. Attempts to open the alternate ERCW supply valves will not be successful. (See above.)
			Containment Spray pump 1A-A fails to auto start on Phase B actuation.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

MATERIALS:

1. Appendix A - Shift Turnover

SCENARIO SUMMARY:

Starting from 100% RTP BOL, with 1A-A MD AFW pump , 1A-A SI pump out of service, the following conditions will be encountered in sequence:

1. PZR Level Tranmitter fails High.
2. Letdown Line Filter Failure (Reactor Coolant Filter)
3. Impulse Pressure Transmitter Fails High.
4. Main feedwater pump turbine (MFWPT) high vibration.
5. Rod ejection.
6. ERCW Pump Swing Check Valve Fails.
7. Failure of SSPS slave relay.

CONSOLE OPERATOR'S INSTRUCTIONS

ELAP TIME	IC/MF/RF/OR #	DESCRIPTION
Sim. Setup Reset to IC-88 or	Reset **IC-10.** Perform switch check. Allow the simulator to run for at least 3 minutes before loading CAE or starting the exercise. This will initialize ICS. Load cae ! nrc-s-1 Place simulator momentarily in RUN, Place OOS equipment in required position with tags, Clear alarms and Return to FREEZE.	Initialize simulator at **100%** RTP. **Place Mode 1 placards on panel. Update M-5 placard with RCS C_B from Chemistry Report.**
	Disable override "RCR". **RCR Off** **Important Note -->**	Steps control banks to proper position. Shutdown banks should be fully withdrawn. Ensure operator aid placard is marked **YES** to core burnup less than 12000 MWD/MTU. **Place A Train Week sign on the simulator.**
This remote function is active when the CAE file is loaded.	**MRF** fwr34 out **IOR** zlohs3116aa[1] off **IOR** zlohs3116aa[2] off **IOR** zlohs3116aa[3] off **IOR** zlohs3116aa[4] off **IOR** zdihs3116aa close	1A-A MDAFW pump breaker racked out and pump tagged for maintenance. ***Place a hold order on the 1A-A MDAFW pump & HS-3-116 handswitches.***
This remote function is active when the CAE file is loaded.	**MRF** sir08 off	1A-A SI pump breaker racked out and pump tagged for maintenance. ***Place 1A-A SI pump handswitch in PTL and place a hold order on the handswitch.***
At examiner direction	imf rx05a (none 0)	PZR LEVEL TRANSMITTER Chnl 1 LT-68-339 FAILS HI ***When IMs or MSS contacted to trip bistables, inform the crew that the IMs will report to the MCR in ~ 25 minutes.***

CONSOLE OPERATOR'S INSTRUCTIONS

At Examiner direction	imf cv05 (none 0) 100 3 0	LETDOWN LINE FILTER FAILURE
At Examiner direction	imf rx11b (none 0)	IMPULSE PRESSURE TRANSMITTER PT-1-73 FAILS HI
At Examiner direction	imf fw19c (none 0)	MAIN FEEDWATER REG VALVE (FCV-3-90) PACKING BINDS
At Examiner direction	imf rd06a (none 0)	F-6 Rod Ejection
This malfunction is active when the CAE file is loaded	imf rw11a (none 0) 80 1 0	ERCW Pump J-A Swing Check Valve Fails
This malfunction is active when the CAE file is loaded	imf rp16k611a (none 0)	Tr B SI Relay Failure. (No SI signal to 1B-B MD & TD AFW Pump, ERCW pumps L-B,N-B,M-B,P-B)
This remote malfunction is active when the CAE file is loaded	IOR YPCIHS6768A CLS FAIL	POSITION FOR FCV-67-68, DG 1A-A SUP FROM ERCW HDR 2B
This remote malfunction is active when the CAE file is loaded	IOR YPCIHS6768A CLS FAIL	POSITION FOR FCV-67-66, DG 1A-A SUPPLY FROM ERCW HDR 1A

Appendix A

Plant Data

Unit 1	Rx Power 100	MWD/MTU 3950
Train A Week		
Swap the controlling Pressurizer pressure channel in preparation for calibration, then reduce power to 65% to remove 1B MFP from service due to excessive vibrations.		
3.7.1.2.a for 1A-A MD AFW pump.; Tagged for maintenance to replace motor		
3.5.2.a for 1A-A SI pump.; 1A-A SI pump tagged electrically.		
The National Weather Service has announced a severe storm warning for Hamilton and Rhea counties. It is to remain in effect for 4 more hours.		
There is a small (40 gpd) S/G tube leak in #2 S/G. Chem lab is sampling and monitoring.		

Sequoyah Electric Plant Chemistry Report

U1	U2	RCS Data
100	100	Rx. Power %
Today	Today	Sample Date
Now	Now	Sample Time
976.5	1080	Boron ppm
2.07	2.14	✒ ##Li^+ ppm Goal is variable
35	47	✒ ## H_2 Goal 25 to 50 cc/Kg
2.96 E-02	1.34 E-02	Dose Equ I Goal < 0.1
8.16 E-02	8.52 E-1	Xe-133 µCi/g
200	168	Silica ≤1000 ppb
5.235 E-5	4.528 E-2	Fuel Reliability Index
✒ ## If Goal is exceeded, report on morning status report.		

RWST's & Boric Acid Tanks Boron			
RWST Goal	Boron ppm	Date	Goal
U1 RWST	2608	Today	2500 to 2650
U2 RWST	2626	Today	2500 to 2650
*BAT A	6555	Today	Variable
*BAT B	6747	Today	Variable
*BAT C	6601	Today	Variable
Spent Fuel Pit	2502	Today	≥ 2056

SI-50 & SI-137.5 Primary to Secondary Leakrate Information		
U1	U2	
ND	ND	Leakrate SI-50 gpd
Today	Today	Date/Time SI-50
<0.1	<0.1	Leak rate SI-137.5 gpd
Today	Today	Date / Time SI-137.5
800	848	CPM above Bkgd. Equivalent to 5 gpd leak
14000	21730	CPM above Bkgd. Equivalent to 126 gpd leak
9000	2542	Δ CMP increase within 15 min. to equal a 15 gpd leak.
35	61	Current 119 countrate
31	40	119 Background cpm

Phone and Beeper Numbers:
- Chemistry Shift Supervisor Beeper 40-732
- Chem Lab Phones 7285; 6348 voice mail; Fax 7261
- Ecolochem Onsite Pager 350-20-395

Comments ☻ All Parameters are within goals.
1) N_2 blanket on U1 HW pump 1C to control dissolved oxygen.
2) U-2 RCS DEI Currently at steady state conditions within the goal.AOP-R.08 exited 6/2/99 1640
3) U-2 HW air in-leakage Action Plan I/P.
4) U2 Sulfate Recovery Action Plan is I/P.
5)

U1	U2	S/G, FW & HW Data
0.38	0.34	✒ ## S/G Sodium Goal Goal ≤ 0.8 ppb
2.32	3.4	S/G Chloride Goal ≤ 10 ppb
1.0	1.0	✒ ## S/G Sulfate Goal ≤ 1.7 ppb
0.23	0.14	✒ ## S/G Molar Ratio Goal 0.05 to 0.5
1.13	0.62	S/G Cation Cond Goal ≤1.0 µS
5.6	8.8	S/G Boron Goal 5 to 10 ppm
50	155	SGBD Flowrate in GPM
1.01	1.1	✒ ## CPI Goal ≤1.1
SO_4 226 ppb days 18%of S/D Limit	Cl^- 425 ppb-days 23%	Corrosion Index Limiting Value ppb-days for % of hot soak value
2.3	2.9	FW ETA Goal 2 to 3 ppm
9.7	9.1	FW pH
64	75	FW Hydrazine Goal ≥ 30 ppb
0.18	1.9	✒ ## FW Iron Goal ≤ 5 ppb
0.2	1.2	FW Dissolved O_2 Goal ≤ 5.0 ppb
3.8	0.2	HW Dissolved O_2 Goal ≤5.0ppb
0.01	0.02	HW Sodium ppb
<5.0	<5.0	Condenser Air Inleakage Goal ≤ 6 cfm
✒ ## If Goal is exceeded, report on morning status report.		

	U1 Con-DI			U2 Con-DI		
	Outlet Sodium ppb 0.05			Outlet Sodium ppb 0.08		
	Flowrate gpm 1000			Flowrate gpm 1000		
Pol	Sp Cond	Status	Millions of Gal.	Sp Cond	Status	Millions of Gal.
1	Vessel is empty & in service				FR	
2		SF	5.0		Empty OOS	
3		Fresh			Ex	
4		Fresh			Ex	
5		Fresh		0.11	I/S	~ 12
6		Fresh			Fresh	

NR = Needs Rinse, I/S = In Service EX = Exhausted, SF=Semi-Fresh

ERCW Chlorination Goal is 3/Wk at RT >50° F < 80°

Mon.	Tues.	Wed	Thur.	Fri.
no	Yes	Yes		

- PCL-222 continuous injection to ERCW in progress downstream of each ERCW strainer.
- Injecting CL-363 to ERCW ~ twice per week

Chemistry WR's
1. C410323 12/17/98 TB Lab A/C leak-coil remains I/S. WW242
2. C415811 Drain line from CCS/ERCW overflows when sampling. WW230
3. C402198 2-SIV-43-78 U2 RHR-B sample valve leaking through. WW238
4. C412044 U1 HW Sample Pump A. WW235
5.

Tech Spec or Critical Items:
None

Inoperable Rad Monitors requiring compensatory sampling:
☼ For Information only : 2-RM-90-99 inoperable.
1-RM-90-99

6.2 Setup

[1] VERIFY the status of the following trip status lights and perform the following:

[a] RECORD status, lit or not lit, of each.

[b] IF any light is lit, THEN

OBTAIN Unit 1 UO's concurrence before proceeding (N/A concurrence if NO light is lit.)

CAUTION The following functions will occur if any of the applicable trip status lights are lit. The P-11 status lights will be lit when above the P-11 setpoint.

A. Reactor Trip (Applies to REAC TRIP lights.)
B. Remove Manual Block of Safety Injection (Applies to P-11 lights.)
C. Safety Injection (Applies to SI SIG lights.)
D. Turbine Runback Initiation and Block of Automatic and Manual Rod Withdrawal (only applies to the transmitter calibration) (Applies to TURB RNBK lights.)

WINDOW #	DESCRIPTION	RACK LIT	RACK NOT LIT	TRANSMITTER LIT	TRANSMITTER NOT LIT
XX-55-6A-30	PS-68-334B PRZR LO PRESS REAC TRIP	☐	☐	☐	☐
XX-55-6A-31	PS-68-334A PRZR HI PRESS REAC TRIP	☐	☐	☐	☐
XX-55-6A-33	PS-68-334D PRZR LO PRESS SI SIG	☐	☐	☐	☐
XX-55-6A-34	PS-68-334E PRZR HI PRESS P-11	☐	☐	☐	☐
XX-55-6A-50	PS-68-323B PRZR LO PRESS REAC TRIP	☐	☐	☐	☐
XX-55-6A-51	PS-68-323A PRZR HI PRESS REAC TRIP	☐	☐	☐	☐
XX-55-6A-53	PS-68-323D PRZR LO PRESS SI SIG	☐	☐	☐	☐
XX-55-6A-54	PS-68-323E PRZR HI PRESS P-11	☐	☐	☐	☐
XX-55-6A-70	PS-68-322D PRZR LO PRESS REAC TRIP	☐	☐	☐	☐

Rack _____ / _____ Transmitter _____ / _____

(step continued)

6.2 **Setup** (Continued)

Step 6.2 [1] (Continued)

WINDOW #	DESCRIPTION	RACK LIT	RACK NOT LIT	TRANSMITTER LIT	TRANSMITTER NOT LIT
XX-55-6A-71	PS-68-322A PRZR HI PRESS REAC TRIP	☐	☐	☐	☐
XX-55-5-30	TS-68-25D RC LP2 OTΔT REAC TRIP	N/A	N/A	☐	☐
XX-55-5-35	TS-68-25E RC LP2 OTΔT TURB RNBK	N/A	N/A	☐	☐
XX-55-5-50	TS-68-44D RC LP3 OTΔT REAC TRIP	N/A	N/A	☐	☐
XX-55-5-55	TS-68-44E RC LP3 OTΔT TURB RNBK	N/A	N/A	☐	☐
XX-55-5-70	TS-68-67D RC LP4 OTΔT REAC TRIP	N/A	N/A	☐	☐
XX-55-5-75	TS-68-67E RC LP4 OTΔT TURB RNBK	N/A	N/A	☐	☐

Rack	Transmitter
_____ / _____	_____ / _____
_____ / _____	_____ / _____
Unit 1 UO Concurrence	Unit 1 UO Concurrence

[2] **HAVE** Unit 1 UO place PRESS CONTROL CHANNEL SELECTOR switch 1-XS-68-340D (PS/455F) on 1-M-5 to the Loop PT-68-334 & 323 (PT-456 & 457) position.

Rack	Transmitter
_____ / _____	_____ / _____
Unit 1 UO	Unit 1 UO
_____ / _____	_____ / _____
Concurrent Verifier	Concurrent Verifier

6.2 Setup (Continued)

NOTE Steps 6.2 [3] and [4] can be N/A'd by Unit 1 UO if performing this instruction during modes 5 and 6.

