

U. S. NUCLEAR REGULATORY COMMISSION  
REGION 1

Docket Nos.: 50-317 and 50-318

Report Nos.: 98-301 (OL)

License No.: DPR-53 and DPR-69

Licensee: Baltimore Gas and Electric

Facility: Calvert Cliffs Units 1 and 2

Location: Lusby, Maryland

Dates: April 1, 1998

Chief Examiner: J. D'Antonio, Operations Engineer/Examiner

Approved By: Richard J. Conte, Chief  
Operator Licensing and  
Human Performance Branch  
Division of Reactor Safety

## EXECUTIVE SUMMARY

**Calvert Cliffs Nuclear Power Plant, Units 1 and 2  
Inspection Report Nos. 50-317/98-301(OL) and 50-318/98-301(OL)**

### Operations

A retake written examination was administered to one Senior Reactor Operator(SRO) candidate who had failed the original examination administered in October, 1997. This individual passed the retake examination and was issued a license.

## Report Details

### I. Operations

#### 05 Operator Training and Qualifications

##### 05.1 Senior Reactor Operator Written Examination

###### a. Scope

A written retake examination was administered to one SRO instant applicant.

###### b. Observations and Findings

The applicant passed the examination and was issued a license.

The facility examination submittal was an improvement over the prior examination submittal in that far less revision was necessary for NRC approval. NRC comments resulted in changes to approximately 10% of the examination. The most common comment concerned one or more implausible distractors. No post exam comments were provided by the facility.

###### c. Conclusions

The facility had successfully remediated the applicant for the prior exam failure.

The examination submittal was an improvement over the October 1997 examination submittal.

### V. Management Meeting

#### X1 Exit Meeting Summary

An exit meeting was held by telephone on April 29, 1998. The NRC summarized the exam review comments. Participants were the NRC Chief Examiner and the facility Supervisor of Initial License Training, John Hornick.

Attachments: Calvert Cliffs SRO Written Exam w/Answer Key

Attachment 1

CALVERT CLIFFS SRO WRITTEN EXAM W/ANSWER KEY



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

**Applicant Information**

Name:	Region: <u>I</u> / II / III / IV
Date:	Facility/Unit: <u>CALVERT CLIFFS 1&amp;2</u>
License Level: RO / SRO	Reactor Type: W / <u>CE</u> / BW / GE
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	<u>100</u> Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

1. Given the following:

- Unit 2 has implemented AOP 7H (Loss of Plant Computer)
- DAS is not available

Select the more restrictive limit which, when exceeded, requires a power reduction within the specified time interval:

- A. Less than DNB limits within 3 hours.
- B. Less than Linear Heat Rate limits within 3 hours.
- C. Less than DNB limits within 1 hour.
- D. Less than Linear Heat Rate limits within 1 hour.

2. Unit 1 is in MODE 3 with  $T_{avg}$  at 532 °F, when one CEA is declared inoperable. How long after the detection of the inoperable CEA must the shutdown margin be verified?

- A. Immediately
- B. 1 hour
- C. 12 hours
- D. 24 hours

3. Which one of the following parameters would absolutely differentiate a steam line rupture inside containment from a LOCA inside containment?

- A. Containment Sump Level.
- B. Pressurizer Level.
- C. Containment Temperature.
- D. Subcooled Margin.

4. An immediate change to an STP, that is not a change of intent, requires the approval of how many members of plant management staff, and who must one of these members be?

- A. Two, Test Coordinator.
- B. Three, General Supervisor or above.
- C. Two, a Senior Reactor Operator.
- D. Three, GS-NPO

5. STP M-212A-1 is in progress on Channel A RPS. Trip Units 1, 2, 7, 8 and 10 are bypassed. Instrument Maintenance personnel discover an out of tolerance voltage for the high power trip unit. They suspect a bad power supply and request permission to commence troubleshooting the problem. Who must authorize the Troubleshooting Control Form?

- A. RMGS and CRS.
- B. RMGS, GS-Instrument Maintenance, and CRS.
- C. RMGS, CRS, and SS.
- D. RMGS, SS, and GS-NPO.

6. The setpoint for the normal liquid effluent monitor is based on assumptions in the Offsite Dose Calculation Manual (ODCM).

Which one of the following would require the Plant Computer activity setpoint to be decreased?

- A. Decrease in actual release rate from 120 gpm to 90 gpm.
- B. Decrease in operating circ water pumps from 6 to 5.
- C. Decrease in monitor background radiation level.
- D. Decrease in Bay level.

7. An operator is assigned a task to monitor a resin transfer line for blockage. The operator's current dose for the year is 850 mRem. The task is expected to result in a dose of 100 mRem.

Describe the procedure, if required, for extending the administrative dose limit:

- A. No administrative dose limit extension is needed.
- B. Dosimeter record review, Shift Supervisor and GS-NO approvals.
- C. Dosimeter record review, GS-NO and GS-RS approvals.
- D. EPD functional review, RadCon S/S and Shift Supervisor approvals.

8. 11 and 12 Heater Drain Pump Chiller Units are scheduled to be taken out of service for scheduled maintenance. The chiller units will be out of service for 23 hours. The maintenance order describes only the inspection that the shop will be performing. You have directed the Principal Plant Operator (PPO) to place two "heat killer" fans in operation at the Heater Drain Pump motors. What additional controls, if any, are required by plant procedures?

- A. Initiate a Troubleshooting Control Form.
- B. Have the Shift Supervisor perform an evaluation and initiate a Temporary Alteration.
- C. Place the temporary fans in service, no additional action is required.
- D. Initiate a Procedure Controlled Temporary Plant Configuration Change.

9. Unit 1 reactor startup following a refueling outage is in progress. The Shift Supervisor has assigned you as the Dedicated SRO for physics testing that NFM has just commenced. Prior to the start of the physics test you had been assigned as the Operations Work Control Center Coordinator (OWC). Which of the following functions may be performed by the Dedicated SRO?

- A. Direct the immediate actions necessary to place the unit in a safe condition.
- B. Make recommendations to the Shift Supervisor concerning the physics test data reduction activity.
- C. Review and approve Maintenance Orders.
- D. Approve emergent risk significant maintenance contingencies.



10. Unit 1 core offload is scheduled to begin within the next week. The Unit 1 Refueling Machine shall be demonstrated operable by performing the required surveillance within \_\_\_\_\_ hours prior to the start of fuel movement, including demonstrating that the automatic overload cutoff functions when main hoist load exceeds \_\_\_\_\_ pounds.
- A. 72, 3000
  - B. 72, 1550
  - C. 24, 3000
  - D. 24, 1550

11. given the following conditions for Unit-1:

- 1) PA912 = 2475
- 2) Th = 590.5 °F
- 2) Tc = 546.5 °F
- 3) ASI = +0.015
- 4) PZR pressure = 2250 PSIA

Using appropriate Tech Specs, calculate actual Pvar and the resultant Ptrip value:

- A. Pvar 1797, Ptrip 1875
- B. Pvar 1875, Ptrip 1797
- C. Pvar 1875, Ptrip 1875
- D. Pvar 1811, Ptrip 1797

12. Refer to the attached Unit 1 Technical Specifications Core Operating Limits Report (COLR).

Unit 1 reactor power is 70% when a continuous CEA withdrawal occurs. When the withdrawal is stopped, indicated Axial Shape Index (ASI) is -0.29 and reactor power peaks at 79%. Unit 1 is using Excore Monitoring for LHR and DNB surveillance monitoring.

Which, if any, axial flux offset control limit(s) is(are) being exceeded?

- A. Linear Heat Rate only.
- B. DNB only.
- C. Both Linear Heat Rate and DNB.
- D. Neither Linear Heat Rate nor DNB.

13. Which condition would require notification of the NRC within 4 hours of occurrence?

- A. Performance of an STP that does not result in discharge to the RCS.
- B. SIAS actuation resulting from shutdown of ESFAS cabinets per OI-34.
- C. Operator initiated manual reactor trip as part of a preplanned physics test.
- D. Pressurizer spray valve opening due to high RCS pressure.

