

## Initial RO and SRO Written Examinations

1. 001A2.03 1

Plant conditions are as follows:

- The plant is operating at 85% power.
- Control Bank D group step counters indicate 192 steps.
- Control Bank D rod B8 DRPI indicates 206 steps.
- Rod B8 was found to be movable.

Which ONE (1) of the following is the method used to realign rod B8 with Control Bank D, in accordance with AOP-403.5, Stuck or Misaligned Control Rod?

- A. With Rod Control Bank Selector Switch in BANK D, disconnect the lift coils of the unaffected rods and insert rod B8 to 192 steps.
- B. With Rod Control Bank Selector Switch in MAN, disconnect the lift coils of the unaffected rods and insert rod B8 to 192 steps.
- C. With Rod Control Bank Selector Switch in MAN, disconnect the lift coil of the affected rod, and withdraw Bank D to 206 steps.
- D. With Rod Control Bank Selector Switch in BANK D, disconnect the lift coil of the affected rod, and withdraw Bank D to 206 steps.

### DISTRACTORS:

A CORRECT

B INCORRECT

C INCORRECT

D INCORRECT

### REFERENCES:

1. AOP-403.5, "Stuck or Misaligned Control Rod," Step 15a thru 15f on page 7.

### K/A CATALOGUE QUESTION DESCRIPTION:

- Control Rod Drive System; Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod.

Question was written to the second part of this K/A in accordance with the guidance provided in NUREG 1021 Rev.9 Section 401.

Answer: A

## 2. 002A4.08 2

The crew is increasing power from 50% to 100% when the following annunciators actuate:

- XCP-615 Point 3-2, OTDT
- XCP-621 Point 1-5, OTDT AUTO TURB RUNBCK W/DRWL BLCK
- Bistable status light CHAN 1 LP A OT DT is illuminated

No other annunciators have actuated or bistable status lights have illuminated. Indicated Main Generator megawatts are steady.

Given the above conditions, which ONE of the following describes the expected plant conditions and operator response?

- A. A reactor trip failed to occur. Operators should enter ATWS and take actions IAW EOP-1.0, "Reactor Trip/Safety Injection Actuation."
- B. A reactor trip failed to occur. Operators should trip the reactor and go to EOP-1.0, "Reactor Trip/Safety Injection Actuation."
- C. A Turbine Runback and Rod Withdrawal Stop failed to occur. Operators should take actions IAW AOP-214.02, "Response to Load Rejection/Runback. "
- D. A Turbine Runback and Rod Withdrawal Stop did not occur, the turbine load increase may have been excessive, operators should stop the power increase.

DISTRACTORS:

A INCORRECT      A reactor trip has NOT occurred. Panel XCP-615, 3-2 only requires 1 out of 3 channels to cause it to actuate. For a reactor trip to have occurred, 2 out of 3 channels would have had to trip which would have also caused Annunciator Point 3-5, OTDT, on Panel XCP-626 to actuate. Additionally, operators would not enter ATWS until after taking manual actions to trip the reactor and those actions had failed as well.

B INCORRECT      A reactor trip should NOT have occurred. Panel XCP-615, 3-2 only requires 1 out of 3 channels to cause it to actuate. For a reactor trip to have occurred, 2 out of 3 channels would have had to trip which would have also caused Annunciator Point 3-5, OTDT, on Panel XCP-626 to actuate.

C INCORRECT      A Turbine Runback and Rod Withdrawal Stop should not have occurred. While Panel XCP-615, 3-2 only requires 1 out of 3 channels to cause it to actuate, for a Turbine Runback and Rod Withdrawal Stop to have occurred, 2 out of 3 channels would have had to trip which also could not have happened without causing both Annunciator Points 1-4 & 1-5, OTDT AUTO TURB RUNBCK W/DRWL BLCK, on Panel XCP-621 to actuate.

D CORRECT An excessive load increase would have caused this annunciator to actuate.

Although a number of other probable causes could have actuated this annunciator, each would have actuated other annunciators.

REFERENCES:

1. ARP-001, XCP-615, Annunciator Point 3-2, page 24.
2. ARP-001, XCP-626, Annunciator Point 3-5, page 18.
3. ARP-001, XCP-621, Annunciator Points 1-4 & 1-5, pages 6 & 7.
4. IC-9, "Reactor Protection and Safeguards Actuation System;" Table IC9.1, "Reactor Trip Signals," page 65; Table IC9.3, "Control Interlocks," page 70.
5. AOP-403.3, "Continuous Control Rod Motion," pages 1 & 2.

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Coolant (RCS); Ability to manually operate and/or monitor in the control room: Safety parameter display systems.

Answer: D

## 3. 003A4.01 1

The plant is operating at steady state, 100% power conditions when the following indications are observed for RCP "A":

- Seal injection flow has increased.
- Seal leak off flow has decreased, annunciator RCP A #1 SL LKOFF FLO HI/LO is in alarm.
- Annunciator RCP A STNDPIP LVL HI/LO has alarmed, the operators have filled the standpipe and the alarm has not cleared.

Which ONE of the following is a probable cause for the indications on RCP "A"?

- A. The No. 1 and No. 2 seals have failed.
- B. Only the No. 1 seal has failed.
- C. Only the No. 2 seal has failed.
- D. Only the No. 3 seal has failed.

DISTRACTORS:

- A INCORRECT      Seal return flow would have increased in this condition.
- B INCORRECT      Seal return flow would have increased in this condition.
- C CORRECT        These are all indications of No. 2 seal failure.
- D INCORRECT      RCP standpipe low level, not a high level, is indicative of a No. 3 seal failure.