[3] **HAVE** Unit 1 UO place LOOP TAVG ΔT REC/SEL switch 1-XS-68-2B (TS/411E) on 1-M-5 to Loop 2, 3, or 4 position.

Rack		Transmitter	
N/A	/		/

[4] **HAVE** Unit 1 UO place PRESS REC CHANNEL SELECTOR switch 1-XS-68-340B (PS/455G) on 1-M-5 to a position other than Loop PT-68-340 (PT-455).

Rack		Transmitter	
	/		/

[5] **DELETE** the following computer points from PROCESSING.

	RACK	XMTR
A. 1P0480A	☐	☐
B. 1T0410A	N/A	☐

Rack		Transmitter	
	/		/

NOTE The channel calibration, verification and adjustment is divided into two parts, the rack calibration (Section 6.3) and transmitter calibration (Section 6.4). These parts may be performed as follows:

[6] **PERFORM** one part at a time such that the channel is removed and returned to service during the performance of each part **OR**

PERFORM both parts prior to returning channel to service.

RACK	XMTR
☐	☐

Op-Test No.: __1__ Scenario No.: __1__ Event No.: _1___ Page _1_ of __

Event Description: Swap Controlling Pressurizer Pressure Channels IAW 1-SI-ICC-068-340.1.

Time	Position	Applicant's Actions or Behavior
	CREW	Swap Controlling Pressurizer Pressure Channels IAW 1-SI-ICC-068-340.1.
	SRO	REVIEW the SI for impact on the plant. Review expected actions of the IM's with the crew
	RO critical STep	IM have signed off procedure step 6.2.1. IM have RO place Press Control Channel Selector switch to the 334/323 position. **(Critical Step)**
	RO	IM have RO place Loop Tavg/ DT Rec/Sel switch to the Loop 2, 3, or 4 position.
	RO	IM have RO place PRESS REC CHANNEL SELECTOR switch to a position other than 340.
	SRO	Allow IM's to commence work

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _2___ Page _1_ of __

Event Description: Reduce power from 100% to 65% to remove 1B MFP from service. 65%

Time	Position	Applicant's Actions or Behavior
	CREW	Perform a power reduction from 100 to 30% of GO-5. Sect 5.2

	RO/SRO/BOP	• REVIEW of Precautions and Limitations section 3.0 has been completed/REVIEW of Precautions and Limitations section 3.0 has been completed.
		• NOTIFY Radcon of impending load reduction.
		• NOTIFY CON DI operators of load reduction and to remove beds as needed.
		• NOTIFY Load Dispatcher of impending load reduction.
		• INITIATE a load reduction.
		  • Change Setter to the desired setting by using the down pushbutton
		  • Verify load rate thumbwheel set a t 1%/min or as directed by the SRO
		  • Depress the GO pushbutton

	RO/BOP	• MONITOR turbine load decreasing. Monitor the following periodically as load is increased. Decreased T-avg following T-ref program. Monitor RPIs, group step counters, Loop ΔT, NIS, QPTR, rod insertion, rod misalignment, inoperable RPIs & inoperable rods. valve position limit ~10% above gov vlv control indication as turbine load is decreased..
	SRO	CONTACT Reactor Engineering if AFD remains outside the target band for 30 min. or more as to why and when AFD may be returned to the target band.
	BOP	WHEN ~ 85 to 90% RTP, THEN IF 3 condensate demineralizer booster pumps are in service THEN STOP I condensate demineralizer booster pump IAW SO-2/ 3-1. IF 2 condensate demineralizer booster pumps are in service, THEN evaluate removing both condensate demineralizer booster pumps IAW 1,2-SO-2/3-1.
	RO	Complete the following at 80% reactor power: Calculate Calorimetric power U1118_____÷34.11= _____%. Verify that all NIS PR A channel drawers are within 2% of calculated calorimetric power. If NO is checked, then perform 0-SI-OPS-092-078.0
	SRO	WHEN turbine load < 75%, THEN Check Turbine Runback circuits are not armed.
	BOP	At 55 - 70% power remove the following from service 1. Simultaneously stop both operating condensate demin booster pumps and 1 of 3 No. 3 Heater drain pumps
	BOP	Dispatch AUO to align sealing steam from opposite unit OR Aux Boiler,
	BOP	At ÷ 65% STOP one of the two #7 HDT pumps.

Op-Test No.: __1__ Scenario No.: _1___ Event No.: _2___ Page _1_ of __

Event Description: Boration for Load Reduction.

Time	Position	Applicant's Actions or Behavior
	CREW	• Reviews PRECAUTIONS AND LIMITATIONS • Reviews PREREQUISITE ACTIONS • If reactor is critical and reactor power to be changed by >5% then perform calculations.
	RO	Performs Section 6.4 BORATE, of)-SO-62.7
	RO	ENSURES Boric Acid Storage Tank level is within TS 3.1.2.6 limits.
	RO	ENSURES makeup system is aligned for AUTO operation
	RO	Records amount of boric acid to be added.
	RO	Places HS-62-140A to STOP
	RO	Places HS-62-140B to BORATE
	RO	ADJUST FC-62-139 for desired flow rate
	RO	SET FQ-63-139 for the desired quantity of water
	RO	PLACE HS-62-140A to START
	RO	ENSURES Boric Acid Pumps are in FAST speed by right red light LIT on HS-62-230A OR HS-62-232A.
	RO	MONITORS nuclear instrumentation and reactor coolant temperature to ensure the proper response from boration is achieved.
	RO	IF VCT level increases to 63% THEN ENSURE LCV-62-118 OPENS
	RO	WHEN boration is complete, THEN: a. Place HS-62-140A to STOP b. Call Chem Lab for an RCS Boron Sample
	RO	REALIGN makeup controls for AUTO makeup

Op-Test No.: __1__ Scenario No.: _1___ Event No.: _3___ Page _1_ of __

Event Description: PZR Level Channel 1-68-339 Transmitter Fails High.

Time	Position	Applicant's Actions or Behavior
	SRO What is applicable ?/	EVALUATE the following Tech Specs for applicability: • 3.2.5, DNB Parameters • 3.3.1.1, Reactor Trip System Instrumentation • 3.3.2.1, Engineered Safety Feature Actuation System Instrumentation • 3.3.3.7, Accident Monitoring Instrumentation • 3.4.3.2, RCS Relief Valves - Operating
	SRO	EVALUATE EPIP-1, Emergency Plan Initiating Matrix. Implement AOP-I.04 Section 2.2 and diagnose the failure as Pressurizer Level Instrument.
	RO Critical STOP	• Section 2.2 • CHECK LI-68-339 indicates NORMAL. If not then perform the following: [ENSURE LEVEL CONTROL CHANNEL SELECTOR switch XS-68-339E in LT-68-335 & 320. • ENSURE LEVEL REC CHANNEL SELECTOR switch XS-68-339B in LT-68-320 or LT-68-335. • GO TO Step 4. • CHECK letdown in service. If not then restore letdown using EA-62-5. • ENSURE pressurizer heaters restored to service.
	SRO	NOTIFY IM to remove failed pressurizer level channel from service USING appropriate Appendix. Contact MSS to remove channel from service Contact management, work control and inform them of the failure
	SRO	GO TO appropriate plant procedure.

Op-Test No.: __1__ Scenario No.: _1___ Event No.: _4___ Page _1_ of __

Event Description: Letdown Line Filter Failure due to blockage.

Time	Position	Applicant's Actions or Behavior
	CREW	Respond to annunciators and diagnoses a letdown line problem. AR checks PI indicators, PCV-62-81 to Manual
	SRO	Directs RO to remove letdown and place excess letdown in service Dispatches AO to investigate
	RO	Goes to 1-SO-62-6
	RO	**ENSURE** [1-FCV-62-93] is in **MANUAL AND OPERATE** as needed to regulate charging flow to keep pressurizer level on program.
	RO/SRO	**NOTIFY** RADCON that Excess Letdown is being PLACED in SERVICE. Notify Maintenance and Engineering to obtain assistance
	RO	**IF** Excess Letdown is the only letdown flowpath, **THEN VERIFY** Positive Displacement Pump is out of service.
	RO	**ENSURE** [1-FCV-70-143] CCS water to the excess letdown heat exchanger is OPEN.
	RO	**ENSURE** [1-FCV-70-85] Excess Letdown Heat Exchanger CCS flow control valve is OPEN.
	RO	**NOTE** Step [6] will prevent subjecting the CVCS piping downstream of the Excess Letdown HX to a temperature above the design value.
	RO	**ENSURE** that [1-FI-70-84] is indicating greater than 230 gpm. **IF AO is dispatched, booth will report hi filter Delta P**
	RO	**ENSURE** Excess Letdown 3-way divert valve [1-FCV-62-59] is in NORMAL.
	RO	**CAUTION** FCV 62-63 has replaced RCP seal leak-off isolation valves as the primary means for isolating seal flow. The normal letdown path for excess letdown will not be available if FCV-62-63 is CLOSED.
	RO	**NOTE** Back flow through the RCP seals will occur should the RCP seal leakoff isolation valves fail to their OPEN position on loss of air or electrical power.

Op-Test No.: __1__ Scenario No.: _1___ Event No.: _4___ Page _2_ of __

Event Description: Letdown Line Filter Failure due to blockage.

Time	Position	Applicant's Actions or Behavior
	RO	**IF** less than 100 psig in RCS and [1-FCV-62-63] is **CLOSED** and excess letdown will be aligned for NORMAL operation, **THEN ENSURE** the following are **CLOSED**: Seal returns and bypasses
	RO	**ENSURE** [1-FCV-62-63] is **OPEN.**
	RO	**OPEN** [1-FCV-62-54] Cold Leg Loop #3 Excess Letdown isolation valve. **(Critical Step)**
	RO	**OPEN** [1-FCV-62-55] Excess Letdown containment isolation valve. **(Critical Step)**
	RO	**OPEN** [1-FCV-62-56] slowly to increase excess letdown flow to desired amount, not to exceed 206°F heat exchanger outlet temperature, as indicated on 1-TI-62-58.
	RO	**NOTE** Placing Excess Letdown in service causes increased activity in various areas of the Auxiliary Building.
	RO/SRO	**NOTIFY** RADCON that Excess Letdown has been placed in service.
		Removing Letdown From Service
	RO	**OBTAIN** permission from Unit 1 SRO to remove letdown from service.
	RO	**IF** excess letdown is to be put in service, **THEN PERFORM** 1-SO-62-6, **AND RETURN** to step **[3]**.
	RO	**ENSURE** following letdown orifice valves **CLOSED**: 62-72, 62-73, 62-74
	RO Critical Step	**CLOSE** following letdown isolation valves: 62-69 and 62-70. (**Critical Step**)

Op-Test No.: __1__ Scenario No.: _1___ Event No.: _5___ Page _1_ of __

Event Description: Impulse Pressure Transmitter 1-73 fails High.

Time	Position	Applicant's Actions or Behavior
	CREW	STABILIZE THE PLANT
	RO/SRO/BOP Crit Step	**If PT-1-73 has failed, then place control rods in MANUAL.** **(Critical Step)** • REFERENCE ANNUNCIATOR RESPONSES • UTILIZE SUPPORTING PROCEDURES **The crew may refer to AOP-C.01, Section 2.2, Continuous Control Rod Movement in addition to AOP-I.08, Turbine Impulse Pressure Instrument Malfunction**
	RO/BOP	EVALUATE the following Tech Specs for applicability: 3.3.1.1, Reactor Trip System Instrumentation
	SRO	Direct actions of AOP-I.08
	BOP	CHECK PI-1-72 indicates normal. If not then Place steam dumps in STEAM PRESSURE mode & NOTIFY IM to remove P-1-72 from service using Appendix A.
	RO	CHECK PI-1-73 indicates normal. If not then perform the following: PLACE rods in MAN. STABILIZE reactor power.
	BOP	EVALUATE placing Main Reg Valves in MAN to maintain SG level on program. PLACE steam dumps in STEAM PRESSURE mode.
	SRO	NOTIFY IM to remove P-1-73 from service using Appendix B. GO TO appropriate plant procedure.
		RO may request or SRO may direct to move rods to match Tavg/Tref

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _6___ Page _1_ of __

Event Description: FRV 3-90 fails as is.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and announce failure of MFW Feedwater Control. Place loop feedwater reg valve to MANUAL and increase feedwater flow to return SG level to program.
	SRO	Direct the actions of AOP-S.01, Section 2.1.
	BOP	Maintain S/G level(s) on program.
	BOP	Check Steam Flow and Feed Flow channels NORMAL.
	BOP	Maintain SG levels on program
	BOP	Verify failure due to steam/feed flow instrument failure
		Insert the next failure prior to the crew tripping the reactor
	CREW	Crew will diagnose cannot control S/G level and will discuss the need to trip the reactor due to uncontrollable S/G level.
		NOTE: with NRC examiner concurrence, call SRO as Ops. Supt to continue to get power down

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _7___ Page _1_ of __

Event Description: Rod Ejection/ Small Break LOCA.

Time	Position	Applicant's Actions or Behavior
	CREW	Recognize RCS leak using control room alarms and indications and announce to all crew members.
	CREW	Crew will determine the reactor needs to be tripped, the below actions are included in case crew delays in tripping the unit.
	CREW	Enter and direct the actions of E-0.
	RO/SRO/BOP	Perform actions of E-0.

Op-Test No.: __1__ Scenario No.: _1___ Event No.: _7___ Page _4_ of __

Event Description: Reactor Trip Response/Small Break LOCA.