14. A Unit 1 startup is in progress following a 7 day forced outage to replace an RCP seal. You are performing the functions of the Dedicated SRO for the plant startup. The following conditions exist:

- \* RPS Delta-T power 14%
- \* Plant computer thermal power 17%
- \* STA reports that RCS loop Th-Tc is consistent with a power level of ~18%.

You notice that the "LOSS OF LOAD CH TRIP BYP" alarm is still in alarm at 1C05. When should this alarm clear, when is the trip required to be enabled, and what is the design basis of the trip?

- A. 12%,  $\geq$  14%, helps avoid lifting the main steam line safety valves.
- B. 13%,  $\geq$  14%, protects the RCS from overpressurization.
- C. 14%,  $\geq$  15%, helps avoid lifting the main steam line safety valves.
- D. 13%,  $\geq$  15%, protects the RCS from overpressurization.

15. You are performing the function of the Operations Work Control Center Coordinator (OWC) when the Outside Operator reports that the 2A DG Standby Lube Oil Pump is making an unusual noise. The System Engineer and Mechanical Maintenance Supervisor recommend that the pump be replaced immediately as Priority 2 maintenance. What action, if any, should the OWC initiate per plant procedures?

- A. Ensure completion of an Operational Risk Assessment.
- B. Authorize the Maintenance.
- C. Direct the Outside Operator to secure the lube oil pump.
- D. Direct the CRO to perform a breaker line-up verification

16. You are the Unit 2 CRS and you have directed the CRO to shift EHC Pumps to allow the System Engineer to observe pump performance. The Unit 2 Turbine Building Operator, System Engineer, and Mechanical Maintenance Supervisor are standing by at the EHC Unit. What additional actions, if any, are required by Operation's procedures?

- A. Shift EHC Pumps as requested, no additional action required.
- B. Announce start of the EHC Pump over the plant page prior to EHC Pump start.
- C. Have TBO evacuate unnecessary personnel from the area around the EHC Pumps.
- D. Announce start of the EHC Pump and evacuate unnecessary personnel from the EHC Pumps.



17. Given the following:

- Due to a loss of all AC power, EOP 7 (Station Blackout) was implemented ~20 minutes ago
- Unit 1 is meeting the intermediate SFSC but Unit 2 is not meeting the intermediate SFSC for Core and RCS heat removal as a result of sabotage
- The interim RAD estimates that a release of  $2E6$  uCi/sec is occurring and will continue for at least 2.5 hours
- Wind direction from the DRDT screen is from the North

What Prompt Protective Action Recommendation should be made?

- A. Shelter 10 mile EPZ
- B. Evacuate 10 mile EPZ
- C. Evacuate zone 1 and 3 and shelter the remainder of 10 mile EPZ
- D. Shelter zone 1 and evacuate remainder of 10 mile EPZ

18. Which of the following components under expected conditions will have Salt Water isolated to it during a SIAS?

- A. SRW heat exchanger.
- B. CCW heat exchanger.
- C. Circ water pump seals.
- D. ECCS pump room coolers.

19. The Miscellaneous Waste System receives liquid waste from which of the following major sources?

- A. Containment tendon galleries.
- B. Containment normal sump and pumped sumps.
- C. Waste Gas Decay Tank condensate.
- D. Evaporator distillate.

20. The Containment Spray System is designed to limit containment pressure to less than its design value during a design basis accident. The system is also expected to be effective for which of the following:

- A. Collecting and processing containment penetration leakage.
- B. Preventing fuel and cladding damage.
- C. Maintaining hydrogen concentration below 4%.
- D. Removing fission products from the containment atmosphere.

21. What happens on a transfer from High Power to Low Power Mode if SG level rises to greater than +20" during the transfer?
- A. The transfer continues at the same rate.
  - B. The transfer continues at 1/2 the original rate.
  - C. The transfer is suspended, the MFV returns SG level to normal in Auto, and the BFV is held at current position.
  - D. The transfer is suspended, the BFV returns SG level to normal in Auto, and the MFV is held at current position.

22. Instrument Maintenance Shop plans to perform troubleshooting activities on Reactor Regulating System (RRS) Channel X & Y per MN-1-110. RRS Channel Y is selected. Trouble-shooting activities will begin on Channel X first. Which of the following actions may also be necessary?
- A. Calculate and set the Power Ratio Calculator potentiometers per AOP-7H.
  - B. Fail the temperature instrument input to RRS.
  - C. Remove Reactor Regulating NI inputs to the Digital Feedwater System.
  - D. Calibrate RRS NIs per OI-30.

23. Which one of the following annunciator alarms also indicates the presence of an interlock which will prevent the start of 22A RCP?
- A. "OIL RESVR LEVEL LO"
  - B. "OIL LIFT PP PRESS LO"
  - C. "CC TEMP HI"
  - D. "RCP BLD OFF FLOW HI/LO"

24. Given the following:
- Unit 1 is at 100% power
  - various alarms annunciate
  - CRO reports that 12 120 VAC Vital Bus (1Y02) indicates 0 volts at 1C24A
- Select the indication that is effected :
- A. Channel B WRNI at 2C43
  - B. Channel B LRNI at 1C15
  - C. Channel A WRNI at 1C43
  - D. RRS Channel X LRNI at 1C05

25. During troubleshooting efforts on the Unit 2 Auxiliary Feedwater Actuation System, an inadvertent "AFAS A" is actuated. The "AFAS A ACTUATED" alarm is received in the Control Room. Which of the below listed combinations of component actuations should be expected to occur?

- A. CV 4070a and 4071a OPEN to supply steam to the aligned steam driven pump.
- B. CV 4070a and 4070 OPEN to supply steam to the aligned steam driven pump and 23 AFW pump STARTS.
- C. CV 4071a and 4071 OPEN to supply steam to the aligned steam driven pump.
- D. CV 4070 and 4071 OPEN to supply steam to the aligned steam driven pump.

26. The Control Room Ventilation High Radiation Monitor (RE-5350) fails high. Which of the following automatic component actions are expected to occur?

- A. Main Plant Exhaust Fans STOP and Control Room Ventilation goes to RECIRC mode.
- B. POST-LOCI Filter Fans START, Outside Air Dampers CLOSE and Toilet Area Exhaust Fan STOPS.
- C. POST-LOCI Filter fan discharge dampers OPEN and Toilet Area Exhaust Fan STARTS.
- D. NSR Chiller Unit STOPS and Control Room SR HVAC STOPS.

27. Which of the following provides a possible indication of a failed incore detector?

- A. CECOR/BASSS display on the Plant Computer.
- B. "Selected Computer Point" alarm at C06.
- C. Incore detector computer point in alarm below the limit on Plant Computer.
- D. Small variations in reactor thermal power ( $PA\ 911 \pm 2\ Mwth$ ).

28. Due to a problem on 2-TIC-223, 2-CC-223-CV fails shut causing Letdown Heat Exchanger outlet temperature to increase. What effect does this have on reactor power and why?

(Assume normal CVCS lineup)

- A. Reactor power will decrease due to the increase in B-10 removal in the CVCS Ion Exchanger.
- B. Reactor power will decrease due to the resultant increase in B-10 concentration in the VCT.
- C. Reactor power will increase due to the resultant increase in B-10 concentration in the VCT.
- D. Reactor power will increase due to the increase in B-10 removal in the CVCS Ion Exchanger.



29. Unit 1 is operating @ 100% power. RCS boron concentration is 161 ppm. The RO is monitoring a 120 gallon DI water addition to the VCT. The following indications are observed:

- \* Reactor thermal power at 2700 Mth and slowly increasing
- \* Auctioneered Tc at 548 °F
- \* Highest RPS Tc at 548 °F

Which of the following actions should be performed first?

- A. Trip the reactor and implement EOP-0.
- B. Insert Group 5 CEAs to 105".
- C. Stop any makeup to the RCS.
- D. Perform a 10 second fast boration.