REFERENCES:

1. AB-4, REACTOR COOLANT PUMP, rev 10, 05/01/00, pages 43 - 46

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Coolant Pump; Ability to manually operate and/or monitor in the control room: Seal Injection.

Answer: C

## 4. 003AK1.17 2

The plant is operating in Mode 1 at 100% power when a rod drop occurs.

Which ONE of the following describes the effect in the area around the dropped rod?

- A. Fuel temperature coefficient becomes more negative.
- B. Fuel temperature coefficient becomes less negative.
- C. Control rod worth increases.
- D. Power defect becomes more negative.

DISTRACTORS:

A CORRECT Negative reactivity is added to the core with the rod drop causing the fission rate to decrease and produce less heat in the fuel. The fuel temperature coefficient is the reactivity change that results from a change in the resonance cross section of the fuel due to a change of fuel temperature. As the temperature of the fuel decreases, the resonance peaks increase and the base of the peaks become more narrow. Although the total area under the curve stays the same, the number of neutrons in this region decreases. This results in less neutrons being lost to the fission process through resonance absorption.

- B INCORRECT Fuel temperature coefficient becomes more negative.
- C INCORRECT Control rod worth decreases.
- D INCORRECT Power defect becomes less negative.

REFERENCES:

1. Westinghouse Technology Manual

K/A CATALOGUE QUESTION DESCRIPTION:

- Dropped Control Rod; Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Fuel temperature coefficient.

Answer: A

## 5. 004G2.4.49 2

The plant is operating at 100% power with all CVCS controls in AUTO when the following occur:

- XCP-613, Point 3-2, VCT TEMP/PRESS HI, actuates
- The crew has verified that the alarm is valid due to high VCT temperature.
- TCV-144, CC TO LTDN HX, is in its normal 100% power position.

Given the above indications, which one of the following describes the correct crew response to reduce VCT temperature IAW the ARP?

- A. Increase charging and increase letdown
- B. Reduce charging and isolate letdown
- C. Increase charging or reduce letdown and manually open TCV-144
- D. Reduce charging or increase letdown and manually open TCV-144

DISTRACTORS:

A INCORRECT

B INCORRECT

C CORRECT IAW ARP-001, Panel XCP-613, Annunciator Point 3-2, the crew should increase charging or reduce letdown flow to reduce letdown temperature and VCT level. Since VCT temperature is high, the ARP directs verifying proper operation of TCV-144 and take manual control of TCV-144 if necessary.

D INCORRECT

REFERENCES:

1. ARP-001, PANEL XCP-613, ANNUNCIATOR POINT 3-2, VCT TEMP/PRESS HI, page 14.

K/A CATALOGUE QUESTION DESCRIPTION:

- Chemical and Volume Control; Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Answer: C

## 6. 005AA2.03 3

The Unit was at 73% reactor power with a slow power increase to 100% in progress with the following conditions:

- Control Bank 'D' Rod 'B8' indicates 144 steps on DRPI
- Control Bank 'D' Rod 'K6' indicates 156 steps on DRPI
- Control Bank 'D' indicates 168 steps on the Group Demand Position Indicators
- Control Bank 'D' is being moved as required to maintain Delta I
- AOP-403.5, Stuck or Misaligned Control Rod, is being implemented
- Neither Rod 'B8' or Rod 'K6' moves when the AOP directs the RO to drive the AFFECTED Bank in the direction of the misaligned rod.

Which ONE of the following describes the action to be taken within one hour?

- A. Be in Mode 3, Hot Standby.
- B. Reduce turbine load to < 55% RTP and insert Control Bank 'D' to 155 steps.
- C. Immediately trip the reactor and perform EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION.
- D. Initiate boration at 30 gpm until the plant is in MODE 3.

DISTRACTORS:

A INCORRECT T.S. 3.1.3.1 allows 6 hours to be in MODE 3.

B INCORRECT This will place the stuck rod within the 12 step limit but will not correct the K6 rod.

C INCORRECT This is the correct action for unexplained rod motion or for a dropped rod.

D CORRECT Rod 'B8' should be considered to be untrippable. STP-134.001, SDM Verification, NOTE 6.2 states "In Mode 1, 2, 3, 4, or 5 with one or more untrippable rod(s), the RCS should be borated per the applicable Abnormal Operating Procedure."

REFERENCES:

1. TS 3.1.3.1 and 3.2.1
2. AOP 403.5, STUCK OR MISALIGNED CONTROL ROD, rev 3, 04/07/04
3. IC-5, ROD CONTROL, rev 8, 06/07/04, fig IC5.3
4. Lesson Plan AOP-403.5, STUCK OR MISALIGNED ROD, rev 4, 11/21/00

K/A CATALOGUE QUESTION DESCRIPTION:

- Inoperable/Stuck Control Rod; Ability to determine and interpret the following as they apply to the Inoperable/Stuck Control Rod: Required actions if more than one rod is stuck or inoperable.

Answer: D

## 7. 005K6.03 2

Which one of the following would prevent the RHR heat exchangers from performing their design function?

- A. A loss of air to Heat Exchanger outlet valves HCV-603A(B).
- B. Manually closing XVT08720B, LETDOWN HDR RH RETURN HDR B INLET VALVE (to HCV-142).
- C. A loss of air to Heat Exchanger bypass valves FCV-605A(B).
- D. Manually closing the Component Cooling outlets from the RHR heat exchangers.