Time	Position	Applicant's Actions or Behavior
		• VERIFY Rx trip. If not then trip reactor. If reactor can not be tripped then monitor status trees and GO TO FR-S.1 • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps

	RO/BOP	• VERIFY turbine trip. Turbine stop valves CLOSED.
		• If not then trip turbine. If turbine can not be tripped then close MSIVs and MSIV bypass valves.
		• VERIFY Shutdown boards energized.
		  • VERIFY generator breakers OPEN 30 seconds after turbine trip.
		  • ENSURE station service ENERGIZED from start busses.
		  • VERIFY at least one train of shutdown boards ENERGIZED.
		  • VERIFY both trains of shutdown boards ENERGIZED.
		• IF power can NOT be restored to at least one train of SD Bds then GO TO ECA-0.0.
		• DETERMINE if SI actuated. If required, then actuate SI. If not actuated, then determine if SI is required. If SI is not actuated/required then monitor status trees and GO TO ES-0.1.
		  • ECCS pumps RUNNING
		  • Any SI alarm LIT [M-4D].
		• VERIFY CCS pumps running.
		• CHECK ERCW System operation. VERIFY at least four ERCW pumps running. **(Will start 2 additional pumps).** VERIFY D/G ERCW supply valves OPEN. **(Will attempt to open both DG supply valves, valves will not open, Will emergency stop DG)**
		• MONITOR ECCS operation.
		  • VERIFY ECCS pumps RUNNING:
		  • VERIFY CCP flow through CCPIT.
		  • CHECK RCS pressure less than 1500 psig.
		  • VERIFY SI pump flow.
		  • CHECK RCS pressure less than 180 psig.
		  • VERIFY RHR pump flow.
		• VERIFY ESF system aligned.
		  • Phase A ACTUATED:

Critical Step

- CONTAINMENT ISOLATION PHASE A TRAIN A alarm LIT [M-6C, B5].
- CONTAINMENT ISOLATION PHASE A TRAIN B alarm LIT [M-6C, B6].

- Containment Ventilation Isolation ACTUATED:
  - CONTAINMENT VENTILATION ISOLATION TRAIN A alarm LIT [M-6C, C5].
  - CONTAINMENT VENTILATION ISOLATION TRAIN B alarm LIT [M-6C, C6].
- Status monitor panels:
  - 6C DARK
  - 6D DARK
  - 6E LIT OUTSIDE outlined area
  - 6H DARK
  - 6J LIT.
- Train A status panel 6K:
- Train B status panel 6L:

- MONITOR containment spray NOT required. (Phase B NOT ACTUATED, Containment pressure less than 2.81 psid.) If required then ENSURE containment spray initiated, ENSURE Phase B valves CLOSED, STOP RCPs & MONITOR containment air return fans.
- Check if main steam lines should be isolated. (Any S/G pressure less than 600 psig **AND** STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive DARK [M-4A, A4]. OR Phase B actuation OR Any S/G pressure drop at a rate greater than 100 psi in a 50-second period **AND** STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT [M-4A, A4]. If required **VERIFY** MSIVs and MSIV bypass valves CLOSED.
- VERIFY MFW isolation.
- VERIFY AFW pumps running. (TDAFW & MDAFW)
- VERIFY AFW valve alignment. AFW MD in AUTO & TD LCVs open and recirc valves closed.
- DETERMINE if secondary heat sink available. (Level in at least 1 SG >10% [25% ADV] or >440 gpm. Control feed flow to maintain > 10% [25% ADV] and 50% in all S/Gs)
- MONITOR RCS temperatures. (RNO = If T-avg < 547°F then ensure steam dumps and atmospheric relief valves CLOSED, If cooldown continues then control total AFW flow using EA-3-8. IF cooldown still continues, THEN close MSIVs.)
- DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
- CHECK pressurizer steam space integrity.

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _7___ Page _5_ of __

Event Description: Rod Ejection/ Small Break LOCA.

Time	Position	Applicant's Actions or Behavior

	RO	• CHECK pressurizer steam space integrity.
		  • Pzr PORVs CLOSED. (IF RCS press < 2335 then close PORV or block valve. IF NOT then GO TO E-1.)
		  • Pzr safety valves CLOSED. (IF NOT then GO TO E-1.)
		  • Pzr sprays CLOSED. (If RCS press < 2260 psig then close spray valves. IF NOT then stop RCP supplying failed spray valve.
		• MONITOR RCP trip criteria. If at least one CCP OR SI pump running AND RCS pressure < 1250 psig then STOP RCPs. **(Crew may stop RCP's earlier based on foldout page)**
		• CHECK S/G secondary pressure boundary integrity. IF not then monitor status trees and GO TO E-2.
		• CHECK S/G tube integrity. IF not then monitor status trees and GO TO E-3.
		• ***CHECK RCS integrity. IF not then monitor status trees and GO TO E-1.***
		• STA should be called to monitor status trees, If called early should ~~meet~~ transition to FR-Z.1, otherwise crew will have to monitor trees.

FR-Z.1 Steps		MONITOR RWST level greater than 27%.
		VERIFY containment ventilation dampers CLOSED: Panel 6K CNTMT VENT GREEN Panel 6L CNTMT VENT GREEN
		VERIFY Phase A valves CLOSED: Panel 6K PHASE A GREEN Panel 6L PHASE A GREEN
		VERIFY Phase B valves CLOSED: Panel 6K PHASE B GREEN Panel 6L PHASE B GREEN.
		VERIFY containment spray operation: STOP RCPs CHECK procedure applicability for containment spray operation: • RHR sump recirculation capability AVAILABLE. VERIFY containment spray pumps RUNNING. (Will have to start 1 Spray Pump) MONITOR RWST level greater than 8%.
		VERIFY containment spray suction ALIGNED to RWST: Containment spray suction from RWST valves FCV-72-22 and FCV-72-21 OPEN.
		VERIFY containment spray discharge alignment: Containment spray discharge valves FCV-72-39 and FCV-72-2 OPEN

		Containment spray recirculation to RWST valves FCV-72-34 and FCV-72-13 CLOSED Containment spray flow greater than 4750 gpm on each train.
		VERIFY EGTS operation VERIFY EGTS fans RUNNING. VERIFY EGTS operation NORMAL.
		MONITOR containment air return fans: RECORD present time in Operator's Daily Journal. WHEN 10 minutes have elapsed from time recorded in Substep 7.a., THEN VERIFY containment air return fans running.
		VERIFY MSIVs and MSIV bypass valves CLOSED.
		MONITOR if RHR spray should be placed in service: CHECK the following: • Containment pressure greater than 9.5 psid AND • At least 1 hour has elapsed since beginning of accident AND • RHR suction ALIGNED to containment sump AND • At least one CCP AND one SI pump RUNNING.
	SRO	Transition to and direct actions of E-1. ***(Scenario may terminate at examiner discretion)***

Critical STEP

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _7___ Page _6_ of __

Event Description: Rod Ejection/ Small Break LOCA.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• MONITOR RCP trip criteria. • CHECK S/G secondary pressure boundary integrity. IF not met then VERIFY all Faulted S/G(s) ISOLATED. IF any Faulted S/G NOT isolated then GO TO E-2. • MAINTAIN Intact S/G narrow range level between 10% & 50% [25% & 50% ADV]. IF level in any S/G continues to rise above 50% in an uncontrolled manner, then GO TO E-3. • VERIFY secondary radiation NORMAL. IF NOT then GO TO E-3. • MONITOR pressurizer PORVs and block valves. • ENSURE Rx Bldg auxiliary floor and equipment drain sump pumps STOPPED. • MONITOR SI termination criteria. (IF criteria met THEN GO TO ES-1.1.) • MONITOR if containment spray should be stopped. • MONITOR if containment vacuum control should be returned to normal. • MONITOR shutdown boards continuously energized. WHEN shutdown board reenergized, then ENSURE safeguard equipment running as necessary. • DETERMINE if RHR pumps should be stopped. • CHECK RCS and S/G pressures. IF S/G pressure dropping or RCS pressure rising then GO TO Note prior to Step 1. • DETERMINE if D/Gs should be stopped. • INITIATE evaluation of plant status. IF cold leg recirculation capability can NOT be verified then GO TO ECA-1.1. IF LOCA outside containment indicated then GO TO ECA-1.2. • MONITOR if hydrogen igniters and recombiners should be turned on. • DETERMINE if RCS cooldown and depressurization required. IF RCS pressure ≥ 180 psig & one RHR pump flow ≤ 1500 gpm, then GO TO ES-1.2. • DETERMINE if transfer to cold leg recirculation is required. If RWST level < 27% then GO TO ES-1.3. If not then GO TO Step 14 (Initiate evaluation of plant status). • MONITOR if CLAs should be isolated. • MONITOR if RHR spray should be placed in service. • DETERMINE if Intact S/Gs should be depressurized to RCS pressure. • DETERMINE if reactor vessel head should be vented.

Facility: Sequoyah **Scenario No.:** 2 **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

Objectives: To evaluate the applicants' ability to perform normal operations and to raise reactor power in accordance with plant procedures; to respond to a false power range channel overpower rod stop; to respond to a centrifugal charging pump shaft break; to respond to a respond to a loss of the running ERCW pump; to respond to a No. 5 FW heater level controller failing low; and to assess the applicants' in using the "Reactor Trip or Safety Injection" EOP and Functional Recovery procedure FR-H.1 as a result of a loss of 125 VDC Vital Battery Board I in conjunction with a temporary loss of all Auxiliary Feedwater.

Initial Conditions: Reactor is operating at 58% power. SG 2 has a 4 gph tube leak. Severe thunderstorm warnings are in effect for Hamilton and Rhea counties for the next 2 hours. The Train week is "A". The following equipment out of service: 1A-A AFW pump, 1A-A SI pump.

Turnover: Raise reactor power to 90% as soon as possible to meet load demand. The 1B MFWP has been locally checked out per 1-SO-2/3-1, section 5.10 and is ready for loading.

Critical Task Event 1, P 2
Event 4, P 1
Event 5, P 1
Event 6, P 1
Event 7, P 2

Event No.	Malf. No.	Event Type*	Event Description
			Set-up to IC-87
Preinsert	FW07	C	MOTOR DRIVEN PUMP 1B-B initially starts, but trips on overload.
1	-	N (BOP)	Place the 1B MFW pump in service.
2	-	R (RO)	Increase power from 90 % to 95 %.
3	NI10A	I (RO)	NIS A PR Channel 1 overpower rod stop false signal.
4	CV21B	C (RO)	Centrifugal Charging Pump 1B-B shaft breaks. Place standby pump in service.

Event No.	Malf. No.	Event Type*	Event Description
5	RW	C (BOP)	The N-B ERCW pump trips. Manually start a standby pump.
6	RX26C	I (BOP)	No. 2 S/G Pressure Transmitter Fails High.
7	ED12	M (All)	Loss of 125 VDC Vital Battery Board I.
	FW07B	C	MOTOR DRIVEN PUMP 1B-B initially starts, but trips on overload. (Will not be restored.)
	FW07C FW0	C	TURBINE DRIVEN PUMP 1A-S fails to start. Can be restarted locally but will immediately overspeed. (After entering FR-H.1 and prior to step 16, TTAFW pump will be returned and SG levels restored.)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

MATERIALS:

1. Appendix A - Shift Turnover

SCENARIO SUMMARY:

Starting from 73% RTP BOL, with 1A-A MD AFW pump , 1A-A SI pump out of service, the following conditions will be encountered in sequence:

1. NIS overpower rod stop false signal.
2. CCP broken shaft.
3. ERCW pump Trips.
4. No. 5 feedwater heater level control fails low.
5. Loss of 125V DC Vital Battery Board.
6. AFW pump trip or fail to start.
7. AFW pump trip or fail to start.