30. The correct action to take to trip the Unit 2 turbine on a loss of 125 VDC Bus 11 is:

- A. Use trip button on 2C02, it is unaffected by loss of 125 VDC Bus 11.
- B. Initiate turbine trip from either ESFAS logic cabinet by depressing either Turbine Trip Hi Level or RxTrip Bus Undervoltage bistable manual trip pushbutton.
- C. Station an operator at the front standard and when directed, manually trip the turbine using the trip lever.
- D. Enter the HP turbine doghouse and flip the MSR High Level Trip Bypass Switch up and down which will trip the turbine.

31. The Control Element Assembly Position Display System (CEAPDS) uses a reactor power signal (Qmet) to generate which of the following functions?

- A. Sequential Permissive signal.
- B. Shutdown Group Exercise limit.
- C. CEA Withdrawal Prohibit (CWP)
- D. Secondary PDIL and PPDIL setpoints

32. Given the following:

- Unit 1 is in Mode 3
- SIAS Pressurizer Pressure Blocked on both logic channels
- RCS pressure being reduced to 1500 PSIA
- PZR Spray valves fail shut and RCS pressure starts to increase

Select the expected system response as pressure increases:

- A. SIAS Pressurizer Pressure Block will be manually removed when the RO goes to "NORMA!" at 1800 PSIA with the keyswitch for SIAS Block A at 1C10.
- B. SIAS Pressurizer Pressure Block will be automatically removed when ZE and ZF SIAS Pressurizer Pressure sensors clear
- C. SIAS Pressurizer Pressure Block will be manually removed when the RO goes to "NORMAL" at 1800 PSIA with both keyswitches for SIAS Block A and B at 1C10.
- D. SIAS Pressurizer Pressure Block will be automatically removed when ZD SIAS Pressurizer Pressure sensor clears.

33. Given the following trend & alarms on the 12B RCP with Unit 1 at 100% power:

TIME	ANALOG VIBRATION	ALARMS
0000	14 mils	
0100	18 mils - Alert	"RCPs Vibration" alarm
0115	30 mils - Danger	"RCPs Vibration" alarm
0130	36 mils	
0135	0 mils	

What action should be taken?

- A. Commence an expeditious plant shutdown, and then secure 12 B RCP.
- B. Trip reactor, implement EOP-0, perform Reactivity Control and secure 12 B RCP.
- C. 12B RCP must be secured within 8 hours with GS-NO concurrence.
- D. Immediately Contact Performance Testing Unit and GS-NO, evaluate vibration data.

34. As CRS, the CRO reports that the ABO noticed the Waste Gas Surge Tank pressure had lowered from ~4 PSIG to 0 PSIG. The CRO is concerned that if a vacuum is reached, air could mix with the H<sup>2</sup> and result in an explosive mixture.

What direction is appropriate for the CRO to verify:

- A. N<sup>2</sup> Control Valve opens at 0 psig.
- B. Waste Gas Surge Tank relief to Waste Gas header OPEN.
- C. Waste Gas Discharge Isolation Valves 0-WGS-2191-CV and 2192-CV OPEN.
- D. Waste Gas Surge Tank drain trap aligned to Waste Gas Compressors.



35. Given the following:

- Unit 2 has implemented EOP 4 (Excess Steam Demand)
- 21 SG blowdown in the Containment has been completed
- Containment temperature is ~252 °F
- Containment pressure is ~ 47 PSIG
- Pressurizer level indicates ~ 128 " and pressure is ~ 1000 PSIA

As the Containment Cooling Systems remove heat from the containment atmosphere, what effect is expected on the indicated level in the Pressurizer compared to the actual level?

- A. Indicated level will be less than actual level due to decreasing containment temperature, it will always be lower than actual.
- B. Indicated level will be greater than actual level, and as the containment temperature lowers, it will approach actual level.
- C. Indicated level will be greater than actual level and will stay higher due to reference leg flashing as the containment temperature lowers.
- D. Indicated level will be less than actual level, and as the containment temperature lowers, it will approach actual level.

36. Following a design basis Loss of Coolant Accident the Containment Spray System fails to actuate as required.

As a result, the containment design pressure will be exceeded unless which of the following actions are taken as a minimum:

- A. 2 Reactor Cavity Cooling Fans and 2 Containment Cooling Fans are started in SLOW speed.
- B. 3 Containment Coolers are started in SLOW speed.
- C. 3 Containment Coolers are started in FAST speed.
- D. 4 Containment Coolers are started in FAST speed.

37. A CAR unit has been shutdown and the inlet CV has failed to shut. If the CAR is in the "Holding Mode", describe the effect, if any:

- A. Air will not leak into the condenser.
- B. Air will leak into the condenser via the seal water recirc pump.
- C. Air will leak into the condenser via the hogging CV.
- D. Air will leak into the condenser via the three way valve.

38. WHICH ONE (1) of the following is the MAXIMUM hydrogen concentration allowed inside Containment before the Hydrogen Recombiners are required to be placed in service?

- A. 0.5%
- B. 2%
- C. 3%
- D. 4%

39. During refueling a new fuel assembly has just been inserted in its specified core location when the FHS observes that the mast detent is at "0" vice "180" as required by the fuel handling procedure. Choose the answer that represents the applicable actions to be taken:

- A. Withdraw the fuel assembly from the core, FHS and Shift Supervisor shall evaluate, and obtain written approval from the PE-NFM to resume core alterations.
- B. Leave the assembly grappled and exit the refueling machine, the RCRO and FHS shall evaluate, and obtain verbal approval from the Shift Supervisor to resume core alterations.
- C. Leave the assembly grappled and notify the Shift Supervisor and PE-NFM immediately.
- D. Withdraw the fuel assembly from the core, rotate mast to the correct detent, and reinsert the assembly.

40. The most serious failure for the Spent Fuel Pool Cooling System is the loss of SFP Water. What feature of the system is designed to prevent this?

- A. Piping interconnection to either RWT.
- B. Cask Handling Crane modified to meet single failure criteria.
- C. Two channels of remote level indication with alarm function.
- D. SFP pipe connections with siphon breakers, above the water level in SFP.

41. During a large break LOCA fuel cladding temperatures sharply rise within the first 20 seconds. Why does this occur?

- A. MTC and doppler add positive reactivity to the core, raising power and temperature.
- B. RCS pressure drops to saturation pressure and the fuel rods are blanketed with steam.
- C. RCPs trip due to SIAS and CIS and this results in no driving head for flow.
- D. LPSI and SIT flows are blocked by the voiding in the reactor vessel downcomer region.

42. As the Plant Watch Supervisor you are conducting a tour of the Turbine Building. 11 Plant Air Compressor is in service and you notice the following indications on the microcontrollers:

- \* Alarm light is blinking
- \* "SURGE" displayed in the function display

What direction from the PWS, if any, is necessary?

- A. Depress the ACK/RESET pushbutton twice.
- B. No action is required.
- C. Place the MODE OF OPERATION handswitch to UNLOAD.
- D. Place the MODE OF OPERATION handswitch to MODULATE.

43. During the performance of STP O-7B-2 on Unit 2 at 100% power, the CRO reports that the Containment RMS isolation valve 2-RE-5291-CV fails to close on the SIAS signal. What action is appropriate for this condition:
- A. Complete the STP, place the Containment RMS back in service, note the malfunction in the STP.
  - B. Shut 2-RE-5291-CV, deactivate the valve within 4 hours per TS, note the malfunction in the STP.
  - C. Shut 2-RE-5291-CV within 4 hours, verify position once per shift, note the malfunction in the STP.
  - D. Notify System Engineer, evaluate STP results, note the malfunction in the STP.

44. Given the following:
- Unit 1 is at 10% power with a Plant startup in progress
  - Alarm "12 SG CONTR CH LVL" annunciates at 1C03
  - RO reports that 12 SG level by 1-LT-1106 indicates +63.5" and remaining SG level indications are at 0"
- Describe the effect on the Plant and action required:
- A. 12 Bypass Feedwater Valve will go SHUT requiring a manual Reactor trip and implementation of EOP 0.
  - B. 12 Bypass Feedwater Valve will continue to maintain level, the downcomer selector switch at 1C36 should be placed in the LT-1106 failure position to provide LT-1121 input to the control channel indication.
  - C. 12 Bypass Feedwater Valve will go SHUT, requiring manual operation by placing its associated handswitch in the BYPASS FAIL position.
  - D. 12 Bypass Feedwater Valve will continue to maintain level, a manual transfer from LOW to HIGH power of the DFWCS will be required for 12 Feed System.