DISTRACTORS:

A INCORRECT

B INCORRECT

C INCORRECT

D CORRECT

REFERENCES:

1. AB-7, RESIDUAL HEAT REMOVAL SYSTEM, rev 15, 09/27/04, fig AB7.2

K/A CATALOGUE QUESTION DESCRIPTION:

- Residual Heat Removal System; Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger.

Answer: D



8. 006K4.11 1

Plant conditions are as follows:

- A small-break LOCA has occurred.
- Containment pressure is 5 psig.
- Pressurizer pressure is 1850 psig.
- Steam generator pressures are:
  - A - 850 psig
  - B - 775 psig
  - C - 825 psig
- The control room operators have carried out the required immediate actions, transitioned to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, and are ready to secure the RHR pumps.

The operators attempt to reset SI but it does not reset.

Which ONE of the following explains why the SI signal could not be reset?

- A. The time-delay timer has failed to actuate and/or supply the proper output.
- B. Containment pressure has not decreased to the bistable reset point.
- C. PZR pressure is still less than the PZR low-pressure SI setpoint.
- D. A steamline low pressure SI signal exists.

DISTRACTORS:

A CORRECT

B INCORRECT

C INCORRECT

D INCORRECT

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Emergency Core Cooling System (ECCS); Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Reset of SIS.

Answer: A

## 9. 007A2.05 2

The Unit is shutdown in Mode 4.

- RCS pressure is 375 psig
- RCS temperature is 305 oF

The crew is performing GOP-6 to place RHR Train A in service for cooldown and to establish RHR Train B as the protected train. When MVG-8701A and MVG-8702A, RCS LP A TO PUMP A, are opened, annunciator PRT LVL LO/TEMP/LVL/PRESS HI actuates.

Operators note the following:

- PRT Temperature: 105 oF
- PRT Level: 69%
- PRT Pressure: 12 psig

Which ONE of the following identifies the correct operator response?

- A. This is an expected alarm and operators should continue placing the RHR Train A in service, then restore the PRT parameters using SOP-101.
- B. Operators should secure from placing the RHR Train A in service since PRT temperature limits have been exceeded, operators should cool the PRT using SOP-101.
- C. Operators should secure from placing the RHR Train A in service since PRT level limits have been exceeded, operators should lower PRT level using SOP-101.
- D. Operators should secure from placing the RHR Train A in service since PRT high pressure limits have been exceeded, operators should vent the PRT using SOP-101.

DISTRACTORS:

A INCORRECT This is not an expected alarm.

B INCORRECT PRT LVL LO/TEMP/LVL/PRESS HI annunciator actuates when PRT temperature reaches 113 degrees F. Although temperature is somewhat elevated, it has not reached that temperature yet.

C INCORRECT PRT LVL LO/TEMP/LVL/PRESS HI annunciator actuates when PRT level reaches 83%. Although level is somewhat elevated, it has not yet reached that level.

D CORRECT PRT LVL LO/TEMP/LVL/PRESS HI annunciator actuated when pressure reached 8 psig.

REFERENCES:

1. AB-02, REACTOR COOLANT SYSTEM, rev 10, 04/18/02, page 49, fig AB2.4
2. SOP-101, REACTOR COOLANT SYSTEM, rev 25, 07/23/04, pages 70 - 74.
3. ARP-001, PANEL XCP-616, rev 6, page 29.

K/A CATALOGUE QUESTION DESCRIPTION:

- Pressurizer Relief Tank/Quench Tank System (PRTS); Ability to (a) predict the impacts of the following malfunctions or operations on the P S; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Exceeding PRT high-pressure limits.

Answer: D

10. 007EK1.05 2

Following a trip from 100% power, the source range detectors should begin to come on scale about \_\_\_\_\_ minutes after the trip.

- A. 4 - 7
- B. 8 - 11
- C. 12 - 15
- D. 16 - 19

DISTRACTORS:

A INCORRECT

B INCORRECT

C CORRECT

D INCORRECT

REFERENCES:

1. RT series lesson plans not forwarded to NRC.

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Trip; Knowledge of the operational implications of the following concepts as they apply to the reactor trip: Decay power as a function of time.

Answer: C

## 11. 007K1.01 2

A small break LOCA has occurred. Pressurizer PORVs are being used to reduce RCS pressure per EOP-2.1, "Post-LOCA Cooldown and Depressurization."

- Containment pressure is 14 psig.

Which ONE of the following represents the maximum pressure that could be reached inside the Pressurizer Relief Tank (PRT) before the PRT rupture disc ruptures?

- A. 90 psig
- B. 100 psig
- C. 114 psig
- D. 128 psig

DISTRACTORS:

A INCORRECT With the RB at atmospheric pressure, the rupture discs are set to release within the range of 86 - 100 psig (nominal release pressure is 90 psig). Plausible since this is the nominal pressure.

B INCORRECT With the RB at atmospheric pressure, the rupture discs are set to release within the range of 86 - 100 psig (nominal release pressure is 90 psig). Plausible since this is the minimum pressure plus containment pressure and also the max pressure with normal containment parameters.

C CORRECT With the RB at 14 psig, the rupture discs set pressure would subsequently be affected causing the release range to increase to between 100 - 114 psig (nominal release pressure is 104 psig).

D INCORRECT With the RB at 14 psig, the rupture discs set pressure would subsequently be affected causing the release range to increase to between 100 - 114 psig (nominal release pressure is 104 psig). Plausible if the applicant tries to take into account psig and psia adding 14 psi.