CONSOLE OPERATOR'S INSTRUCTIONS

ELAP. TIME	IC/MF/RF/OR #	DESCRIPTION
Sim. Setup - reset to IC-87 or	Reset **IC-11** Perform switch check. Allow the simulator to run for at least 3 minutes before loading CAE or starting the exercise. This will initialize ICS. Load cae ! nrc-s-2 Place simulator momentarily in RUN, Place OOS equipment in required position with tags, Clear alarms and Return to FREEZE.	Initialize simulator at **68%** RTP. **Place Mode 1 placards on panel. Update M-5 placard with RCS C_B from Chemistry Report.**
	Disable override "RCR". **RCR Off** **Important Note -->**	Steps control banks to proper position. Shutdown banks should be fully withdrawn. Ensure operator aid placard is marked **YES** to core burnup less than 12000 MWD/MTU. **Place A Train Week sign on the simulator.**
This remote function is active when the CAE file is loaded.	**MRF** fwr34 out **IOR** zlohs3116aa[1] off **IOR** zlohs3116aa[2] off **IOR** zlohs3116aa[3] off **IOR** zlohs3116aa[4] off **IOR** zdihs3116aa close	1A-A MDAFW pump breaker racked out and pump tagged for maintenance. ***Place a hold order on the 1A-A MDAFW pump & HS-3-116 handswitches.***
This remote function is active when the CAE file is loaded.	**MRF** sir08 off	1A-A SI pump breaker racked out and pump tagged for maintenance. ***Place 1A-A SI pump handswitch in PTL and place a hold order on the handswitch.***
		When dispatched as AO to check 1B-B MFP for start report that prestart checks are complete. IM's and AO are standing by for startup.
At examiner direction insert	imf ni10a (none 0)	NIS Channel 1 OVERPOWER ROD STOP FALSE SIGNAL

CONSOLE OPERATOR'S INSTRUCTIONS

At examiner direction insert	imf cv21b (none 0)	CHARGING PUMP 1B-B BROKEN SHAFT ***When the Support ASOS/AUO are dispatched to investigate, wait ~ 5 min. and report that the shaft is broken.***
At examiner direction insert	imf rw01d (none 0)	ERCW Pump M-B Trip ***When the Support ASOS/AUO are dispatched to investigate, wait ~ 5 min. and report that the relay target is instantaneous overcurrent and the pump smells hot.***
At examiner direction insert	imf rx26c 100 (none 0)	PT-1-9A fails high
At examiner direction insert	imf ed12a (none 0)	LOSS OF 125 VDC VITAL BATTERY BOARD I
This malfunction is active when the CAE file is loaded	imf fw07b (none 0)	AFW PUMP 1B-B TRIP OR FAIL TO START ***When the Support ASOS/AUO are dispatched to investigate, wait ~ 5 min. and report that the relay target is instantaneous overcurrent and the pump smells hot.***
This malfunction is active when the CAE file is loaded	imf fw07c (none 0)	AFW PUMP 1C-S TRIP OR FAIL TO START

Unit 1	Rx Power 58	MWD/MTU 3950
Train A Week		
The plant was at 100% power, load was reduced to take 1B MFP from service for maintenance. The pump has been repaired. Increase Power Level to 90% %. GO-5 step 5.3.13 is complete SM wants the OATC to start the feed pump. Preconditioned power level is 100%		
3.7.1.2.a for 1A-A MD AFW pump.; Tagged for maintenance to replace motor.		
3.5.2.a for 1A-A SI pump.; 1A-A SI pump tagged electrically.		
The National Weather Service has announced a severe storm warning for Hamilton and Rhea counties. It is to remain in effect for 4 more hours.		
There is a small (40 gpd) S/G tube leak in #2 S/G. Chem lab is sampling and monitoring.		

Sequoyah Electric Plant Chemistry Report

U1	U2	RCS Data
69	100	Rx. Power %
Today	Today	Sample Date
Now	Now	Sample Time
1096	1080	Boron ppm
2.07	2.14	✒ ##Li^+ ppm Goal is variable
35	47	✒ ## H_2 Goal 25 to 50 cc/Kg
2.96 E-02	1.34 E-02	Dose Equ I. Goal < 0.1
8.16 E-02	8.52 E-1	Xe-133 µCi/g
200	168	Silica ≤1000 ppb
5.235 E-5	4.528 E-2	Fuel Reliability Index
✒ ## If Goal is exceeded, report on morning status report.		

U1	U2	S/G, FW & HW Data
0.38	0.34	✒ ## S/G Sodium Goal Goal ≤ 0.8 ppb
2.32	3.4	S/G Chloride Goal ≤ 10 ppb
1.0	1.0	✒ ## S/G Sulfate Goal ≤ 1.7 ppb
0.23	0.14	✒ ## S/G Molar Ratio Goal 0.05 to 0.5
1.13	0.62	S/G Cation Cond Goal ≤1.0 µS
5.6	8.8	S/G Boron Goal 5 to 10 ppm
50	155	SGBD Flowrate in GPM
1.01	1.1	✒ ## CPI Goal ≤1.1
SO_4 226 ppb days 18%of S/D Limit	Cl^- 425 ppb-days 23%	Corrosion Index Limiting Value ppb-days for % of hot soak value
2.3	2.9	FW ETA Goal 2 to 3 ppm
9.7	9.1	FW pH
64	75	FW Hydrazine Goal ≥ 30 ppb
0.18	1.9	✒ ## FW Iron Goal ≤ 5 ppb
0.2	1.2	FW Dissolved O_2 Goal ≤ 5.0 ppb
3.8	0.2	HW Dissolved O_2 Goal ≤5.0ppb
0.01	0.02	HW Sodium ppb
<5.0	<5.0	Condenser Air Inleakage Goal ≤ 6 cfm
✒ ## If Goal is exceeded, report on morning status report.		

RWST's & Boric Acid Tanks Boron			
RWST Goal	Boron ppm	Date	Goal
U1 RWST	2608	Today	2500 to 2650
U2 RWST	2626	Today	2500 to 2650
*BAT A	6555	Today	Variable
*BAT B	6747	Today	Variable
*BAT C	6601	Today	Variable
Spent Fuel Pit	2502	Today	≥ 2056

SI-50 & SI-137.5 Primary to Secondary Leakrate Information		
U1	U2	
ND	ND	Leakrate SI-50 gpd
Today	Today	Date/Time SI-50
<0.1	<0.1	Leak rate SI-137.5 gpd
Today	Today	Date / Time SI-137.5
800	848	CPM above Bkgd. Equivalent to 5 gpd leak
14000	21730	CPM above Bkgd. Equivalent to 128 gpd leak
9000	2542	Δ CMP increase within 15 min. to equal a 1 gpd leak.
35	61	Current 119 countrate
31	40	119 Background cpm

	U1 Con-DI			U2 Con-DI		
	Outlet Sodium ppb 0.05			Outlet Sodium ppb 0.08		
	Flowrate gpm 1000			Flowrate gpm 1000		
Pol	Sp Cond	Status	Millions of Gal.	Sp Cond	Status	Millions of Gal.
1	Vessel is empty & in service				FR	
2		SF	5.0		Empty OOS	
3		Fresh			Ex	
4		Fresh			Ex	
5		Fresh		0.11	I/S	~ 12
6		Fresh			Fresh	

NR = Needs Rinse, I/S = In Service, EX = Exhausted, SF=Semi-Fresh

ERCW Chlorination Goal is 3/Wk at RT >50° F < 80°

Mon.	Tues.	Wed	Thur.	Fri.
no	Yes	Yes		

- PCL-222 continuous injection to ERCW in progress downstream of each ERCW strainer.
- Injecting CL-363 to ERCW – twice per week

Phone and Beeper Numbers:
- Chemistry Shift Supervisor Beeper 40-732
- Chem Lab Phones 7285; 6348 voice mail; Fax 7281
- Ecolochem Onsite Pager 350-20-395

Comments ☻ All Parameters are within goals.
1) N_2 blanket on U1 HW pump 1C to control dissolved oxygen.
2) U-2 RCS DEI Currently at steady state conditions within the goal.AOP-R.06 exited 6/2/99 1640
3) U-2 HW air in-leakage Action Plan I/P.
4) U2 Sulfate Recovery Action Plan is I/P.
5)

Chemistry WR's
1. C410323 12/17/98 TB Lab A/C leak-coil remains I/S. WW242
2. C415811 Drain line from CCS/ERCW overflows when sampling. WW230
3. C402198 2-SIV-43-78 U2 RHR-B sample valve leaking through. WW238
4. C412044 U1 HW Sample Pump A. WW235
5.

Tech Spec or Critical Items:
None

Inoperable Rad Monitors requiring compensatory sampling:
☻ For Information only : 2-RM-90-99 inoperable.
1-RM-90-99

Op-Test No.: __1__ Scenario No.: __2__ Event No.: _1___ Page _1_ of _2_

Event Description: Place MFP in Service

Op-Test No.: __1__ Scenario No.: __2__ Event No.: _1___ Page _2_ of _2_

Event Description: Place MFP in Service.

Time	Position	Applicant's Actions or Behavior
		NOTIFY the IM's to adjust the MFPT hand changer for the proper rpm as the second MFPT is accelerated.
		PLACE the governor valve positioner to the RAISE position to open the steam chest valves and accelerate the MFPT.
		CAUTION DO NOT increase second MFPT speed faster than the master speed control can maintain program d/p.
		NOTE As the second MFPT is loaded, the first MFPT should back down in load.
		SLOWLY LOAD the second MFPT to supply feedwater to the SGs and INCREASE MFPT speed until demand on MFPT speed controller matches the demand output of the first MFPT.
	Critical Step	WHEN the Master Controller has a zero deviation, THEN PLACE the second MFPT in AUTO.
		CLOSE the second MFPT drain valves: 1-HS-46-41, CLOSED
		CAUTION 1 MFP Recirc valves controllers should NOT be operated in AUTOMATIC due to the potential for isolating all three intermediate heater strings and resulting MFP damage. (Reference: PER 00-002540-000).
		CAUTION 2 Operation of MFP RECIRC valve should be performed slowly due to affect on MFP DP program.
		ENSURE [1-FCV-3-70] OR [1-FCV-3-84] MFP Recirc valve is CLOSED and in MANUAL.
		CAUTION A negative "bias" adjustment (>50%) should be limited to a maximum of 60% unless evaluated by Systems Engineering since the maximum speed could impact a MFPT's ability to carry above normal loads in the event the other MFPT trips.
		NOTE 1 The following step may be performed at any time when both MFPTs are inservice and in AUTO.
		NOTE 2 With both MFPTs in AUTO it may become necessary to adjust the MFPT speed control bias on one of the operating MFPTs to prevent MFPTs from fighting each other (oscillating).
		IF an adjustment of the flow balance between the MFPTs is desired, THEN SLOWLY ADJUST one MFPT speed control bias (0% to 60%) until desired flow balance is achieved.

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _2___ Page _1_ of _4_		
Event Description: Increase power from 58% to 90%.		
Time	Position	Applicant's Actions or Behavior
	CREW	Perform a power increase from 58% to 90% IAW 0-GO-5.
	RO/SRO/BOP	Determines amount of boration/dilution required • Determines reactivity change using 0-SO-62-7, Appendix E and various graphs. Use REACT or ICS to determine Xenon values. Calculates the concentration change in ppm and using TI-44 or REACT, converts ppm change to amount of boration/dilution required
	RO	Performs a DILUTION to establish new concentration using 0-SO-62-7 • Reviews PRECAUTIONS AND LIMITATIONS • Reviews PREREQUISITE ACTIONS • If reactor is critical and reactor power to be changed by >5% then perform calculations. • Performs Section 6.1 At Power Routine Dilution • Places HS-62-140A to STOP • Places HS-62-140B to DILUTE • ENSURES HS-62-140D is CLOSED • SETS FQ-63-142 for the desired quantity of water • ADJUSTS FC-62-142 for desired flow rate • PLACES HS-62-140A to START • VERIFIES FCV-62-128 OPEN and Primary water flow on FI-62-142A OR FQ-62-142. • MONITORS nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution is achieved. • IF VCT level increases to 63% THEN ENSURE LCV-62-118 OPENS • WHEN dilution is complete, THEN: • Place HS-62-140A to STOP • Check no primary flow on either FI-62-142A OR FQ-62-142 • Ensure FC-62-142 is in AUTO and set at 35%. • ENSURE FCV-62-128 CLOSED. • Place HS-62-140B in AUTO position. • Place HS-62-140A to the START position.

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _2___ Page _2_ of _4_

Event Description: Increase power from 58% to 90%.

Time	Position	Applicant's Actions or Behavior
	SRO	Power Ascension Steps: • IF the second #7 HDT pump has not been started, THEN start the second pump IAW 1,2-SO-5-3. • ENSURE generator hydrogen is sufficient for anticipated load per figure. • Maintain river water temperature limitations of HPDES permit as specified in 0-PI-OPS-000-666.0. • Place third CCW pump in service as necessary to maintain maximum condenser vacuum per 0-SO-27-1. • IF startup follows a refueling, THEN perform applicable surveillance's. • WHEN ~.49% of RTP, THEN perform appropriate surveillance's associated with AFD, QPTR. • CONTINUE power ascension to 74% AND ADJUST turbine load as needed while maintaining valve position limit ~10% above gov vlv control indication. • IF diluting the RCS to increase Tavg, THEN continue the dilution and increase turbine load to maintain Tref with Tavg. Control rods may be used along with dilution to increase reactor power. • MONITOR turbine load increasing • At ≥ 50% ensure the following annunciators respond properly: XA-55-4A, Window 32 XA-55-4B, Window 10 XA-55-4B, Window 17 XA-55-4B, Window 25 • Check MFPTC vacuum normal (>20" HG).

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _2___ Page _3_ of _4_

Event Description: Increase power from 58% to 90%.