45. You are the Unit 1 CRS. You are reviewing a Liquid Waste Discharge permit for discharging 12 RCWMT to Unit 1 Circulating Water System. The following plant conditions exist:

- | <u>Unit 1</u>             | <u>Unit 2</u>                             |
|---------------------------|---|
| * Mode 5                  | * 90% power                               |
| * All CW Pumps tagged out | * 23A Condenser Waterbox OOS for cleaning |
| * 12 SW header OOS        | * Both SW Headers in service              |

What action should you as the CRS direct?

- A. Approve the discharge permit and give it to the Unit 1 CRO.
- B. Have Chemistry submit a new permit for discharge to Unit 2.
- C. Pen and Ink the permit to change to "Unit 2" and approve permit for discharge.
- D. Have Chemistry hold the permit until 12 SW Header is returned to service.



46. Unit 1 had been operating continuously for 340 days, when a small RCS leak developed a short time ago. You are the Unit 1 CRS directing a rapid power reduction per OP-3 to place Unit 1 in hot standby. Unit 1 load is at 570 MWe. Reactor power is being lowered at the rate of 35% per hour. Tc is +2 degrees F from program Tc. The RO reports that Tc is beginning to rise suddenly. What has occurred and what effect will there be on core reactivity?

(Note: Consider each condition separately)

- A. TBV-3940 begins to shut, adds (+) reactivity.
- B. S/G blowdown flow raised to 150 gpm, adds (-) reactivity.
- C. MSR 2nd Stage High Load MOVs shut, adds (-) reactivity.
- D. Low Pressure Feedwater Heater High Level Dump valves open, adds (+) reactivity.

47. Given the following:

- Unit 1 is defueled and Unit 2 is in Mode 5
- Alarm "SFP TEMP HI" annunciates at 1C13

Select the cooling mechanisms in preferred order per AOP 6F (SFP Cooling Malfunctions):

- A. Line up Unit 1 SDC to SFP system, place second SFP cooler in service, add makeup to SFP as water boils off.
- B. Place second SFP cooler in service, line up Unit 1 SDC to SFP system, add makeup to SFP as water boils off.
- C. Line up Unit 2 SDC to SFP system, place second SFP cooler in service, add makeup to SFP as water boils off.
- D. Place second SFP cooler in service, line up Unit 2 SDC to SFP system, add makeup to SFP as water boils off.

48. You have just completed watch relief as Unit 1 CRS. The off-going CRS had related two occasions during the previous 12 hours where RPS Channel B Delta-T power had spiked high causing "HI POWER RESET DEMAND" alarms. A short time later you receive the following alarms and indications from Channel A RPS:

- \* HI POWER TRIP RESET DEMAND
- \* PROT CH TRIP
- \* POWER LVL HI CH PRE-TRIP

(NOTE: Above alarms are annunciating, then clearing every 5 seconds)

- \* Channel A RPS T/U #1 is tripped
- \* Delta-T power is steady
- \* N.I. power is steady
- \* Upper and lower linear range power is steady
- \* Th and Tc are steady

What actions would you direct?

- A. Remove the three spurious alarm annunciators from service, no further action is necessary.
- B. Bypass Channel A RPS T/Us 1, 2, 7, 8 and 10 per Tech Spec
- C. IM troubleshoot the RPSICP drawer to determine what is malfunctioning.
- D. Document problem on an Issue Report, no further action is necessary.

49. Given the following:

- Unit 1 is in Mode 6
- Fuel Handling is in progress
- Containment Purge is in operation
- CRO reports that he will be performing a functional test of RMSs at 1C22 per OI-35

As the CRS, what monitor should NOT be tested (per OI-35) that provide AUTOMATIC ACTIONS during a fuel handling incident in the Containment?

- A. Fuel Handling Area Monitor (RI-5420)
- B. Containment Area Radiation Monitor (RI-5316A-D)
- C. Wide Range Noble Gas Monitor (RIC-5415)
- D. Containment ICI Area Monitor (RI-7008)



50. Given the following:

- Unit 1 and Unit 2 are at 100% power
- ESO requires P-13000-1 OOS for maintenance
- RO has been directed to shift Unit 1 RCP power supply to P-13000-2

Describe the proper method to shift an RCP power source to the opposite Unit:

- A. RO starts oil lift pump, insert synch stick, observes no rotation of synchroscope at 1C01, close the breaker at 1C06.
- B. RO starts oil lift pump, insert synch stick, observes no rotation of synchroscope at 1C19, close the breaker at 1C19.
- C. RO inserts synch stick, observes no rotation of synchroscope at 1C01, close the breaker at 1C19
- D. RO inserts synch stick, observes no rotation of the synchroscope at 1C19, close the breaker at 1C06.

51. Given the following:

- Unit 2 is in Mode 1 at 10.5% power
- Main Turbine startup in progress per OI-43A
- DFWCS in automatic
- LT-100X Pressurizer level channel selected
- HS-100 is selected in "X / Y" position

Describe the effect on the RCS if LT-110X fails due to a leak in the reference leg:

- A. No change in Pressurizer level due to LT-110Y will compensate with HS-100 switch position.
- B. Indicated Pressurizer level will decrease as Letdown goes to maximum exceeding Charging pump capacity.
- C. Actual Pressurizer level will decrease as Letdown goes to maximum, PZR Backup Heaters energize.
- D. Actual Pressurizer level will increase as letdown goes to minimum and backup Charging pumps start.

52. A major transient occurred a short time ago on Unit 2. You are the Unit 2 CRS and you are directing the implementation of EOP-0. The following conditions exist:

- \* RCS pressure 1130 psia and lowering
- \* Pressurizer level 35" and lowering
- \* RCS subcooling 42 °F and lowering
- \* Containment pressure 1.5 psig and rising

The RO is performing the RCS Pressure and Inventory Safety Function. He reports that SIAS actuation has been verified but there is no HPSI flow indicated. 21 and 23 HPSI Pump amps and discharge pressure are low. What action would you recommend to the Shift Supervisor?

- A. Start 22 HPSI Pump.
- B. No action necessary, the flow indicators must have failed.
- C. Stop, then restart 21 and 23 HPSI Pumps.
- D. Place all operating ECCS Pumps in PTL, verify valve lineup, vent pumps.

53. Given the following:

- Unit 1 is at 100% power
- The 1B DG is running unloaded for post maintenance testing, Electric Shop and Mechanical maintenance personnel are standing by in the 1B DG Room
- CRO reports a "1B DG" alarm is received at 1C18B
- OSO reports a "START FAILURE" alarm is received at the 1B DG Alarm panel
- Electricians suspect blown fuses, requesting to replace them immediately.

Using the provided electrical schematic, determine which fuses have resulted in the indicated response on the 1B DG and will provide direction from you the CRS for replacement:

- A. Fuses FU7 and FU8 due to the start failure alarm that was annunciated from the loss of control power.
- B. Fuses FU1 and FU2 due to the start failure alarm that annunciated from the loss of control power.
- C. Fuses FU3 and FU4 due to start failure alarm from the engine running with the air start solenoids failed close.
- D. Fuses FU5 and FU6 due to the start failure alarm from the loss of power to the low speed and auxiliary stop relays.

54. Bleed and feed operations to cool the Unit 1 Quench Tank have just been completed. Given the following indications of the Quench Tank parameters:

- 1) Pressure 3 psig
- 2) Temperature 105 °F
- 3) Level 23.5 inches

Determine if any off normal conditions exist.

- A. All parameters normal.
- B. Pressure is too low.
- C. Temperature is too low.
- D. Level is too low.