REFERENCES:

1. AB-2, "Reactor Coolant System," page 46.

K/A CATALOGUE QUESTION DESCRIPTION:

- Pressurizer Relief Tank/Quench Tank System (PRTS); Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the following systems: Containment system.

Answer: C

12. 008A3.06 3

Plant conditions are as follows:

- "A" CCW Pump is running in the **ACTIVE** train, "C" CCW Pump is in Standby.
- "B" CCW Loop in the **INACTIVE** Train.
- Discharge pressure for "A" CCW Pump is 45 psig and decreasing and pump amps are increasing.
- CCW LOOP 'A' PP DISCH PRESS LO annunciator has activated.
- Thermal barrier flow to the RCPs is 80 gpm and the RCP A/B/C THERM BAR & BRG FLO LO annunciator is activated.
- CCBP discharge pressure is 85 psig.
- CCW Surge Tank is at 55%.

Which ONE of the following describes the subsequent and/or current status of the CCW System given these conditions?

- A. CCW flow to essential and non-essential loads will be restored to nominal values following automatic start of the standby CCW pump.
- B. CCW flow will be reduced to essential and non-essential loads; neither CCW or CCBP standby pumps will automatically start.
- C. CCW flow will be reduced to essential loads; **MOST** non-essential loads will be restored to nominal values following automatic start of the standby CCW pump.
- D. CCW flow to essential and **MOST** non-essential loads will be restored to nominal values following automatic start of the standby CCW pump; thermal barriers are isolated.

DISTRACTORS:

- A CORRECT The standby pump automatically starts when pressure reaches 45 psig.
- B INCORRECT The standby pump starts.
- C INCORRECT Pressure to the CCBPs is still enough to prevent the CCBPs from tripping on low CCBP pressure of 30 psig.
- D INCORRECT RCP thermal barriers have an automatic closure of the thermal barrier return flow valve on high flow (vs. low flow).

REFERENCES:

1. IB-2, COMPONENT COOLING WATER SYSTEM, rev 11, 05/04/05, pages 49 - 51, figs IB2.1 - 2.5

K/A CATALOGUE QUESTION DESCRIPTION:

- Component Cooling Water System (CCWS); Ability to monitor automatic operation of the CCWS, including: Typical CCW pump operating conditions, including vibration and sound levels and motor current.

Answer: A

13. 008AG2.4.4 1

Plant conditions are as follows:

- Reactor power and turbine load are stable
- PZR PRESS is 2180 psig and decreasing
- PZR LVL is stable
- VCT level is stable
- PZR Liquid and Vapor temperatures are approximately 645°F and decreasing
- PZR Surge Line temperature is increasing

Given the above information, which ONE of the following describes the event in progress?

- A. The controlling PZR pressure control pressure transmitter has failed low.
- B. A PZR Spray Valve has failed open.
- C. The PZR Surge Line has developed a leak.
- D. A PZR PORV has developed a leak.

DISTRACTORS:

A INCORRECT      If the controlling PZR pressure control pressure transmitter failed low, heaters would energize and PZR Liquid and Vapor temperatures, as well as pressure, would increase.

B CORRECT      If the spray valve failed open, pressurizer temperature and pressure would decrease,

C INCORRECT      If the surge line were leaking, level in the PZR and/or the VCT would be affected.

D INCORRECT      If a PORV was leaking, level would be dropping in either the VCT or PZR.

REFERENCES:

1. ARP-001, Panel XCP-616, Annunciator Points 2-2, 2-3, 3-6, pages 12, 14, 22.
2. AOP-401.5, "Pressurizer Pressure Control Channel Failure," pages 2 - 4.
3. AOP-401.4, "Pressurizer Pressure Protection Channel Failure," page 2.
4. SOP-101, "Reactor Coolant System," pages 16, 18, 93.

K/A CATALOGUE QUESTION DESCRIPTION:

- Pressurizer Vapor Space Accident; Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Answer: B



## 14. 010G2.4.4 3

The plant is at 100% power when the following occurs simultaneously:

- One PZR PORV is open
- Both PZR Spray valves are open.
- PZR Control and BOTH Backup PZR Heater groups are off.

Subsequently, all P-11 Status Lights are lit.

Which ONE of the following describes the event that has occurred and the procedure required to mitigate the event?

- A. PT-444 has failed, perform the actions of AOP-401.5, "Pressurizer Pressure Control Channel Failure."
- B. PT-445 has failed, perform the actions of AOP-401.5, "Pressurizer Pressure Control Channel Failure."
- C. PT-444 has failed, perform the actions of AOP-401.4, "Pressurizer Pressure Protection Channel Failure."
- D. PT-445 has failed, perform the actions of AOP-401.4, "Pressurizer Pressure Protection Channel Failure."

DISTRACTORS:

A CORRECT PT-444 failing high will cause (1) PCV-444B, PWR Relief, to open if in auto (2) both PCV-444C & D, PZR Spray valves, to open if in auto and (3) Control and both Backup PZR Heater groups to deenergize. The P-11 trip status lights will light when actual pressure reaches 1985 psig. This failure is an entry condition for AOP-401.5.

B INCORRECT If PT-445 failed (high) it would cause (1) Both PCV-445A & B, PWR Reliefs, to open if in auto. It would not cause either of the PZR Spray valves to open nor would it cause Control or Backup PZR Heater groups to deenergize.

C INCORRECT Although responding using this procedure would not be correct because none of the other entry conditions are present that would indicate a failure of a "protection" channel. An operator might select AOP-401.4 since one of the entry conditions for this procedure is an abnormal indication on PI-444.