Time	Position	Applicant's Actions or Behavior
	BOP	• If air in leakage exceeds 10 CFM then take immediate corrective measures and notify OPS Supt. or Plant Manager. • Prior to exceeding 55% reactor power complete the following: Calculate calorimetric power - U1118 _____ ÷34.11=_____%. Verify all NIS PR A channel drawers are within 2% of calculated power. If NO is checked, then perform 0-SI-OPS-092-078.0 • Ensure at least one bus duct cooler is in service prior to increasing turbine load above 59.7% or 729 MW. • PRIOR to increasing power above 60%, ENSURE all #3 and # 7 HDT systems are pumping forward. • PRIOR to increasing turbine load above 65% ENSURE second MFPT is in service. (Complete actions of step [19] if the power ascension was done with only one MFP) • At 70% turbine power start 2 condensate demin booster pumps. • Prior to operation above ÷ 65% turbine power ensure second MFPT in service. At ~ 70% turbine power, place third #3 HDT pump in service and ensure LCV-6-106A and B are controlling #3 HDT level properly..
		CAUTION: Evaluate starting and stopping of condensate demineralizer pumps using condensate pressure, MFP inlet pressure, condensate booster pump inlet pressure, and #3 and #7 HDT pump and bypass valve operation. The US/SRO may start or stop condensate demineralizer pumps at his discretion, but if any of the following occurs the pumps must be started. **1) Condensate booster pump suction pressure >125 psig on PI-2-77** **2) Main Feedwater pump suction pressure >420 psig on PI-2-129** **3) Injection Water pump discharge pressure >265 psig as indicated by no alarm on XA-55-3B, Window E-1THEN start the third condensate demin booster pump.**

Op-Test No.: _1___ Scenario No.: __1__ Event No.: _2___ Page _4_ of _4_ Event Description: Increase power from 58% to 90%.		
Time	Position	Applicant's Actions or Behavior
	BOP	EVALUATE starting 2 condensate demineralizer pumps IAW 1,2-SO-2/3-1. This step may be N/A'd or signed-off at a time when the pumps are placed in service.
	RO	• IF startup follows a refueling, THEN perform applicable surveillance's at 75% rated thermal power. • Prior to exceeding 75% reactor power complete the following: • Calculate calorimetric power - U1118 _____ ÷34.11=_____%. • Verify all NIS PR A channel drawers are within 2% of calculated power. • If NO is checked, then perform 0-SI-OPS-092-078.0
	SRO	CONTINUE power ascension to 90% AND ADJUST turbine load as needed while maintaining valve position limit ~10% above gov vlv control indication.
	BOP	IF diluting the RCS to increase Tavg, THEN continue the dilution and increase turbine load to maintain Tref with Tavg. Control rods may be used along with dilution to increase reactor power.
	BOP	MONITOR turbine load increasing.
	BOP	PRIOR to increasing load >80%, ENSURE LCV-6-106A and B are controlling properly, and LCV-6-105A and B are CLOSED.
		WHEN ~ 85 to 90% RTP, THEN PLACE the third condensate booster pump in service IAW SOI-2.1& 3.1. If high pressure condition exists, then THROTTLE 14-550 to attain desired pressure. IF unable to throttle 14-550, then refer to 1,2-SO-5-2, Section 8.0 to adjust pressure.
		When the power levels off at 90% perform NIS PR adjustments and secondary side adjustments.

Op-Test No.: _1___ Scenario No.: _2___ Event No.: _3___ Page _1_ of _1_

Event Description: NIS "A" PR channel 1 overpower rod stop false signal.

Time	Position	Applicant's Actions or Behavior
	CREW	Refer to AR 1-M4-B-D3 to diagnose failure of drawer
	RO/SRO	Checks reactor power, determines drawer failure
	RO/SRO	Goes to AOP-I.01
	SRO what is applicable ?	**EVALUATE** the following Tech Specs for applicability: 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.1.2 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation 3.3.3.5, Remote Shutdown Instrumentation 3.3.3.7, Accident Monitoring Instrumentation 3.9.2, Refueling Operations Instrumentation 4.2.4.2, QPTR with one PR Channel Inoperable
	RO SRO?	**DIAGNOSE** the failure: **Power Range Failure Section 2.3 of AOP-I.01**
	SRO RO?	**PLACE** rod control in MAN.
	RO/BOP	**STABILIZE** reactor power at current level.
	RO	**PLACE** following switches located on Detector Current Comparator drawer [M-13, N50] in position corresponding to failed Power Range Channel: (N41) Upper Section Lower Section Appropriate Rod Stop Bypass switch Appropriate Power Mismatch Bypass switch
	RO	**DEFEAT** failed Power Range channel **USING** Comparator Channel Defeat switch: Comparator and Rate Drawer [M-13, N37]
	RO/BOP	**RESTORE** T-avg to T-ref.
	RO	**ENSURE** OPERABLE Power Range channel selected: Nuclear Power Recorder [M-4, NR-45] RCS Temp ΔT recorder - (green pen) [M-5, XS-68-2B]
	RO	**RETURN** rod control to AUTO if desired.
	SRO/RO	**CHECK** reactor power greater than 75%.
	SRO	**NOTIFY** IM to remove failed power range channel from service **USING** Appendix A, and Rx Eng to perform SI-11 for QPTR

Op-Test No.: __1__ Scenario No.: _2___ Event No.: _4___ Page _1_ of _1_

Event Description: 1B-B Centrifugal Charging Pump Shaft Breaks.

Time	Position	Applicant's Actions or Behavior
		(Letdown will isolate if 1B CCP is stopped prior to starting 1A)
	RO	Respond to 1B-B CCP loss of flow by announcing to crew. Perform the following: • Refer to ARP for loss of charging. • Isolate Letdown • Start 1A-A CCP and place 1B-B CCP in PTL position. • Re-establish letdown. (If isolated)
	SRO	Consult Tech Specs and enter LCO actions 3.1.2.2, 3.1.2.4, and 3.5.2. Dispatch personnel to investigate cause of pump broken shaft and initiate WR.
	SRO	Will enter LCO 3.0.3
	SRO	Will notify management of the LCO, investigate maintenance of other pumps
	SRO	Notify plant mgt. of event in accordance with SSP-4.5. Discuss recommendations for plant conditions. Should recommend a slow plant shutdown to initiate within 1 hour.
		If asked, the MSS will report repairs on SI and AFW pumps will be complete in 5 hours

Op-Test No.: _1___ Scenario No.: _2___ Event No.: _5___ Page _1_ of _1_

Event Description: Running ERCW Pump M-B Trip.

Time	Position	Applicant's Actions or Behavior
	SRO	Enter and direct the actions of AOP-M.01, Section 2.0. • Evaluate Tech Specs • Evaluate EPIP-1 • Go to Section 2.1
	BOP Critical	Perform the actions of AOP-M.01, Section 2.1. • Identify and Lockout failed ERCW pump. • Evaluate the need for starting associated train ERCW pumps. Will start an additional ERCW pump (L-B, M-B, or P-B) • Check two A Train ERCW pumps available.
	SRO	Dispatch personnel to inspect failed pump(s) and determine cause for failure.
	BOP	Check 1A and 2A ERCW supply header pressures and flows NORMAL.
	BOP	Check 1B and 2B ERCW supply header pressures and flows NORMAL.
	BOP	Check ERCW pump loading amps NORMAL.
	BOP	Transfer emergency power selector switch away from failed pump.
	SRO	Close manual discharge valve for failed pump(s). [ERCW Pumping Station]
	SRO	Go To appropriate plant procedure.
	SRO	Refer to TS 3.7.4.1.

Op-Test No.: __2__ Scenario No.: _2___ Event No.: __6__ Page _1_ of _1_

Event Description: PT-1-9A, SG Pressure Transmitter Fails High

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Will respond to the AR 1-M5-A, B-7
	BOP/RO	Will review annunciator response and be directed to AOP-S.01
	SRO	Direct the actions of AOP-S.04, Section 2.1.
	BOP	Takes manual control of #2 FRV
	BOP/RO	SF/FF channels checked normal.
	BOP/RO	Transfers to the alternate control channel.
	BOP	Maintains level on program.
	RO/BOP	Verifies channel failure is cause of the problem.
	BOP	Places FRV in auto when level restored
	SRO/RO	Checks S/G Pressures normal, Transitions to AOP-I.06
	SRO	Diagnoses failure goes to section 2.1.
	SRO	Ensures unaffected channel selected
	SRO	Notifies IM/MSS to remove channel from service IAW Appendix D
	SRO	Go to appropriate plant procedure.

Op-Test No.: _1___ Scenario No.: _2___ Event No.: _7___ Page _1_ of _2_

Event Description: Loss of 125VDC Vital Battery Board 1.

Time	Position	Applicant's Actions or Behavior
	SRO	EVALUATE the following Tech Specs for applicability: 3.8.2.3, DC Power Distribution System, Operating 3.8.2.4 DC Power Distribution System, Shutdown
	SRO	EVALUATE EPIP-1, Emergency Plan Initiating Matrix.
	SRO	Implement AOP-P.02 and diagnose the failure as a loss of 125V DC Battery Board

	SRO (will direct BOP to complete the procedure, Potenaially after FR-H.1)	Implement AOP-P.02 Section 2.1.
		• CHECK Unit 1 in Mode 1, 2, or MODE 3 with reactor trip breakers closed. ***TRIP Unit 1 reactor and GO TO E-0 WHILE continuing with this procedure.***
		• DISPATCH operators with radios to the following areas to determine the cause of the failure:
		  • Aux. Bdlg. 749' elev. 125 Vital Battery Chargers
		  • Aux. Bdlg. 734' elev. 125 Vital Battery Boards
		• EVALUATE Appendix A.
		• IF EOPS are NOT in progress, THEN
		  • ENSURE S/G atmospheric relief valves CONTROLLING RCS temperature.
		  • CONTROL Unit 1 charging flow.
		  • ESTABLISH Excess Letdown USING EA-62-3.
		• MONITOR 125V DC Vital Battery Board I ready to be energized. IF NOT GO TO Step 11.
		• RESTORE 125V DC Vital Battery Board I suing 0-SO-250-1.
		• MONITOR 125V DC Vital Battery Board 1 voltage.
		• GO TO Step 18.
		• MAINTAIN VCT level.
		• DISPATCH an operator to Unit 2 TD AFWP to TRANSFER turbine controller to ALTERNATE.
		• PLACE equipment in PULL-TO-LOCK
		• STOP Unit 1 annulus vacuum fans.
		• PLACE ABGTS Train B IN SERVICE USING 0-SO-30-18.
		• PLACE EGTS Train B IN SERVICE to Unit 1 USING 0-SO-65-1.
		• TRANSFER 125 V DC busses to ALTERNATE USING Appendix E.
		• CHECK AFW status.

Op-Test No.: _1___ Scenario No.: _2___ Event No.: _7___ Page _2_ of _2_

Event Description: Loss of 125VDC Vital Battery Board 1.

Time	Position	Applicant's Actions or Behavior
	BOP	IF EOPs are NOT in progress, THEN CONTROL feed flow to MAINTAIN SG narrow range level in all S/Gs.
	SRO	DISPATCH operator to check Glycol System status.
	BOP	IF EOPs are NOT in progress, AND offsite power is available, THEN PLACE DGs in standby.
	BOP	CHECK voltage on 125 V DC Vital Battery Board I between 124V and 140V.
	BOP	IF EOPs are NOT in progress, THEN PLACE DG 1A-A in standby USING EA-82-1
	BOP/SRO	DISPATCH an operator to Unit 2 TD AFWP turbine controller to transfer DC control power to NORMAL.
	BOP	RESTORE 125V DC Vital Battery Board I to NORMAL USING Appendix I.
	BOP	IF EOPs are NOT in progress, THEN RESTORE systems to NORMAL USING the appropriate procedure.
	SRO/BOP	GO TO appropriate plant procedure.

Op-Test No.: __1__ Scenario No.: _2___ Event No.: _7___ Page _1_ of _3_

Event Description: Loss of DC, Reactor Trip Response.

Time	Position	Applicant's Actions or Behavior
	CREW	Enter and direct the actions of E-0.
	RO/SRO/BOP	• VERIFY Rx trip. If not then trip reactor. If reactor can not be tripped then monitor status trees and GO TO FR-S.1 • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps

		• VERIFY turbine trip. Turbine stop valves CLOSED.
		• If not then trip turbine. If turbine can not be tripped then close MSIVs and MSIV bypass valves.
		• VERIFY Shutdown boards energized.
		  • VERIFY generator breakers OPEN 30 seconds after turbine trip.
		  • ENSURE station service ENERGIZED from start busses.
		  • VERIFY at least one train of shutdown boards ENERGIZED.
		  • VERIFY both trains of shutdown boards ENERGIZED.
		• IF power can NOT be restored to at least one train of SD Bds then GO TO ECA-0.0.
		• DETERMINE if SI actuated. If required, then actuate SI. If not actuated, then determine if SI is required. If SI is not actuated/required then monitor status trees and GO TO ES-0.1.

Op-Test No.: __1__ Scenario No.: _2___ Event No.: _7___ Page _2_ of _3_

Event Description: Loss of DC, Reactor Trip Response.

Time	Position	Applicant's Actions or Behavior
	RO	Transitions to ES-0.1
	RO/BOP	**MONITOR** SI NOT actuated: • S.I. ACTUATED permissive DARK [M-4A, D4].
	RO	**MONITOR** T-avg greater than 540F..
	RO	**MONITOR** RCS temperatures: • **IF** any RCP running, **THEN** **CHECK** T-avg stable at or trending to between 547F and 552F. OR • **IF** RCPs stopped, **THEN** **CHECK** T-cold stable at or trending to between 547F and 552F.
	CREW	When the FR-H.1 transition is identified, the crew should transition to FR-H.1

Op-Test No.: _1___ Scenario No.: _2___ Event No.: ____ Page _1_ of _2_

Event Description: FRP-H.1, Loss of Secondary Heat Sink.

Time	Position	Applicant's Actions or Behavior
	SRO	Transition to and direct actions of FR-H.1.
	SRO	DETERMINE procedure applicability
	RO	MONITOR RWST level > 27%. IF not then go to ES-1.3.
	BOP	CHECK if secondary heat sink required. RCS pressure greater than any non-Faulted S/G pressure RCS temperature greater than 350°F.
	BOP	MONITOR CST level > 10%.
	RO/BOP	MONITOR heat removal capability. At least two S/G wide range levels greater than 25% [35% ADV]. Pressurizer pressure less than 2335 psig.