55. A loss of instrument air has occurred while on SDC with purification in service. What effect does this have on valve position of SI-306 (SDC Flow Control), SI-657 (SD Temp./Flow Cont.), and CVC-500 (VCT Diversion Valve)? (IN ORDER)

- A. Fails OPEN, fails OPEN, and fails to WPS position.
- B. Fails CLOSE, fails CLOSED, and fails to WPS position.
- C. Fails OPEN, fails CLOSED, and fails to VCT position.
- D. Fails CLOSED, fails OPEN, and fails to VCT position.

56. Which one of the following conditions is indicated when the LOAD CHANNEL light on the Unit 2 turbine control panel is lit?

- A. Failure in the Impulse Pressure feedback loop has occurred and the EHC system is in the IMP OUT mode.
- B. Failure in the Impulse Pressure feedback loop has occurred and the EHC system is in the TURBINE MANUAL mode.
- C. Failure of the Turbine Actual Reference counter has occurred and the EHC system is in the TURBINE MANUAL mode.
- D. Failure of the Turbine Actual Reference counter has occurred and the EHC system is in the IMP OUT mode.



57. Following a Unit 2 reactor trip from 100% power the following plant conditions exist:

- \* Pressurizer Pressure 800 psia
- \* Containment Pressure 4.5 psig
- \* All automatic systems have actuated as designed

Which one of the following describes the automatic response of the Component Cooling (CC) System based on these conditions?

- A. Only the CC Heat Exchanger Salt Water (SW) outlet valves shut.  
Both Shutdown Cooling (SDC) Heat Exchanger CC outlet valves open.  
All CC pumps start.
- B. Only the CC Heat Exchanger Salt Water (SW) inlet valves shut.  
CC Containment Isolation valves shut.  
Both 21 and 22 CC pumps start.
- C. Both CC Heat Exchanger SW inlet and outlet valves close.  
Both SDC CC outlet valves open.  
CC Containment Isolation valves shut.  
CC supply to Liquid Waste Evaporators shuts.  
Both 21 and 22 CC pumps start.
- D. Both CC Heat Exchanger SW inlet and outlet valves close.  
Both SDC CC outlet valves open.  
CC Containment Isolation valves shut.  
CC supply to Liquid Waste Evaporators shuts.  
All CC pumps start.

58. On a loss of MCC-214, which boration flowpath would be available?

- A. RWT outlet and a charging pump.
- B. 22 BA pump, BA direct m/u valve and a charging pump.
- C. 21 BA pump, BA flow control valve, VCT to a charging pump.
- D. 21 or 22 BAST gravity valves and a charging pump

59. Which one of the following is the reason that core flush is NOT established before 8 hours following a LOCA?

- A. Boron precipitation is not a problem due to large steam flow through the break.
- B. Avoid entrainment of SI flow in the steam being released from the core.
- C. Maximize cold leg injection due to high decay heat load.
- D. Allow for Rx vessel head cooling to minimize void formation in the head.

60. Which one of the following is a condition necessary to ensure adequate RCS cooling flow exists during a large break LOCA per EOP 5?

- A. Indicated Steam Generator water levels are maintained at ~0".
- B. CET temperatures trend consistent with Tcold.
- C. Injection via operating SI pumps per EOP attachment.
- D. RCS subcooling is 50 °F based on CETs.

61. A rupture occurs downstream of 22 SRW Heat Exchanger SW control Valve, 2-SW-5212. What actions per AOP-7A (Loss of Salt Water) would allow for continued operation of the SW System?

- A. Manual start of 23 SW pump on 22 SW header.
- B. Lineup 21 SW header as an emergency overboard flowpath.
- C. Lineup 22 SW header as an emergency overboard flowpath.
- D. Manual start of 23 SW pump on 21 SW header.

62. Given the following:

- An Excessive Steam Demand Event (ESDE) has occurred and BOTH steam generators are affected.

WHICH ONE (1) of the following parameters should be used to determine the steam generator to be isolated?

- A. The steam generator with the highest Tcold.
- B. The steam generator with the lowest steam pressure.
- C. The steam generator with the lowest AFW flow.
- D. The steam generator with the highest level.

63. Given the following:

- Unit 1 120VAC bus 1Y01 has been lost.
- Operators are being directed per AOP-7J, "Loss of 120 Vital AC Power," to shut Letdown Isolation Valves (CVC-515, 516).

Which one of the following is the reason for closing these valves?

- A. They have no control indication available and placing them in the shut position is a conservative action.
- B. They will eventually lose control air because instrument air to containment is lost.
- C. To isolate any potential leakage flowpath while power is lost.
- D. To minimize transients on the loop charging inlet nozzles when power is restored.



64. With Unit 2 at 850 MWE, all MSR's in service, a reactor trip occurs. What operator action (in the Control Room) must be taken to prevent an overcooling of the RCS per EOP-07?

- A. Press "Close Valves" button on the turbine control panel.
- B. Press "Reset" button on the MSR control panel.
- C. Observe that MSR source valves go shut.
- D. Press the "MSR Trip" button

65. Given the following:

- \* Unit 2 tripped
- \* EOP-5 (Loss of Coolant Accident) is implemented
- \* a concurrent loss of AC power occurs

What is the MAXIMUM design time available to restore power to the affected battery chargers?

- A. 2 hours from initial loss of power
- B. 4 hours from initial loss of power
- C. 6 hours from time of Reactor Trip
- D. 8 hours from time of Reactor Trip

66. Given the following:

- \* Unit 1 completed heatup to Mode 3 at NOT and NOP on this shift
- \* 1C06 alarm E-59 "12A RCP SEAL /TEMP HI/ PRESS" annunciates
- \* CRO reports CCW temperatures, pressures and head tank level normal at 1C13
- \* RO reports 12A RCP temperatures have slowly increased during the heatup of the RCS, parameters are normal for all other RCPs

Select the action required for the apparent reason for the 12A RCP alarm:

- A. Verify CC 3832 and 3833 open, one CC Containment isolation CV is shut.
- B. Start a second CC pump, RCW evaporator in operation.
- C. Check CC flow to 12A RCP, additional flow is needed for RCDT HX cooling.
- D. Check RCS leakrate, 12A RCP integral heat exchanger has a CCW leak.

67. Which one of the following describes the immediate effect on Shutdown Margin as defined by Tech Specs for a dropped CEA?

- A. Shutdown Margin is unchanged.
- B. Shutdown Margin is reduced by the worth of the CEA.
- C. Shutdown Margin is increased by the worth of resultant power change.
- D. Shutdown Margin is unchanged by the offsetting Xe reactivity effects.

68. Which condition is requires entry into the LCO per Tech Specs for Containment Isolation Valves in Mode 1?

- A. Pressurizing the safety injection tanks with nitrogen.
- B. Filling the safety injection tanks from the RWT.
- C. Hot leg sample valve, PS-5467-CV, fails open after completion of sampling.
- D. Quench Tank vent , RC-400-CV, fails open after venting Quench Tank.

69. Given the following:

- Unit 2 is at 100% power
- various alarms annunciate indicating possible loss of power
- CRO reports 0 voltage indication for 2Y09 at panel 1C24A

As the CRS, you direct the implementation of AOP-7I for the loss of 2Y09. A few minutes later, the RO reports that Reactor power is slowly rising.

Select the direction required by you to mitigate this effect and the basis:

- A. Reduce reactor power and turbine load due to increased steam flow through MT Interceptor Valve.
- B. Trip the Reactor, implement EOP-0 due to a dilution event in progress.
- C. Secure Charging and Letdown due a dilution event in progress .
- D. Reduce reactor power and turbine load due to feedwater system cooldown.

70. Given the following:

- Unit 1 is in Mode 3, NOT and NOP
- Both SRW heat exchangers were cleaned last shift
- Alarm "11/12 SRW HX SRW OUT TEMP HI" annunciates at 1C13
- CRO responds and reports that 11 SRW Heat exchanger outlet temperature reads 98 °F and steady. 12 SRW heat exchanger outlet temperature is normal
- CRO reports that 11 SW header pressure is 30 PSIG and 12 SW header pressure is 20 PSIG

As the CRS, you direct the CRO to take actions per the Alarm Manual. The CRO reports that adjustment of the output on 11 SRW heat exchanger SW control valve had no effect on lowering outlet temperature.