D INCORRECT This choice is incorrect for the reasons given in the distractor analysis for choices B and C.

REFERENCES:

1. AOP-401.5, "Pressurizer Pressure Control Channel Failure," page 1.
2. AOP-401.4, "Pressurizer Pressure Protection Channel Failure," page 1.

3. IC-9, "Reactor Protection and Safeguards Actuation System," Table IC9.1, page 68.

K/A CATALOGUE QUESTION DESCRIPTION:

- Pressurizer Pressure Control; Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Answer: A

15. 011EK2.02 1

A Main Steam line Break has occurred inside containment resulting in automatic actuation of the Reactor Building Spray Pumps. EOP-1.0, "Reactor Trip/Safety Injection Actuation," is in progress. PZR pressure is 1500 psig.

Which ONE of the following describes the reason for RCP trip criteria under the above conditions?

- A. To prevent damage to RCP #1 seals.
- B. To prevent overheating RCP motor bearings on loss of Component Cooling Water.
- C. To prevent delaying two-phase flow in the RCS.
- D. To prevent a deeper and longer core uncover.

DISTRACTORS:

A INCORRECT

B CORRECT

C INCORRECT

D INCORRECT      This would be correct for a SBLOCA.

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Large Break LOCA; Knowledge of the interrelations between a large break LOCA and the following: Pumps.

Answer: B

## 16. 012A4.03 2

The unit was operating at 80% power when a spurious low steamline pressure SI signal was received. The cause of the spurious signal was corrected and the SI signal has been reset.

During preparations to return the unit to power operations, the MSIVs fail to open when their control switches are taken to OPEN. The unit is currently in MODE 3 with steam pressure downstream of the MSIVs at 1080 psig and Tavg at 557°F.

Which one of the following is the cause for the MSIVs' failure to open?

- A. The differential pressure across the MSIVs is excessive.
- B. The MSIV bypass valves are CLOSED.
- C. The Instrument Air header pressure is 75 psig.
- D. The Main Steam Isolation signal has not been reset.

DISTRACTORS:

A INCORRECT With pressure downstream of the MSIVs at 1080 psig and Tavg at 557°F (a SG saturation pressure of about 1104 psia), pressure across the MSIVs is essentially equal.

B INCORRECT MSIVs will not open unless the differential pressure across their seats is equalized. Although the bypass valves are normally opened in order to equalize pressure across the seats of the MSIVs, there is not an interlock between the two. The distractor is plausible in that an operator might confuse the operational aspect with an assumed interlock.

C INCORRECT The valves fail close when instrument air header pressure (or pressure felt on the MSIV actuator diaphragm) drops to a certain level. While the actual value at which the valves will shut is probably < 60 psig, a value of 75 psig was chosen since it is lower than normal and will have caused both the standby Station Instrument Air Compressor to start as well as the Supplemental Instrument Air Compressor but is above 70 psig which may confuse operators as it places the plant in AOP-220.1, "Loss of Instrument Air."

D CORRECT To open a MSIV after it has received an isolation signal, the signal must be reset by operating the trains A and B RESET pushbuttons.

REFERENCES:

1. Lesson Plan TB-2, "Main Steam System," pages 30 & 31.
2. TB-12, "Station Service & Instrument Air System," pages 24 25.
3. AOP-220.1, "Loss of Instrument Air," page 1.
4. ARP-001, Panel XCP-607, Annunciator Point 2-5, pages 17 & 18.

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Protection; Ability to manually operate and/or monitor in the control room: Channel blocks and bypasses.

Answer: D

## 17. 012K2.01 2

The reactor is critical at 10- 3% power. Inverter XIT-5902 output breaker trips open causing a loss of APN-5902.

Which one of the following will result?

- A. The loss of Power Range NI-42, with no change in reactor power.
- B. A reactor trip due to the deenergization of Intermediate Range Channel N-35.
- C. A reactor trip due to the deenergization of Intermediate Range Channel N-36.
- D. A low power rod block (C-1) signal, with no change in reactor power.

DISTRACTORS:

A N-42 does lose power, however, the reactor will trip due to loss of power to the IR channel.

B N-35 does not lose power.

C Correct. Losing power to the APN is the same thing as pulling control power fuses. The IR High Flux bistable will trip. 1 of 2 IR above the High Flux setpoint will generate a Reactor Trip if not blocked. Must have P-10 (>10% power) to block the IR High Flux trip.

D Reactor will trip.

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Protection System; Knowledge of bus power supplies to the following: RPS channels, components, and interconnections.

Answer: C

18. 013K1.06 1

A large-break LOCA occurs combined with a malfunction of the ESF sequencers which results in delaying the energizing of ESF components. Which ONE of the following is correct concerning the effects on the fuel during this situation?

- A. Cladding failure can occur as the core experiences an uncontrolled cooling due to vaporization of reactor coolant.
- B. Structural integrity can be lost as delayed cooling can lead to fuel temperatures in excess of ECCS acceptance criteria, resulting in excessive clad oxidation and weakening.
- C. Minimal effects will be seen as reflux cooling is sufficient to cool the core for up to ten minutes after the onset of a large break LOCA.
- D. A natural circulation cooldown of the fuel can be adversely impacted due to excessive reactor coolant blowdown.