	RO/SRO/BOP	• ATTEMPT to establish AFW flow to at least one S/G in the following order of priority--Intact, Ruptured, Faulted.
		  • **CHECK** S/G blowdown isolation valves CLOSED.
		  • **CHECK** control room indications for cause of AFW failure:
		  • **ESTABLISH** MD AFW pump flow: Dispatch people to do EA-9
		  • **ESTABLISH** TD AFW pump flow: Dispatch people to do EA-10
		• STOP RCPs.
		• CHECK at least one CCP AVAILABLE. If not then go to caution prior to Step 16.
		• MONITOR shutdown boards continuously energized.
		• ESTABLISH MFW flow to at least one S/G.
		• DETERMINE if secondary heat sink restored.
		• ATTEMPT to establish feed flow from condensate system.
		  • Depressurize RCS to 1920 psig.
		  • Block SI signals.
		  • CHECK FW isolation valves OPEN.
		  • ALIGN condensate flow path to S/Gs USING EA-2-2.
		  • Depressurize at least one S/G at maximum rate. When condensate flow established then stop S/G depressurization.
		• DETERMINE if secondary heat sink restored. If not then continue with procedure. If restored then return to instruction in effect.

Op-Test No.: _1___ Scenario No.: _2___ Event No.: ____ Page _2_ of _2_

Event Description: FRP-H.1, Loss of Secondary Heat Sink.

Time	Position	Applicant's Actions or Behavior
	SRO	Refer to SQN EPIP-1 and classify event as Site Area Emergency, (based on 1.1 Fuel Clad Barrier potential loss of CSFS and 1.2 RCS Barrier potential loss of CSFS OR 6.2 Loss of Heat Sink) .
	SRO	Make notification to the ODS within 5 min of declaration.
	SRO	Announce emergency classification to crew members.
	SRO	For classifications of SAE and higher, remind the crew that all activities requiring manpower outside the control room must be directed through the SM until relieved by the SED. The same is true of an ALERT if personnel accountability and evacuation is initiated.
	SRO	Notify plant management of emergency plan classification in accordance with appropriate EPIP.
	SRO	Notify NRC within 1 hr.
	CREW	Will transition back to ES-0.1 and should address AOP-P.02 for loss of DC bus.
		TERMINATE THE EXERCISE WHEN EXAMINER DIRECTS AFTER FEEDWATER IS RESTORED TO ALL STEAM GENERATORS AND FR-H.1 IS EXITED

Facility: Sequoyah **Scenario No.:** 3 **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

Objectives: To evaluate the applicants' ability to perform normal operations and to raise reactor power in accordance with plant procedures; to respond to a VCT level transmitter failing high; to respond to a loss of component cooling water to a RCP; to respond to a failure of the Pressurizer spray valves to respond to pressure changes; to respond to a failure of the Steam Dumps; and to assess the applicants' in using the "Reactor Trip or Safety Injection" and "Loss of Reactor or Secondary Coolant" EOPs and Functional Recovery procedure FR-S.1 as a result of an ATWS in conjunction with an unisolable stuck open Pressurizer PORV.

Initial SU7
EVENT 3, P1
EVENT 8, P1
LOCALLY TMP
P-1

Initial Conditions: The reactor is operating at approximately 94% power. SG 2 has a 4 gph tube leak. Severe thunderstorm warnings are in effect for Hamilton and Rhea counties for the next 2 hours. The Train week is "A". The following equipment is out of service: 1A-A AFW pump, 1A-A SI pump.

Turnover: Continue reactor startup and power ascension to 100 % power. A load increase has been approved by the Load Dispatcher. Raise reactor power from 94 % to 100 % and stablize. Swap Centrifugal Charging Pumps to allow tagging the 1B-B CCP for oil change.

Event No.	Malf. No.	Event Type*	Event Description
			Set-up to IC-86
Preinsert	EG03A	C (BOP)	EDG 1A-A fails to auto start.
1	-	R (RO)	Increase power from 83 % to 90 %.
2	-	N (RO)	Swap Charging Pumps.
3	CV09	I (RO)	VCT Level Transmitter LT-62-130-A fails HIGH.
4	CC02	C (BOP)	Loss of Component Cooling Water to RCP #1 thermal barrier heat exchanger - about 6 GPM. Override outlet isolation valve fail to close. Can close manually.

Event No.	Malf. No.	Event Type*	Event Description
5	RC06A	C (RO)	Pressurizer Spray Valve PCV-68-340B fails partially open.
6	RX23A	I (BOP)	Loss of condenser vacuum permissive PS-2-1B to Steam Dumps.
7	TU02I	M (All)	Main Turbine high vibration resulting in rapid or emergency shutdown.
8	ED06A	C (All)	At 50 % power, Loss of Emergency Bus 1A normal power supply. (EDG 1A-A fails to auto start.)
	RP01C	M (All)	ATWS.
	RC07A IRFRCR04		Pressurizer PORV stuck open at mid-position (PORV block can't be closed due to loss of Emerg. Bus 1A.)
		M (All)	Pressurizer vapor space LOCA.
	RP16K611B RP16K608B		Selected Train "B" ECCS components fail to start on a LOCA.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

MATERIALS:

1. Appendix A - Shift Turnover

SCENARIO SUMMARY:

Starting from 95% RTP BOL, with 1A-A MD AFW pump , 1A-A SI pump out of service, the following conditions will be encountered in sequence:

1. VCT Level Transmitter Fails High.
2. Loss of CCS to RCP #1 Thermal Barrier Hx.
3. Pressurizer (PZR) spray valve failure.
4. Loss of 6.9 kV Shutdown Board.
5. D/G failure to start.
6. Loss of Condenser Vacuum Permissive to Steam Dumps.
7. Main turbine high vibration.
8. Turbine Trip Bus A Failure.
9. Reactor Trip Signal Fails (ATWS).
10. Pressurizer (PZR) Automatic Open failure.
11. Failure of SSPS slave relay.
12. Failure of SSPS slave relay.

CONSOLE OPERATOR'S INSTRUCTIONS

ELAP. TIME	IC/MF/RF/OR #	DESCRIPTION
Sim. Setup reset to IC-86 or	Reset IC-9 Perform switch check. Allow the simulator to run for at least 3 minutes before loading CAE or starting the exercise. This will initialize ICS. Load cae ! nrc-s-3 Place simulator momentarily in RUN, Place OOS equipment in required position with tags, Clear alarms and Return to FREEZE.	Initialize simulator at 95% RTP. **Place Mode 1 placards on panel. Update M-5 placard with RCS C_B from Chemistry Report.**
	Disable override "RCR". RCR Off **Important Note -->**	Steps control banks to proper position. Shutdown banks should be fully withdrawn. Ensure operator aid placard is marked YES to core burnup less than 12000 MWD/MTU. **Place A Train Week sign on the simulator.**
This remote function is active when the CAE file is loaded.	MRF fwr34 out IOR zlohs3116aa[1] off IOR zlohs3116aa[2] off IOR zlohs3116aa[3] off IOR zlohs3116aa[4] off IOR zdihs3116aa close	1A-A MDAFW pump breaker racked out and pump tagged for maintenance. ***Place a hold order on the 1A-A MDAFW pump & HS-3-116 handswitches.***
This remote function is active when the CAE file is loaded.	MRF sir08 off	1A-A SI pump breaker racked out and pump tagged for maintenance. ***Place 1A-A SI pump handswitch in PTL and place a hold order on the handswitch.***
At Examiner Direction	imf cv09 (none 0)	VCT LEVEL TRANSMITTER FAILS HIGH (LT-62-130-A)
At Examiner Direction	imf cc02 (none 0) 15 10 0	Loss of CCW to RCP #1 Thermal Barrier Htx. ***Will have to adjust severity up to 25% to get effect***

CONSOLE OPERATOR'S INSTRUCTIONS

At Examiner Direction	imf rc06a (none 0) 8 45 0	PRZR SPRAY VALVE (PCV-68-340B) FAILURE ***Will have to adjust severity up to ~13% to get heaters on***
At Examiner Direction	imf ed06a (none 0)	LOSS OF 1A-A 6.9 KV SD BOARD DUE TO DIFFERENTIAL ***If dispatched, wait ~ 4 minutes and report a board differential relay operation. You can not determine the cause but will continue to investigate. If dispatched to bypass the H2 and Air side seal oil TCVs, then set rwrv5448 to 45% and rwrv556 to 35%. This will hold temperature at ~ 110 degrees F.***
This malfunction is active when the CAE file is loaded	imf eg03a (none 0)	DIESEL GENERATOR 1A-A FAILURE TO START
At Examiner Direction, insert after PZR Lo pressure alarm comes in	imf rx23a (none 1500)	LOSS OF COND VAC PERMISSIVE (C-9) PS-2-1B Fails
At Examiner Direction	imf tu02i (none 1500) 35 45 0	Main Turbine High Vibration on Bearing #9 Increase to 40% after crew takes initial actions
		Role play as SM to get the turbine off line ASAP
Event trigger, after Turbine Trip	imf rp01c (e7 0) imf rp01a imf rp01b	Both Reactor Trip Breakers Fail
Event trigger, after Rx Trip	imf rc07a (e1 0) imf rc05 (e1 0) 40%	FAILURE OF PZR PORV FCV-68-334 Automatic Circuit
If requested by the crew then insert this remote malfunction	irf rcr04 off	PRZ PORV BLOCK VLV FCV-68-333 PWR REMOVAL
Event trigger, after SI	imf rp16k611a (e2 0)	Tr B SI Relay Failure. (No SI signal to 1B-B MD & TD AFW Pump, ERCW pumps L-B,N-B,M-B,P-B)
Event trigger, after SI	imf rp16k608b (e2 0)	Tr B SI Relay Failure. (No B-Tr CRI, Train B ECCS pumps, 1B-B CCS pump)
When directed to trip rx	dmf rp01a, b, c irf rdr01 trip irf rdr02 trip	Removes failure and trips mg set supply breakers

Appendix B

Plant Data

Unit 1	Rx Power 95	MWD/MTU 3950
Train A Week		
Increase Power Level to 100%. Swap charging pumps in preparation for planned maintenance on 1B-B pump		
3.7.1.2.a for 1A-A MD AFW pump.; Tagged for maintenance to replace motor.		
3.5.2.a for 1A-A SI pump.; 1A-A SI pump tagged electrically.		
The National Weather Service has announced a severe storm warning for Hamilton and Rhea counties. It is to remain in effect for 4 more hours.		
There is a small (40 gpd) S/G tube leak in #2 S/G. Chem lab is sampling and monitoring.		

SIMULATOR EXERCISE GUIDE

Sequoyah Electric Plant Chemistry Report

U1	U2	RCS Data
100	100	Rx. Power %
Today	Today	Sample Date
Now	Now	Sample Time
995	1080	Boron ppm
2.07	2.14	✒ ##Li^+ ppm Goal is variable
35	47	✒ ## H_2 Goal 25 to 50 cc/Kg
2.96 E-02	1.34 E-02	Dose Equ I Goal ≤ 0.1
8.16 E-02	8.52 E-1	Xe-133 µCi/g
200	168	Silica ≤1000 ppb
5.235 E-5	4.528 E-2	Fuel Reliability Index
✒ ## If Goal is exceeded, report on morning status report.		

RWST's & Boric Acid Tanks Boron			
RWST Goal	Boron ppm	Date	Goal
U1 RWST	2608	Today	2500 to 2650
U2 RWST	2626	Today	2500 to 2650
*BAT A	6555	Today	Variable
*BAT B	6747	Today	Variable
*BAT C	6601	Today	Variable
Spent Fuel Pit	2502	Today	≥ 2056

SI-50 & SI-137.5 Primary to Secondary Leakrate Information		
U1	U2	
ND	ND	Leakrate SI-50 gpd
Today	Today	Date/Time SI-50
<0.1	<0.1	Leak rate SI-137.5 gpd
Today	Today	Date / Time SI-137.5
800	848	CPM above Bkgd. Equivalent to 5 gpd leak
14000	21730	CPM above Bkgd. Equivalent to 128 gpd leak
9000	2542	Δ CMP increase within 15 min. to equal a 15 gpd leak.
35	61	Current 119 countrate
31	40	119 Background cpm

Phone and Beeper Numbers:
- Chemistry Shift Supervisor Beeper 40-732
- Chem Lab Phones 7285; 6348 voice mail; Fax 7281
- Ecolochem Onsite Pager 350-20-395

Comments ☻ All Parameters are within goals.
1) N_2 blanket on U1 HW pump 1C to control dissolved oxygen.
2) U-2 RCS DEI Currently at steady state conditions within the goal.AOP-R.06 exited 6/2/99 1640
3) U-2 HW air in-leakage Action Plan I/P.
4) U2 Sulfate Recovery Action Plan is I/P.
5)

U1	U2	S/G, FW & HW Data
0.38	0.34	✒ ## S/G Sodium Goal Goal ≤ 0.8 ppb
2.32	3.4	S/G Chloride Goal ≤ 10 ppb
1.0	1.0	✒ ## S/G Sulfate Goal ≤ 1.7 ppb
0.23	0.14	✒ ## S/G Molar Ratio Goal 0.05 to 0.5
1.13	0.62	S/G Cation Cond Goal ≤1.0 µS
5.6	8.8	S/G Boron Goal 5 to 10 ppm
50	155	SGBD Flowrate in GPM
1.01	1.1	✒ ## CPI Goal ≤1.1
SO_4 226 ppb days 18%of S/D Limit	Cl^- 425 ppb-days 23%	Corrosion Index Limiting Value ppb-days for % of hot soak value
2.3	2.9	FW ETA Goal 2 to 3 ppm
9.7	9.1	FW pH
64	75	FW Hydrazine Goal ≥ 30 ppb
0.18	1.9	✒ ## FW Iron Goal ≤ 5 ppb
0.2	1.2	FW Dissolved O_2 Goal ≤ 5.0 ppb
3.8	0.2	HW Dissolved O_2 Goal ≤5.0ppb
0.01	0.02	HW Sodium ppb
<5.0	<5.0	Condenser Air Inleakage Goal ≤ 6 cfm
✒ ## If Goal is exceeded, report on morning status report.		