Select the direction required by you to respond to this condition:

- A. Direct implementation of AOP 7A (Loss of SW) to determine if a SW system rupture exists.
- B. Direct implementaion of AOP 7B (Loss of SRW) to determine if a SRW system rupture exists.
- C. Direct implementation of AOP 7A (Loss of SW) to determine if SW system flow blockage exists.
- D. Direct implementation of AOP 7B (Loss of SRW) to determine if SRW system heat loads are excessive.

71. Given the following:

- Unit 1 is operating at 100% power.
- Alarm 1C13, CC PP(S) DISCH PRESS LO, has actuated.

WHICH ONE (1) of the following RCP conditions requires the operator to trip both the reactor and the reactor coolant pump?

- A. Upper thrust bearing temperature is 197 °F.
- B. Controlled bleed off flow is 2.0 gpm.
- C. Guide Bearing temperature is 193 °F.
- D. Component cooling water outlet temperature at the RCP is 135 °F.

72. Given:

- \* Both Units 1 & 2 are at 100% power
- \* A Loss of Offsite Power occurs
- \* All DGs start and load as expected
- \* EOP-0 is implemented for both units
- \* Condenser vacuum is 22" HG on both Units

Select the expected response on steam dumping capabilities for both Units:

- A. Unit 1 TBV's are operable, Unit 2 TBV's are operable.
- B. Unit 1 TBV's are inoperable, Unit 2 TBV's are operable
- C. Unit 1 TBV's are inoperable, Unit 2 TBV's are inoperable.
- D. Unit 1 TBV's are operable, Unit 2 TBV's are inoperable

73. During a main steam line break event (ESDE), unaffected S/G temperature must be maintained within 25 °F of CET temperature while blowdown of the affected S/G is in progress. Which one of the following is the basis for this limitation?

- A. Prevents an excessive RCS heatup after blowdown of the affected S/G is complete.
- B. Minimizes leakage from a SGTR which may occur after blowdown is complete.
- C. Minimizes time for RCP restart after blowdown by equalizing primary to secondary SG temperatures
- D. Prevents the formation of tube voids after blowdown of the affected S/G is complete.



74. Given the following:

- \* Unit 2 is in Mode 3 with EOP-2 (Loss of Offsite Power) implemented
- \* Plant cooldown has commenced due to condensate inventory
- \* 21 loop Th 520 °F and Tc 525 °F
- \* 22 loop Th 535 °F and Tc 520 °F

Which of the following is the required action for this condition?

- A. Increase steaming from 22 SG via TBVs.
- B. Increase steaming from 21 SG via 21 ADV.
- C. no action required, this is a normal condition.
- D. Restart RCPs when power is available.

75. Given the following:

- \* Unit is manually tripped due to Loss of Instrument Air
- \* RCPs are secured approximately 15 minutes later due to RCP temperature limits reached.

Which of the following is a required action per EOP-2:

- A. Monitor RCS loop differential pressures for 5-15 minutes to ensure proper RCP coastdown.
- B. Monitor RCS loop temperatures for 5-15 minutes for thermal driving head development.
- C. Immediately increase the Steaming rate from both SGs by opening all TBVs to establish natural circulation conditions.
- D. Immediately shut ADVs and TBVs to establish natural circulation conditions.

76. A discharge of the Miscellaneous Waste Monitor Tank is in progress.

Which one of the following conditions would require entry into AOP-6B, "Accidental Liquid Waste Release"?

- A. Trip of a Circ Water Pump on the unit receiving the discharge with no corresponding reduction in discharge flow rate.
- B. LQD WASTE DISCH valves (2201 and 2202 CVs) OPEN with discharge RMS alarm.
- C. Discharge activity exceeds the computer alarm high setpoint specified in the release permit.
- D. Discharge activity decreases to less than the Discharge Permit background activity value.

77. A fire is reported to the Control Room in Unit 1 12 foot turbine Building at 1000. The Fire Brigade responds at 1004 and reports that 11 SGFP pump oil has leaked out and ignited. Due to the oil leaking out, it flows down to the bowser room in the condenser pit and ignites the lube oil bowser. The fire in the 12 foot is extinguished at 1008 and the fire in the lube oil bowser room is extinguished 5 minutes later.

Select one of the following that describes the EIRPIP Emergency Action Level (EAL) for this event:

- A. An EAL is not required because less than 15 minutes has elapsed since fire fighting began.
- B. An EAL is not required because non-safety related equipment is involved.
- C. An EAL event is required because the fire burned for greater than 10 minutes.
- D. An EAL event is required because the fire affected Appendix R equipment.

78. Given the following:

- Unit 1 is in Mode 3, NOT and NOP (previously was at 100% power for 245 days)
- Chemistry reports that the trend on weekly samples indicate an increase in the RCS activity for non-soluble matter
- NFM reports that CECOR data indicates that fuel rod fouling is increasing

Which condition will cause 1C07 alarm F-21 "RAD MON LVL HI" to alarm AND a dose rate change in the Letdown line?

- A. LOCA inside the Containment resulting in stopping RCPs after CIS actuation.
- B. LOCA outside the Containment resulting in activity in the 27' West Penetration Room.
- C. Establishing forced circulation by starting RCPs after a Loss of Offsite Power.
- D. Starting additional Charging pumps in response to an RCS leak.

79. Given the following:

- Unit 1 has received a Reactor Protection System input which requires a reactor trip.
- The Reactor has not tripped.
- The MANUAL reactor trip buttons have failed to actuate a reactor trip.

WHICH ONE (1) of the following methods is used NEXT to shutdown the reactor per EOP-0, "Post Trip Immediate Actions"?

- A. Trip the main turbine.
- B. De-energize the CEDM motor generator sets.
- C. Commence RCS boration using BAST gravity feed valves.
- D. MANUALLY drive the CEAs into the core.

80. Given the following:

- \* Specific activity of the reactor coolant has exceeded 1.0 microcurie/gram DOSE EQUIVALENT I-131 for greater than 100 continuous hours interval.

Which one of following is the basis for the requirement to cooldown below 500 °F within 6 hours?

- A. Prevents the release of activity should a SG tube rupture.
- B. Increases reliability of the data collected for actual Iodine determination per ODCM.
- C. Minimizes the expected Iodine spiking phenomena from the large change in thermal power due to plant shutdown.
- D. Increases the coolant density to enable self-shielding to reduce on-site exposures.

81. Given the following:

- \* Unit 2 event resulted in implementation of EOP-3 (Total Loss of Feedwater) 3 hours ago
- \* Once-thru-Core Cooling in progress
- \* RCS pressure is 700 PSIA
- \* Tc is 505 °F, CET is 507 °F
- \* Total HPSI flow is 340 gpm

Which of the following describes the condition of Unit 2 and required action:

- A. Reactor core is partially uncovered, immediately increase HPSI injection.
- B. Reactor core is covered, immediately increase cooldown via SGs.
- C. Reactor core is partially uncovered, immediately lower RCS pressure via Aux Spray using charging pumps.
- D. Reactor core is covered, immediately lower RCS pressure via Aux Spray and charging pumps.

82. The Chemistry Tech has reported to the CRS that the weekly sample of #13 WGDT (onservice) has been completed. The analysis results are 9 curies of noble gas and 5% O<sup>2</sup> by volume.

What are the required actions for the sample results per Tech Specs?

- A. Isolate #13 WGDT, sample WG surge tank.
- B. Maintain #13 WGDT in service, have RCS sampled for activity.
- C. Isolate #13 WGDT, reduce O<sup>2</sup> concentration.
- D. Maintain #13 WGDT in service, monitor letdown process rad monitor.



83. What action is required to prevent a common mode failure during SDC operation per Operating Instruction 3B?

- A. STBY Pump H/S in "PTL".
- B. Recirc SDC header prior to initiating SDC.
- C. Running 2 LPSI Pumps.
- D. MOV jog limits.