DISTRACTORS:

A INCORRECT

B CORRECT Failure to provide ESF flow to the core will result in increasing fuel temperatures resulting in structural integrity loss

C INCORRECT

D INCORRECT

REFERENCES:

1. AB-9, "Introduction to Engineered Safety Features."

K/A CATALOGUE QUESTION DESCRIPTION:

- Engineered Safety Features Actuation System (ESFAS); Knowledge of the physical connections and/or cause effect relationships between the ESFAS and the following systems: ECCS.

Answer: B

19. 015AK1.02 2

Plant conditions are as follows:

- The plant is operating at 45% power
- 'C' RCP #1 seal d/p is 190 psig
- 'C' RCP #1 seal leakoff flow is 5.0 gpm
- P-8, 2 LOOP FLOW, is not lit

Which ONE of the following describes the required sequence/response to these conditions?

- A. Trip the reactor, trip the 'C' RCP, and enter EOP-1.0, "Reactor Trip/Safety Injection Actuation."
- B. Trip the 'C' RCP, and commence shutdown in accordance with GOP-4B, "Power Operation (Mode 1-Descending)."
- C. Trip the 'C' RCP, trip the reactor and enter EOP-1.0, "Reactor Trip/Safety Injection Actuation."
- D. Ensure PVT-8141C, C RCP SEAL LKOFF, is open, and increase seal injection flow to the 'C' RCP.

DISTRACTORS:

A CORRECT Since power is above P-8, reactor power is > 38% and a reactor trip is required.

B INCORRECT Since power is above P-8, reactor power is > 38% so a reactor trip is required. This is the action is if power less than P-8.

C INCORRECT Reactor trip criteria is met.

D INCORRECT Correct action would be to close PVT-8141 and increase seal injection flow.

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Coolant Pump (RCP) Malfunctions; Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): Consequences of an RCPS failure.

Answer: A

20. 017K1.01 1

With the Core Subcooling Monitor in the "DEG. F MAR" mode, which of the following is used to calculate the subcooling margin?

- A. The average of the four highest core exit thermocouples or median-selected RTD temperature.
- B. The average of the highest core exit thermocouples in each core quadrant or highest RTD temperature.
- C. The highest core exit thermocouple or median-selected RTD temperature.
- D. The highest core exit thermocouple or highest RTD temperature.

DISTRACTORS:

A INCORRECT

B INCORRECT

C INCORRECT

D CORRECT

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- In-Core Temperature Monitor System (ITM); Knowledge of the physical connections and/or cause-effect relationships between the ITM system and the following systems: Plant computer.

Answer: D



21. 022A1.04 2

Given the following:

- The plant is operating at 75% reactor power.
- The Reactor Building sump was pumped down to the Waste Holdup Tank twenty minutes ago.

Which one of the following may provide an alarm for a 0.7 GPM leak from the reactor coolant system to the Reactor building?

- A. Reactor Building Sump level.
- B. Reactor Building Radiation level.
- C. Reactor Building Temperature.
- D. Reactor Building Cooling Unit condensate drain flow.

DISTRACTORS:

- |             |   |
|-------------|---|
| A INCORRECT | Sump level would provide indications of leaks >10GPM or > 1 GPM             |
| B INCORRECT | Radiation level will cause an alarm when leakage exceeds 1 gpm for one hour |
| C INCORRECT | Temperature may not increase until leakage is excessive.                    |
| D INCORRECT | Condensate drain flow will alarm when condensed leakage exceeds 0.5 GPM.    |

REFERENCES:

1. GS-7, "Leak Detection."

K/A CATALOGUE QUESTION DESCRIPTION:

- Containment Cooling (CCS); Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Cooling water flow.

Answer: D

## 22. 022AA1.08 2

The following plant conditions exist:

- The plant is at 90% rated thermal power
- All controls are in their normal configuration
- VCT level is at 38%

Which ONE of the following correctly describes how the plant would respond if VCT Level Transmitter LT-115 were to fail high with no operator intervention?

- A. VCT level would lower until the VCT was approximately empty.
- B. VCT level would lower to approximately 5% and stabilize.
- C. VCT rate of level decrease would remain unchanged from the pre-event rate of decrease.
- D. VCT level would lower to approximately 20% and then begin to rise.

K/A MATCH ANALYSIS:

The K/A requires testing knowledge of VCT level monitoring skills in conjunction with a loss of VCT makeup. LT-115 failing high would create a situation where L/D would be diverted and auto makeup would not occur. The question is testing knowledge of how VCT level would respond in this situation; therefore, the K/A is met.

ANSWER CHOICE ANALYSIS:

- A. Correct. Due to the failure, L/D would be diverted and auto makeup to the VCT would not occur. The VCT level would continue to drop (CCPs would eventually lose suction).
- B. Incorrect. At 5% on LT-112 AND 115 the CCP suction would auto swap to the RWST, thus making this answer choice incorrect. This swapover would close the VCT outlets, which would cause the VCT level to stabilize at approximately 5%. Plausible because the applicant must know that it takes a 2/2 coincidence to initiate the auto swapover.
- C. Incorrect. Same reasons as B above. Plausible because at 10% the auto swapover signal clears. The applicant may associate the level at which the signal clears with the level at which auto swapover occurs.
- D. Incorrect. Same reasons as B above. Plausible because this would be the correct answer if LT-112 were to fail high.

REFERENCES:

1. Braidwood exam question from 09/14/1998 (022AA1.08 same K/A).
2. VCSummer Training Material, Auxiliary Building System AB-3, Chemical and Volume Control System, Rev. 10, 05/03/2004.

K/A CATALOGUE QUESTION DESCRIPTION:

022 Loss of Reactor Coolant Makeup

AA1.08 Ability to operate and/or monitor the following as they apply to the loss of Reactor Coolant Pump Makeup: VCT Level.