	U1 Con-DI			U2 Con-DI		
	Outlet Sodium ppb 0.05			Outlet Sodium ppb 0.08		
	Flowrate gpm 1000			Flowrate gpm 1000		
Pol	Sp Cond	Status	Millions of Gal.	Sp Cond	Status	Millions of Gal.
1	Vessel is empty & in service				FR	
2		SF	5.0		Empty OOS	
3		Fresh			Ex	
4		Fresh			Ex	
5		Fresh		0.11	I/S	~ 12
6		Fresh			Fresh	

NR = Needs Rinse, I/S = In Service, EX = Exhausted, SF=Semi-Fresh

ERCW Chlorination Goal is 3/Wk at RT >50° F < 80°

Mon.	Tues.	Wed	Thur.	Fri.
no	Yes	Yes		

- PCL-222 continuous injection to ERCW in progress downstream of each ERCW strainer.
- Injecting CL-363 to ERCW ~ twice per week

Chemistry WR's
1. C410323 12/17/98 TB Lab A/C leak-coil remains I/S. WW242
2. C415811 Drain line from CCS/ERCW overflows when sampling. WW230
3. C402198 2-SIV-43-78 U2 RHR-B sample valve leaking through. WW238
4. C412044 U1 HW Sample Pump A. WW235
5.

Tech Spec or Critical Items:
None

Inoperable Rad Monitors requiring compensatory sampling:
♀ For Information only : 2-RM-90-99 inoperable.
1-RM-90-99

Op-Test No.: __1__ Scenario No.: __3__ Event No.: _1___ Page _1_ of _2_

Event Description: Increase Power to 100%.

Time	Position	Applicant's Actions or Behavior
	CREW	Briefs load increase from GO-5
	SRO/RO	Determines amount of boration/dilution required: • Determines reactivity change using 0-SO-62-7, Appendix E and various graphs. Use REACT or ICS to determine Xenon values. • Calculates the concentration change in ppm and using TI-44 or REACT, converts ppm change to amount of boration/dilution required
	RO	Performs a DILUTION to establish new concentration using 0-SO-62-7

	RO	• Reviews PRECAUTIONS AND LIMITATIONS
		• Reviews PREREQUISITE ACTIONS
		  • If reactor is critical and reactor power to be changed by >5% then perform calculations.
		• Performs Section 6.1 At Power Routine Dilution
		• Places HS-62-140A to STOP
		• Places HS-62-140B to DILUTE
		• ENSURES HS-62-140D is CLOSED
		• SETS FQ-63-142 for the desired quantity of water
		• ADJUSTS FC-62-142 for desired flow rate
		• PLACES HS-62-140A to START
		• VERIFIES FCV-62-128 OPEN and Primary water flow on FI-62-142A OR FQ-62-142.
		• MONITORS nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution is achieved.
		• IF VCT level increases to 63% THEN ENSURE LCV-62-118 OPENS
		• WHEN dilution is complete, THEN:
		  • Place HS-62-140A to STOP
		  • Check no primary flow on either FI-62-142A OR FQ-62-142
		  • Ensure FC-62-142 is in AUTO and set at 35%.
		  • ENSURE FCV-62-128 CLOSED.
		  • Place HS-62-140B in AUTO position.
		  • Place HS-62-140A to the START position.

Op-Test No.: __1__ Scenario No.: __3__ Event No.: _1___ Page _2_ of _2_

Event Description: Increase Power to 100%.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	CONTINUE power ascension to 100% AND ADJUST turbine load as needed while maintaining valve position limit ~10% above gov vlv control indication.
	RO	IF diluting the RCS to increase Tavg, THEN continue the dilution and increase turbine load to maintain Tref with Tavg. Control rods may be used along with dilution to increase reactor power.
	BOP	MONITOR turbine load increasing.

Op-Test No.: _1___ Scenario No.: __3__ Event No.: _2___ Page _1_ of _1_

Event Description: Swap Charging Pumps from "B" to "A".

Time	Position	Applicant's Actions or Behavior
	BOP	**ENSURE** an "A" Train Component Cooling Water Pump is in service.
	RO	**NOTIFY** appropriate operator to locally inspect 1A-A pump to ensure it is ready for operation.
	SRO	**WHEN** ready to start 1A-A CCP, **THEN PLACE [1-HS-62-108A]** in **START, AND REFER** to LCO 3.4.12.
	RO	**WHEN** ready to shutdown 1B-B CCP, **THEN PLACE [1-HS-62-104A]** in **STOP**.

Op-Test No.: __1__ Scenario No.: __3__ Event No.: _3___ Page _1_ of _2_

Event Description: VCT Level Transmitter LT-62-130A fails High.

Time	Position	Applicant's Actions or Behavior
		CAUTION If actual level is permitted to become low, charging pump gas intrusion could occur. [C.5]
		NOTE 1 High failure of 1-LT-62-129A or 1-LT-62-130A defeats auto switch over to RWST on low level. **NOTE 2** High failure of 1-LT-62-129A will divert letdown flow with NO affect on Auto makeup. **NOTE 3** High failure of 1-LT-62-130A will divert letdown and prevent Auto makeup. 1-LI-62-129 will indicate actual level. **NOTE 4** Symptom of partial loss of reference leg 1-LT-62-129A and -129C.1-LI-62-129 (1-M-6) and 1-LI-62-129C (1-L-10) both indicating the same and higher than log point L0112A (1-LT-62-130A). . **[C.5]** **NOTE 5** Symptom of partial loss of reference leg 1-LT-62-130A and -130C. Log point L0112A (1-LT-62-130A) indicating higher than 1-LI-62-129 (1-M-6) and 1-LI-62-129C (1-L-10). . **[C.5]**
	RO	**COMPARE** indicated level between **[1-LI-62-129]** (1-M-6), Plant computer point **LO112A** (1-LT-62-130), and **[1-LI-62-129C]** (2-L-10).
	RO	**IF [1-LI-62-129]** (1-M-6) and **[1-LI-62-129C]** (1-L-10) agree and are indicating lower than Log Point **L0112A** (1-LT-62-130A), **THEN, RELY** on **[1-LI-62-129]** (1-M-6).
	RO	**IF** Log Point **L0112A** (1-LT-62-130A) is indicating lower with **[1-LI-62-129]** (1-M-6) and **[1-LI-62-129C]** (1-L-10) in agreement but indicating higher, **THEN. DETERMINE [1-LT-62-130C]** output for comparison to **L0211A** by obtaining **TP-19** voltage reading in (1-L-11A) using the table for conversion.
	RO	**IF** level loop 1-LT-62-130C and Log Point L0211A agree, **THEN, RELY** on Log Point **L0211A** for actual level.
	RO	**IF LOW** level, **THEN,** **[a] INITIATE** makeup in accordance with 1-SO-62-7, *Boron Concentration Control.* **[b] ENSURE [1-LCV-62-118]** aligned to VCT. **[c] LOCATE** and **ISOLATE** leaks. **[d] CHECK** Reactor Coolant Filter ΔP.

Op-Test No.: _1___ Scenario No.: __3__ Event No.: _3___ Page _2_ of _2_

Event Description: VCT Level Transmitter LT-62-130A fails High.

Time	Position	Applicant's Actions or Behavior
	RO	**IF HIGH** level, **THEN** **[a] ENSURE [1-LCV-62-118]** aligned to HUT. **[b] STOP** VCT makeup.
	SRO	**IF** in MODE 4, or MODE 5 and a LOCA is identified, **THEN, GO TO** AOP-R.02, Shutdown LOCA (MODE 4, or 5).
	SRO	**IF** a small RCS leak is indicated, **THEN, GO** to AOP-R.05, RCS Leak and Leak Source Identification.

Op-Test No.: _1___ Scenario No.: _3___ Event No.: __4__ Page _1_ of _2_

Event Description: Loss of Component Cooling Water to RCP Thermal Barrier.

Time	Position	Applicant's Actions or Behavior
	SRO	Implement AOP-M.03
	SRO	**EVALUATE** the following Tech Specs for applicability: 3.4.1.1, Reactor Coolant Loops and Coolant Circulation - Startup and Power Operation 3.4.1.2, Reactor Coolant System - Hot Standby 3.4.1.3, Reactor Coolant System - Shutdown 3.5.2, ECCS Subsystems Tavg ≥ 350°F 3.5.3, ECCS Subsystems Tavg <350°F 3.6.2.1, Containment Spray Subsystems 3.7.3, Component Cooling Water System Which are Applicable ?
	SRO	EVALUATE EPIP-1, Emergency Plan Classification Matrix.
	SRO	DIAGNOSE the failure: **CCS Thermal Barrier Booster Pump trip or failure 2.4**
	RO/BOP	IDENTIFY and LOCK OUT failed Thermal Barrier Booster Pump.
	RO/BOP	CHECK Thermal Barrier isolation valves OPEN: • FCV-70-87 • FCV-70-90 • FCV-70-133 • FCV-70-134
	SRO	NOTIFY Chemistry to sample CCS for activity, and **GO TO** Step 4.
	RO	ENSURE proper RCP seal injection: • Flow between 8 gpm and 13 gpm • VCT outlet temperature less than or equal to 130°F
	RO	MONITOR RCP seal water and lower bearing temperatures less than or equal to 225°F. (Bearing temps will be less than 225°F initially)
	CREW	TRIP the affected Unit's reactor and RCP(s). **IF** in MODE 1, 2, or 3, THEN GO TO E-0, Reactor Trip or Safety Injection. ***(This will be the step that the crew will trip the reactor with later)***
	RO/BOP	MONITOR CCS radiation levels STABLE or DROPPING: • RA-90-123A, CCS Liquid Effluent Monitor • Chemistry Sample

Op-Test No.: _1___ Scenario No.: _3___ Event No.: __4__ Page _2_ of _2_

Event Description: Loss of Component Cooling Water to RCP Thermal Barrier.

Time	Position	Applicant's Actions or Behavior
	CAUTION	AUTOMATIC ISOLATION OF THE THERMAL BARRIER CAN BE CAUSED BY A HEAT EXCHANGER TUBE LEAK. REALIGNMENT OF THE THERMAL BARRIER MAY CAUSE ADDITIONAL LEAKAGE.
	SRO	DETERMINE whether Thermal Barrier is to be placed back IN SERVICE. (NO)

Op-Test No.: ____ Scenario No.: _3___ Event No.: _5___ Page _1_ of _1_

Event Description: Pressurizer Spray Valve PCV-68-340 fails partially Open.

Time	Position	Applicant's Actions or Behavior
	CREW	Refer to AR 1-M-5A-D4
		Restore pressure using heaters and spray Adjust spray valve manually
	RO/SRO	PRUDENT OPERATOR ACTIONS • STABILIZE THE PLANT **ATTEMPT TO CLOSE PZR SPRAY VALVE. IF PZR SPRAY VALVE WILL NOT CLOSE THEN TRIP THE RX AND REMOVE APPLICABLE RCP FROM SERVICE.** • REFERENCE ANNUNCIATOR RESPONSES • UTILIZE SUPPORTING PROCEDURES •
		EPM-4, Section 3.4, Management Expectations **The use of Alarm response procedures is not intended to delay actions.** **NOTE** **When a parameter is approaching a protective setpoint in an uncontrolled manner, the operator is expected to:** • **evaluate parameter magnitude and trend.** • **initiate a manual trip and/or safety injection prior to automatic initiation.**
	Examiner Note	This is event is slow moving, the crew may not immediately trip the reactor until they determine if PZR heaters will maintain pressure
	CREW	May discuss the possibility of isolating air to containment FCV-32-80 & 102
	SRO	Evaluate TS 3.3.1, 3.3.2, 3.2.5

Op-Test No.: ____ Scenario No.: _3___ Event No.: _6___ Page _1_ of _1_

Event Description: Loss of Condenser Vacuum Permissive PS-2-1B.

Time	Position	Applicant's Actions or Behavior
	CREW	**NOTE** The presence of this alarm allows steam dumps to operate.
	BOP	**VERIFY** condenser pressure less than 3.4 psia.
	BOP	**VERIFY** at least one condenser circulating water pump operation.
	BOP	**IF** C-9 goes dark during normal operation, **THEN REFER** to AOP-S.02, *Loss of Condenser Vacuum.*
	Examiner Note	AOP-S.02 will not address this failure
		Notify MIG and Management of the failure

What do we expect them to do?