84. Given the following:

- \* Unit 1 in in Mode 5, shutdown for 7 days
- \* RCS pressure is 200PSIA and temperature is 180 °F
- \* 12 LPSI pump is OOS for maintenance

The RO reports that the ABO noticed that 11 LPSI pump outer pump bearing is overheating. Shortly thereafter, The CRO reports that 11 LPSI pump tripped and the TBO reported that the breaker tripped on overcurrent and the relay can not be reset.

Which of the following actions is the first to be taken to restore core cooling?

- A. Establish core cooling by bleeding steam from the SGs.
- B. Reduce RCS pressure and line up CS pumps on SDC.
- C. Start a HFSI pump, open the PORVs to cool the core via RCS blowdown to the containment.
- D. Start a charging pump, open PORVs to cool the core via RCS blowdown to the containment

85. Given the following conditions:

- \* Unit 1 at 80% power
- \* PZR backup and proportional heater control in auto
- \* 1-HS-100 (PZR pressure control) in the "Y" position
- \* 1-HS-100-3 (PZR htr cutoff) in the "X+Y" position
- \* 1-PT 100Y fails high

Select the expected plant response prior to any Operator action being taken:

- A. Letdown control valves will open due to common mode failure effect.
- B. PZR heaters will deenergize and spray valves will open.
- C. PZR heaters are unaffected and spray valves will open.
- D. PZR heaters will deenergize and spray valves are unaffected.

86. There are 3 basic types of LOCAs the safety injection system is designed to compensate for. However, operator response must vary depending on the actual size of the break. If RCS pressure has reduced to 1320 psia strictly due to a LOCA event the focus of operator actions should be to:

- A. verify that SIAS, CIS and CSAS have properly initiated and realign safety injection to a recirculation mode upon receipt of a RAS.
- B. establish and maintain core and RCS heat removal via forced or natural circulation.
- C. establish and maintain natural circulation flow while adjusting HPSI flow to provide inventory control.
- D. maximize charging, throttle SRW flow to CACs, and monitor Core and RCS heat removal for further degradation.

87. The plant has experienced a small break LOCA. Using the following plant conditions calculate the subcooled margin.

- Core exit thermocouples read 600 °F.
- All RCPs are stopped.
- Pressurizer level indicates 300".
- Thot indicates 590 °F.
- Tcold indicates 560 °F.
- Pressurizer pressure indicates 1545 psia (lowest channel)

- A. 5 °F subcooled.
- B. 0 °F subcooled.
- C. 5 °F above saturation temperature.
- D. 10 °F above saturation temperature.

88. AOP 2A has been implemented for Excessive RCS Leakage. What condition(s) will identify a leak located on the charging header?

- A. Decreasing PZR level with minimum letdown flow.
- B. Charging header pressure greater than RCS pressure.
- C. Charging header flow < 44 gpm with one charging pump.
- D. Charging header pressure less than RCS pressure.

89. Given the following:

- \* Unit 2 is in Mode 2 with Shutdown Rods ARO and Reg Rods ARI
- \* RCS has been diluted to the ECC Boron value
- \* Channel B WRNI indication failed low, CRO recommends declaring it OOS

Select one of the following which describes the condition allowed by Tech Spec:

- A. Trip or Bypass affected RPS bistables within 6 hours, repair Channel B WRNI, continue Plant start up.
- B. Trip or Bypass affected RPS bistables within 1 hour, continue with Plant start up.
- C. Repair Channel B WRNI within 1.25 hours, continue Plant start up.
- D. Repair Channel B WRNI within 12 hours, continue Plant start up.

90. During a loss of instrument air during MODE 1 operation, when would the reactor and turbine be tripped and EOP-0 implemented?

- A. If instrument air pressure decreases to less than 40 psig AND in the opinion of the SS or CRS continued plant operation may cause equipment damage.
- B. If instrument air pressure decreases to less than 40 psig OR in the opinion of the SS or CRS continued plant operation may cause equipment damage.
- C. If component cooling containment isolation valves, CC-3832-CV or CC-3833-CV, begin to go shut AND low flow alarms received on the RCPs.
- D. If component cooling containment isolation valves, CC-3832-CV or CC-3833-CV, begin to go shut OR in the opinion of the SS or CRS continued plant operation may cause damage to RCPs.

91. Given the following:

- \* Unit 2 tripped, EOP-0 implemented and Excess Steam Demand (EOP-4) is diagnosed and implemented
- \* "CNTMT RAD LVL HI" at 2C10 is received and verified as valid by the CRO,

What procedural actions are required?

- A. Parallel implementation of EOP-5(LOCA) concurrent with EOP-4.
- B. Implementation of EOP-8 (Func Recovery) due to EOP-4 Cont Env SFSC not met.
- C. Implementation of EOP-8 (Func Recovery) due to EOP-4 Rad levels SFSC not met.
- D. Parallel implementation of AOP-6A (abnormal RCS activity) concurrent with EOP-4.



92. Given the following:

- Unit 1 and Unit 2 tripped due to loss of all AC power, implemented EOP 0
- Unit 1 sustains a LOCA concurrent with the loss of all AC power
- Unit 2 implements EOP 7 (Station Blackout)
- Unit 1 implements EOP-8 (Functional Recovery)

(Assume no safety functions are currently being met on Unit 1)

Select the correct success paths in order of implementation based on the safety function hierarchy for Unit 1:

- A. RC, VA, PIC, HR, CE, RLEC
- B. RC, PIC, HR, VA, CE, RLEC
- C. RC, HR, PIC, VA, CE, RLEC
- D. RC, VA, HR, PIC, CE, RLEC

93. U-2 is operating at 100% with RCS boron concentration at 965 ppm when a reactor trip (no SIAS) occurs. The RO observes that 4 CEAs do not have their rod drop light energized but 3 of the 4 CEAs have their LEL (green light) energized.

Per EOP-0, what action(s), if any, are required for Reactivity Control Safety Function?

- A. Monitor for drop in reactor power, a negative SUR and borate to at least 1165 ppm.
- B. Monitor for drop in reactor power, a -1/3 DPM SUR and make a note to inform the CRS of CEA indication problems.
- C. Inform CRS that Reactivity Control Safety Function is complete and you are checking CEAPDS to determine status of all CEAs.
- D. Monitor for drop in reactor power, a negative SUR and borate to at least 2300 ppm.

94. Given the following:

- Unit 1 is at 50% power
- Maintenance is in progress on 11 Charging pump
- alarm at 1C17 "RAD MON PANEL 1C22" annunciates
- CRO reports that "UNIT 1 WP VENT" alarmed with 1-RI-5410 reading 1000 cpm
- ABO reports that 11 Charging pump was inadvertently vented

As CRS, select the proper response to these conditions:

- A. Direct CRO to acknowledge the alarm and remove the monitor from service until completion of maintenance on 11 Charging pump.
- B. Declare the 1-RI-5410 OOS due to alarm setpoint is set too low, have CRO refer to Alarm Manual for compensatory actions.
- C. Direct CRO to acknowledge the alarm and bypass 1-RI-5410 for duration of maintenance on 11 Charging pump.
- D. Direct CRO to monitor for trends on 1-RI-5410 and notify Rad Safety and Shift Supervisor.

95. Given the following:

- Unit 1 is tripped due to guidance contained in AOP-2A (Excessive RCS Leakage)
- EOP 0 is implemented and a diagnosis is made for a SGTR in 12 SG
- EOP 6 is implemented
- RO is lowering RCS pressure

During implementation of EOP 6 (SG Tube Rupture) procedural guidance is given to maintain subcooling at a different value than EOP 0.

As the CRS, select the proper direction and the basis for maintaining the subcooled margin requirement:

- A. Maintain subcooling  $>25^{\circ}\text{F}$  to minimize the RCS leak rate.
- B. Maintain subcooling  $>30^{\circ}\text{F}$  to ensure adequate NPSH for RCPs.
- C. Maintain subcooling  $>25^{\circ}\text{F}$  to minimize excessive Safety injection flowrate.
- D. Maintain subcooling  $>30^{\circ}\text{F}$  to minimize backflow from the affected SG.