Answer: A

## 23. 022K3.02 2

The Unit is operating at 100% power. A failure of a Reactor Building Cooling Unit occurred while the system was aligned to provide maximum cooling. Containment temperature has increased from 119 oF to 126 oF.

Which ONE of the following describes how Pressurizer level indication changes due to this increase in Containment temperature and why?

- A. Level indicates higher than actual due reference leg density decreasing.
- B. Level indicates lower than actual due to reference leg density decreasing.
- C. Level indicates higher than actual due to reference leg density increasing.
- D. Level indicates lower than actual due to reference leg density increasing.

DISTRACTORS:

A CORRECT

B INCORRECT

C INCORRECT

D INCORRECT

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the effect that a loss or malfunction of the CCS will have on the following:  
Containment instrument readings

Answer: A

## 24. 024AG2.4.6 3

The reactor has failed to automatically trip when required and cannot be manually tripped. The turbine is tripped, the EFW pumps are running, and emergency boration is in progress. PZR pressure is 2385 psig. A malfunction in the control circuitry has caused PZR PORVs, PCV-445A and PCV-444B to fail to open.

PZR PORV, PCV-445B, BLOCK valve is closed with its breaker closed (pre-event condition due to the PORV leaking). The crew plans to open the PORV BLOCK valve.

Under the above conditions, which ONE of the following describes when the crew should open the PORV BLOCK valve and the reason?

- A. Immediately open the valve to prevent a rapid RCS overpressurization transient expected with most ATWS events.
- B. Open the valve just prior to the code safety lifting in order to prevent the code safety from lifting and thus preventing the possibility of the code safety valve sticking open.
- C. Immediately open the valve to allow enough borated water to flow into the RCS to ensure the addition of negative reactivity to the core.
- D. Immediately open the valve to begin a slow, controlled cooldown and depressurization, thereby minimizing positive reactivity feedback via a negative MTC.

DISTRACTORS:

A INCORRECT Overpressure limited by safeties. Opening PORVs won't prevent overpressure; they are assumed to operate for best estimate ATWS analysis.

B INCORRECT SGTR is not limiting (loss of FW is).

C CORRECT Requires trainee to analyze all conditions given and determine the limiting parameter.

D INCORRECT Depressurization doesn't affect + reactivity from negative MTC (procedure discusses allowing heat-up).

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Emergency Boration; Knowledge symptom based EOP mitigation strategies.

Answer: C

## 25. 025AG2.1.32 1

In EOP-14.0, "Response to Inadequate Core Cooling," the operator is cautioned that the "RHR Pumps should NOT be run longer than 90 minutes without CCW flow to the RHR Heat Exchangers."

Which ONE of the following is the reason for this caution?

- A. To prevent a subsequent loss of the CCW system upon restart.
- B. To prevent causing RHR pump bearing damage.
- C. To ensure an alternate heat sink is maintained.
- D. Extended operation without CCW flow could cause boiling on the CCW side of the RHR heat exchangers.

DISTRACTORS:

A INCORRECT This is credible since the RHR HX could be damaged due to thermal shock or cavitation of the CCW pump and its subsequent loss when the water from the RHR HX reached its suction.

B CORRECT Per Instructor's Lesson Plan, EOP-14.0, page 7, para IV.A.2.a.3).

C INCORRECT This is credible since using RHR as a heat sink would be lost if RHR system temperature continued to rise.

D INCORRECT This is credible since this may occur but is not the reason for securing the RHR pumps.

REFERENCES:

1. EOP-14.0, "Response to Inadequate Core Cooling," page 2.
2. Instructor's Lesson Plan, EOP-14.0, page 7.

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Residual Heat Removal System (RHRS); Ability to explain and apply all system limits and precautions.

Answer: B

26. 026AA1.01 2

Plant conditions are as follows:

- A plant event occurred simultaneously with a Component Cooling System malfunction.
- ALL ESF and ALL Reactor Coolant pumps are running.
- Component Cooling System temperature is going **UP**.
- RCP A seal water outlet temperature is 230 oF and increasing very slowly.
- CHG pump A oil cooler outlet temp is 148 oF and increasing very slowly.
- RHR pump A seal water heat exchanger temperature is 185 oF and increasing very slowly
- Spent Fuel Pool temperature is 122 oF and increasing very slowly

Which ONE of the above components has exceeded a MAXIMUM temperature LIMIT per AOP-118.1, Total Loss of Component Cooling Water, or System Operating Procedures?

- A. RCP A
- B. CHG pump A
- C. RHR pump A
- D. Spent Fuel Pool

DISTRACTORS:

A Incorrect. The maximum temperature limit for RCP seal water outlet is 235 oF per AOP-118.1, Step 1 caution. Plausible because the maximum temperature limit for RCP lower seal water bearings is 225 oF.

B Incorrect. The maximum temperature for CHG pump oil cooler outlet is 150 oF per AOP-118.1, Total Loss of Component Cooling Water, Attachment 3. The running Charging pump would be secured within ONE (1) minute of losing CCW, so it is realistic to believe that oil temperature may be decreasing

C Incorrect. Could not find a temperature limit associated with RHR pump seal water HX in SOP-115, Residual Heat Removal or AOP-118.1 (step 17). Note that CCW Loop A Essen Load Temp Hi does not alarm on high CC temp until 205 oF. Plausible because other setpoints, below 185 oF, are associated with this alarm.