Op-Test No.: _1___ Scenario No.: __3__ Event No.: _7___ Page _1_ of _2_ Event Description: Main Turbine High Vibration resulting in a rapid shutdown.		
Time	Position	Applicant's Actions or Behavior
	BOP	**MONITOR** recorder **[1-XR-47-2]** to determine which bearing has possible vibration problems and establish trend.
	SRO	**DISPATCH** operator to sound out turbine to verify alarm and 1-XR-47-2 indications.
	BOP	**CHECK** the following conditions for potential root cause. a. Oil temperature. b. Critical speed. c. Sealing steam pressure. d. Condenser vacuum. e. Exhaust shell temperature.
	BOP	**CORRECT** parameter values within applicable plant procedures' limits.

	RO/BOP	**IF** vibration remains high > 7 mills, **THEN**
		CONSULT with SRO/SM, **AND**
		EVALUATE starting unit shutdown.
		IF vibration continues to increase and **[1-HS-47-120]** is in CUTOUT position, **THEN**
		CONSULT SM, **AND**
		EVALUATE tripping the turbine prior to exceeding 14 mils verified vibration.
		IF reactor trip, **THEN GO TO** E-0, *Reactor Trip or Safety Injection.*
		IF turbine trips and no reactor trip, **THEN GO TO** AOP-S.06, *Turbine Trip.*

	Note	Crew will go to AOP-C.03 for the emergency shutdown

Op-Test No.: _1___ Scenario No.: __3__ Event No.: _7___ Page _2_ of _2_

Event Description: Main Turbine High Vibration resulting in a rapid shutdown.

Time	Position	Applicant's Actions or Behavior
		Emergency Shutdown Procedure AOP-C.03
	SRO	**EVALUATE** Tech Specs for applicability Are they Met?
	SRO	**EVALUATE** EPIP-1, Emergency Plan Initiating Conditions Matrix.
	SRO	**NOTIFY** following personnel of emergency shutdown: Load Coordinator **[C.1]** Chemistry RADCON Plant Management
	SRO	**MONITOR** reactor/turbine trip NOT required **USING** Appendix A, Reactor and Turbine Trip Criteria.
		NOTE Using a conservative differential boron worth (DBW) of 8 pcm/ppm and a charging flowrate of 90 gpm the RWST has the capability to inject approximately 24 to 30 pcm/min.
	RO	**INITIATE** boration using BAT to maintain control rods above low-low insertion limits.
	RO	**ENERGIZE** one set of backup heaters to maintain pressurizer boron concentration within 50 ppm of RCS boron concentration.
	BOP	**INITIATE** load reduction at rate of between 2% and 5% per minute.
	BOP/RO	**MONITOR** automatic rod control maintaining T-avg/T-ref mismatch less than 5°F.
	RO/BOP	**IF** T-avg/T-ref mismatch can NOT be maintained less than 5°F, **THEN TRIP** the reactor and **GO TO** E-0,Reactor Trip or Safety Injection.
	BOP	**STOP** secondary plant equipment **USING** Appendix B, Secondary Plant Equipment.
	SRO	**IF** shutdown of Reactor is required, **THEN** continue with next step.
		NOTE The following ESF actuations are expected to occur as a result of removing the unit from service: • Feedwater Isolation • Auxiliary Feedwater start

Op-Test No.: ____ Scenario No.: __3__ Event No.: _8___ Page _1_ of _1_

Event Description: Loss of 6.9Kv Shutdown Board.

Time	Position	Applicant's Actions or Behavior
	SRO Which are Applicable ?	EVALUATE the following Tech Specs for applicability: • 3.0.5, Power Source OPERABILITY - Modes 1-4 • 3.1.2.3, Charging Pump - Shutdown • 3.8.1.1, AC Sources - Operating • 3.8.1.2, AC Sources - Shutdown • 3.8.2.1, AC Power Distribution System, Operating • 3.8.2.2 AC Power Distribution System, Shutdown • 3.8.2.3 DC Power Distribution System, Operating • 3.8.2.4 DC Power Distribution System, Shutdown
	SRO	EVALUATE EPIP-1, Emergency Plan Initiating Matrix.
	SRO	Implement AOP-P.05 and diagnose the failure as a loss of 1A-A 6900V Shutdown Board.
	BOP	Perform actions of AOP-P.05 Section 2.1. • MONITOR 1B-B 6900V Shutdown Board ENERGIZED. • ENSURE at least 1 A train ERCW pump in service. • ENSURE 1B-B CCS pump SUPPLYING A Train.
	RO	**MONITOR REACTOR COOLANT PUMPS MOTOR THRUST BEARING TEMP HIGH alarm DARK.**
	RO	CHECK charging in service and letdown IN SERVICE.
	BOP	CHECK ERCW supply header pressure NORMAL.
	~~BOP~~ Failure to Start — Manually Start ? BOP	ENSURE 1A-A DG RUNNING and ERCW ALIGNED to all DGs.
	SRO	DISPATCH operators with radios to determine the cause of the failure.
	BOP	EVALUATE starting additional CRDMs based on reactor cavity air temperature and RPI indications USING 0-SO-30-6.
	SRO	EVALUATE air system status.
	BOP	ENSURE affected Battery Chargers ALIGNED to AVAILABLE source USING 0-SO-250-1, 0-SO-250-5 or 0-SO-250-6 as applicable.
	RO Not Both	***Crew should recognize the need to trip the reactor based on one of the following: 1. high temperature of RCP bearings, 2. Tavg/Tref > 5F, 3. Increased turbine vibrations and trip the reactor and reactor coolant pumps, Go to E-0***

Op-Test No.: ____ Scenario No.: _3___ Event No.: ____ Page _1_ of _5_

Event Description: Reactor Trip Response/FRP-S.1 ATWS.

Time	Position	Applicant's Actions or Behavior
	CREW	Enter and direct the actions of E-0.
	RO/SRO/BOP	Perform actions of E-0. • VERIFY Rx trip. If not then trip reactor. If reactor can not be tripped then monitor status trees and GO TO FR-S.1
	RO/BOP	Recognition of ATWS Condition and announce to crew.
	SRO	Attempt to initiate a manual reactor trip as directed by the US and inform the crew of an ATWS condition.
	RO/BOP Critical BOP ? Critical	Perform the actions of FR-S.1. • VERIFY reactor TRIPPED. If not then trip the reactor. If the reactor trip breakers will NOT open then place control rods in MANUAL and INSERT control rods. (Critical) • VERIFY turbine TRIPPED. If not then trip the turbine. If the turbine can NOT be tripped then close main turbine governor valves using valve position limiter control. If main turbine governor valves can not be closed then close MSIVs and MSIV bypass valves. • CHECK AFW system with MD & TD AFW pumps running, MD AFW LCVs in AUTO & TD AFW LCVs open. FCV-3-400 & 401 closed. • INITIATE emergency boration of the RCS using EA-68-4. If PZR pressure > 2335 psig then ensure PZR PORVs and block valves open, actuate Cntmt Vent/Phase A. • MONITOR SI NOT Actuated. If SI actuated then perform steps 1 through 12 of E-0 while continuing with this procedure. • CHECK reactor and turbine trip status. If Rx NOT tripped then dispatch personnel to locally trip the reactor. If turbine NOT tripped then dispatch personnel to locally trip the turbine. • MONITOR CST level > 10%.

Op-Test No.: ____ Scenario No.: _3___ Event No.: ____ Page _2_ of _5_

Event Description: Reactor Trip Response/FRP-S.1 ATWS.

Time	Position	Applicant's Actions or Behavior

	BOP	• MAINTAIN S/G narrow range levels. If ≤ 10% [25% ADV] then maintain total AFW flow > 880 gpm until level > 10% [25% ADV] in at least one S/G. If total flow < 880 gpm then establish required AFW alignment.
		• ENSURE inadvertent dilution paths are blocked, isolated or bypassed.
		• CHECK if uncontrolled RCS cooldown in progress. If NOT then STOP any controlled cooldown. If uncontrolled RCS cooldown in progress then perform the following
		  • CHECK MSIVs and MSIV bypass valves closed.
		  • IDENTIFY Faulted S/G(s).
		  • DETERMINE if any S/G Intact.
		  • ISOLATED Faulted S/G(s).
		  • CHECK Core Exit TCs - Less Than 1200°F. If NOT and increasing then GO TO SACRG-1, Severe Accident Control Room Guideline Initial Response.
		• VERIFY reactor subcritical. IF NOT then continue boration. IF boration NOT available then allow RCS to heat up.
		• MONITOR boration termination criteria. Notify Chemistry to sample
		• Return to procedure and step in effect.

		The first two actions of FR-S.1 are immediate operator actions
	SRO/BOP	Note: In the RNO for uncontrolled cooldown, stopping any controlled cooldown should include reducing feed flow to slightly above 880 gpm until 1 S/G ≥ 10% [25% ADV].
	SRO	Refer to SQN EPIP-1 per EAL 2.3 and declare a Site Area Emergency (If Rx Power > 5% and not decreasing after valid auto & manual trip signals) or Alert (If Rx Power > 5% and not decreasing after valid auto trip signal but manual trip is sucessful).
	SRO	Make notification to ODS within 5 min. of declaration. Announce emergency classification to crew members. Notify plant management of the event in accordance with applicable EPIP. Notify NRC within 1 hr.

Op-Test No.: ____ Scenario No.: _3___ Event No.: ____ Page _3_ of _5_

Event Description: Reactor Trip Response/FRP-S.1 ATWS.

Time	Position	Applicant's Actions or Behavior
		Transition to E-0
		• VERIFY Rx trip. If not then trip reactor. If reactor can not be tripped then monitor status trees and GO TO FR-S.1 • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps

	RO/BOP	• VERIFY turbine trip. Turbine stop valves CLOSED.
		• If not then trip turbine. If turbine can not be tripped then close MSIVs and MSIV bypass valves.
		• VERIFY Shutdown boards energized.
		  • VERIFY generator breakers OPEN 30 seconds after turbine trip.
		  • ENSURE station service ENERGIZED from start busses.
		  • VERIFY at least one train of shutdown boards ENERGIZED.
		  • VERIFY both trains of shutdown boards ENERGIZED.
		• IF power can NOT be restored to at least one train of SD Bds then GO TO ECA-0.0.
		• DETERMINE if SI actuated. If required, then actuate SI. If not actuated, then determine if SI is required. If SI is not actuated/required then monitor status trees and GO TO ES-0.1.
		  • ECCS pumps RUNNING (Critical 'B' train equip)
		  • Any SI alarm LIT [M-4D].
		• VERIFY CCS pumps running.

	RO/BOP	• CHECK ERCW System operation. VERIFY at least four ERCW pumps running. VERIFY D/G ERCW supply valves OPEN.
		• MONITOR ECCS operation.
		  • VERIFY ECCS pumps RUNNING:
		  • VERIFY CCP flow through CCPIT.
		  • CHECK RCS pressure less than 1500 psig.
		  • VERIFY SI pump flow.
		  • CHECK RCS pressure less than 180 psig.
		  • VERIFY RHR pump flow.

Op-Test No.: ____ Scenario No.: _3___ Event No.: ____ Page _4_ of _5_

Event Description: Reactor Trip Response/FRP-S.1 ATWS.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• VERIFY ESF system aligned. • Phase A ACTUATED: • CONTAINMENT ISOLATION PHASE A TRAIN A alarm LIT [M-6C, B5]. • CONTAINMENT ISOLATION PHASE A TRAIN B alarm LIT [M-6C, B6]. • Containment Ventilation Isolation ACTUATED: • CONTAINMENT VENTILATION ISOLATION TRAIN A alarm LIT [M-6C, C5]. • CONTAINMENT VENTILATION ISOLATION TRAIN B alarm LIT [M-6C, C6]. • Status monitor panels: • 6C DARK • 6D DARK • 6E LIT OUTSIDE outlined area • 6H DARK • 6J LIT. • Train A status panel 6K: • Train B status panel 6L: • MONITOR containment spray NOT required. (Phase B NOT ACTUATED, Containment pressure less than 2.81 psid.) If required then ENSURE containment spray initiated, ENSURE Phase B valves CLOSED, STOP RCPs & MONITOR containment air return fans. • Check if main steam lines should be isolated. (Any S/G pressure less than 600 psig AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive DARK [M-4A, A4]. OR Phase B actuation OR Any S/G pressure drop at a rate greater than 100 psi in a 50-second period AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT [M-4A, A4]. If required **VERIFY** MSIVs and MSIV bypass valves CLOSED. •

Op-Test No.: ____	Scenario No.: _3___	Event No.: ____	Page _5_ of _5_
Event Description: Reactor Trip Response/FRP-S.1 ATWS.			
Time	Position	Applicant's Actions or Behavior	
	RO/BOP	• VERIFY MFW isolation. • VERIFY AFW pumps running. (TDAFW & MDAFW) • VERIFY AFW valve alignment. AFW MD in AUTO & TD LCVs open and recirc valves closed. • DETERMINE if secondary heat sink available. (Level in at least 1 SG >10% [25% ADV] or >440 gpm. Control feed flow to maintain > 10% [25% ADV] and 50% in all S/Gs) • MONITOR RCS temperatures. (RNO = If T-avg < 547°F then ensure steam dumps and atmospheric relief valves CLOSED, If cooldown continues then control total AFW flow using EA-3-8. IF cooldown still continues, THEN close MSIVs.) • DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation. • CHECK pressurizer steam space integrity.	
		Transition to E-1	
		Terminate at examiner direction	