96. Given the following:

- Unit 2 is in Mode 2, EOL and at  $\sim 2\%$  Reactor power with Main Turbine tripped
- 21 SGFP running with 22 SGFP lined up in STBY
- AFW system aligned for normal operation
- The RO reports that Tc is lowering, approaching  $515^{\circ}\text{F}$  Tavg and Reg Group 5 CEAs have being withdrawn from 125" to raise power and restore RCS Tavg
- The CRO reports that 21 SGFP overspeed and tripped on high discharge pressure
- Shortly thereafter, the RO reports Unit 2 is in Mode 1 with .5 DPM SUR

As the CRS, describe the action(s) required and basis for the decision:

- A. Direct the insertion of Reg group 5 to return to Mode 2, start up 22 SGFP.
- B. Direct a reactor trip due to positive reactivity excursion from excessive CEA motion.
- C. Direct the insertion of Reg group 5 to maintain power at 5%, start 23 AFW Pump.
- D. Direct a reactor trip due to a positive reactivity excursion from excessive cooldown.

97. Given the following:

- \* Unit 2 tripped from 100% power
- \* EOP-0 "Post Trip Immediate actions" are being performed
- \* The Main Turbine did not trip as expected

Which one of the following actions should be performed per EOP-0 to trip/stop the turbine?

- A. Manually close both MSIVs.
- B. Manually stop EHC pumps.
- C. Manually Shut Turbine Throttle Valves using Test pushbuttons.
- D. Locally trip the Turbine from the front standard.

98. Given the following:

- Unit 2 is at 80% power
- Unidentified RCS leakage is .5 GPM
- No SG leakage is identified
- RO reports that VCT trace indicates an increase in RCS leakage

As the CRS, you direct the implementation of AOP 2A (Excessive RCS leakage).

Which of the following conditions would require Unit 2 to be shutdown per T.S. 3.4.6.2?

- A. 5 GPM leakage identified from body of 2-CVC-500 (VCT Diversion).
- B. 5 GPM leakage identified from the packing gland on PORV-404.
- C. 5 GPM leakage identified from RCP integral heat exchanger.
- D. 5 GPM leakage identified from seat of SI-652-MOV.

99. Given the following:

- Reactor power is at 100%
- A transient has caused pressurizer level to DECREASE 14 inches below the programmed level.
- The Pressurizer Level Control System is in AUTOMATIC.
- The Charging Pump operational mode selector switch is in the "13 + 11" position.

WHICH ONE (1) of the following describes the response of the Pressurizer Level Control System?

- A. Charging pumps 11, 12, and 13 will be running and letdown flow will be isolated.
- B. ONLY the 13 charging pump will be running and letdown flow will be isolated.
- C. ONLY charging pumps 12 and 13 will be running with letdown flow at minimum.
- D. Charging pumps 11, 12, and 13 will be running with letdown flow at minimum.

100. The 4 major actions of EOP-2, Loss of Offsite Power are designed to:

- A. Protect the condenser from overpressure, restore forced circulation, restore RCS pressure, and restore affected electrical buses.
- B. Protect the condenser from overpressure, verify shutdown sequencer loads operating, establish inventory control and restore affected electrical buses.
- C. Restore affected electrical buses, maintain natural circulation, commence plant cooldown to shutdown cooling entry conditions and determine appropriate ERPIP actions.
- D. Minimize inventory losses, isolate the affected steam generators, depressurize and cooldown to shutdown cooling entry conditions.



Test Name: NRCFINAL.TST

Test Date:

Question ID	Type	Pts	Answer(s)											
			0	1	2	3	4	5	6	7	8	9		
1: 1	EMER PROCEDURES	005	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 2	CONDUCT OF OPS	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 3	EMER PROCEDURES	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 4	EQUIPMENT CONTROL	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 5	EQUIPMENT CONTROL	005	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 6	RADIATION CONTROL	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 7	RADIATION CONTROL	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 8	EQUIPMENT CONTROL	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 9	CONDUCT OF OPS	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 10	CONDUCT OF OPS	004	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 11	CONDUCT OF OPS	006	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 12	EQUIPMENT CONTROL	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 13	CONDUCT OF OPS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 14	EQUIPMENT CONTROL	006	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 15	EQUIPMENT CONTROL	004	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 16	CONDUCT OF OPS	005	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 17	EMER PROCEDURES	004	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 18	ESFAS	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 19	LIQUID RADWASTE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 20	CONTAINMENT SPRAY	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 21	MAIN FEEDWATER	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 22	NUCLEAR INST	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 23	REACTOR COOLANT PP	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 24	NUCLEAR INST	004	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 25	AFW	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 26	AREA RAD MONITOR	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 27	INCORE TEMP MON	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 28	CVCS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 29	CVCS	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 30	DC DISTRIBUTION	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 31	ROD POSITION IND	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 32	ESFAS	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 33	REACTOR COOLANT PP	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 34	WASTE GAS	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 35	CONTAINMENT COOL	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 36	CONTAINMENT COOL	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 37	COND AIR REMOVL	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 38	H2 RECOMBINER	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 39	FUEL HANDLING	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 40	SFP COOLING	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 41	REACTOR COOLANT SYS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 42	STATION AIR	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 43	CONTAINMENT SYS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 44	STM GENERATOR	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 45	CIRCULATING WATER	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C

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					Answer(s)									
Question ID	Type	Pts	0	1	2	3	4	5	6	7	8	9		
1: 46	MAIN AND REHEAT STM	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 47	SFP COOLING	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 48	REACTOR PROTECTION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 49	CONTAINMENT PURGE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 50	AC DISTRIBUTION	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 51	PZR LEVEL CONTROL	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 52	EMER CORE COOLING	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 53	EMER DG	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 54	PZR RELIEF/QT	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 55	SDC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 56	MAIN TURB GEN	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 57	SERVICE WATER	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 58	EMER BORATION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 59	LARGE BREAK LOCA	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 60	LARGE BREAK LOCA	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 61	LOSS NUC SRW (SW)	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 62	STM LINE RUPTURE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 63	LOSS VITAL AC	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 64	STM LINE RUPTURE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 65	STATION BLACK OUT	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 66	RCP MALFUNCTION	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 67	DROPPED ROD	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 68	LOSS CONT INTEG	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 69	LOSS VITAL AC	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 70	LOSS NUC SRW (SW)	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 71	LOSS OF CCW	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 72	LOSS OF COND VAC	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 73	RCS OVERCOOLING	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 74	NATURAL CIRC	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 75	RCP MALFUNCTION	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 76	ACCID LIQ RELEASE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 77	PLANT FIRE	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 78	HI RCS ACTIVITY	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 79	ATWS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 80	HI RCS ACTIVITY	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 81	INADEQUATE CORE CLG	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 82	ACCID GAS RELEASE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 83	LOSS OF RHR (SDC)	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 84	LOSS OF RHR (SDC)	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 85	PZR PRESS MALF	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 86	SMALL BREAK LOCA	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 87	SMALL BREAK LOCA	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 88	LOSS RC M/U	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 89	LOSS SR NIS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 90	LOSS OF INST AIR	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C

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Question ID	Type	Pts	Answer(s)									
			0	1	2	3	4	5	6	7	8	9
1: 91 FUNC RECOVERY	001 MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 92 FUNC RECOVERY	002 MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 93 RX TRIP STABIL.	001 MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 94 AREA RAD ALARMS	002 MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 95 SG TUBE RUPTURE	001 MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 96 LOSS OF MFW	001 MC-SR	1	D	A	B	C	D	A	B	C	D	A
* → 1: 97 RX TRIP STABIL.	002 MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 98 EXCESSIVE RCS LEAK	001 MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 99 PZR LEVEL MALF	001 MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 100 LOOP	001 MC-SR	1	B	C	D	A	B	C	D	A	B	C

\* DISTRACTOR C CHANGED