D Correct. The SFP administrative temperature limit per SOP-123 is 120 oF. Plausible because the CCW supply temp to the SFP HX is limited to 105 oF during refueling operations.

REFERENCES:

1. AOP-118.1, Total Loss of Component Cooling Water.
2. SOP-123, Spent Fuel Cooling System
3. SOP-115, Residual Heat Removal

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Component Cooling Water (CCW); Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: CCW temperature indications.

Answer: D

27. 026K2.02 2

The Unit was at 100% with the 'A' D/G is tagged out for maintenance.

- A LOCA occurred in conjunction with a Loss of Off-site Power.
- EOP-1.0, "Reactor Trip or Safety Injection Actuation" is in progress.
- Reactor Building Pressure peaked at 15 psig.

Which ONE of the following describes how MVG-3004 A(B), SUMP ISOL LOOP A(B), valves will respond when the RWST LVL LO-LO XFER TO SUMP annunciator is received and why?

- A. MVG-3004B will be open, because it is powered from 1DB2Y.
- B. MVG-3004A will be open, because it is powered from 1DB2Y.
- C. MVG-3004B will be open, because it is powered from 1DA2Y.
- D. MVG-3004A will be open, because it is powered from 1DA2Y.

DISTRACTORS:

A CORRECT This valve will be open and it is powered from 1DB2Y

B INCORRECT The B train does not have power to the MOV.

C INCORRECT This is the correct valve that will open but not the correct power supply.

D INCORRECT The A train does not have power to the MOV.

REFERENCES:

1. AB-08, "Reactor Building Spray System," pages 13 & 18, figs AB-8.1, 8.3, 8.4, and 8.5.
2. GS-2, "Safeguards Power," fig GS-2.3 thru 2.5.
3. ES-3, "Electrical Component Control," page 8.

K/A CATALOGUE QUESTION DESCRIPTION:

- Containment Spray System (CSS); Knowledge of bus power supplies to the following: MOVs.

Answer: A



28. 026K3.01 2

Given the following initial plant conditions:

- The plant was at 100% power.
- RBCUs were in a normal, at power lineup.

A DBA LOCA occurs with the following plant response:

- Only 'B' Train SI actuates.
- 'B' ESFLS has failed to operate.
- An XTF-4 Lockout has actuated with the DG reenergizing the ESF Bus.
- After the DG reenergizes the bus, 'A' ESFLS has operated as designed.
- RB pressure is 25 psig.

Assuming NO operator action, which ONE of the following describes the operating systems that are ACTUALLY providing cooling to the Reactor Building (RB)?

- A. TWO RB Spray Pumps delivering flow each to the RB, and ONE RBCU running in SLOW.
- B. ONE RB Spray Pump delivering flow to the RB and ONE RBCU running in SLOW.
- C. ONE RB Spray Pump delivering flow to the RB, and ONE RBCU running in SLOW and TWO RBCUs running in FAST.
- D. TWO RB Spray Pumps delivering flow each to the RB, and ONE RBCU running in SLOW and TWO RBCUs running in FAST.

DISTRACTORS:

A INCORRECT

B CORRECT; Since "A" Train SI did not actuate, the "A" Train RB Spray discharge header isolation valve will not open so "A" Train RB Spray will not provide cooling, even though the pump should start on Hi-3 RB pressure. Train "B" SI will align the "B" Train RB Spray discharge header and the "B" RB Spray Pump will start on Hi-3 and provide flow to the RB. Since "A" Train ESFLS operated as designed, Industrial Cooling will be isolated to both trains of RBCUs (see D-302-222). This will also cause the Industrial Cooling pump to trip on low flow. Normal, 100% RBCU lineup is one "A" Train and two "B" Train RBCUs running in FAST. Since "A" Train ESFLS operates as designed, the FAST RBCU trips and ONE "A" Train RBCU starts in SLOW, providing RB cooling as "A" Train SW is aligned to its RBCUs. Since "B" Train ESFLS failed, its RBCUs will not realign to SW and a "B" Train RBCU will not start in SLOW RBCU. Although the two "B" Train RBCUs will continue to run in FAST, they will not be providing cooling since neither industrial cooling or SW will be flowing through the RBCUs.

C INCORRECT

D INCORRECT

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the effect that a loss or malfunction of the CSS will have on the following: CCS

Answer: B

## 29. 027AK1.02 2

The crew has just completed a 6% per hour power ascension from 75% to 90% rated thermal power. A Pressurizer Safety Valve has just been identified as leaking to the PRT.

Which ONE of the following describes the affect on RCS temperature and Pressurizer water temperature, associated with the above events? (Assume no operator actions.)

- A. RCS temperature will initially rise from its steady state value. Pressurizer water temperature will initially rise from its steady state value.
- B. RCS temperature will initially rise from its steady state value. Pressurizer water temperature will initially lower from its steady state value.
- C. RCS temperature will initially lower from its steady state value. Pressurizer water temperature will initially rise from its steady state value.
- D. RCS temperature will initially lower from its steady state value. Pressurizer water temperature will initially lower from its steady state value.

K/A MATCH ANALYSIS

The K/A requires the testing of knowledge of operational implications of a PCS malfunction, which is accomplished with the safety valve leaking. The safety valve has a pressure control function to keep the RCS from encroaching on the RCS pressure safety limit. The K/A also requires testing the implications of expansion of liquids as temperature increases. Therefore, the K/A is met because the RCS temperaure goes up, causing the liquid volume to expand. The safety valve leaks, reducing the pressure in the pressurizer. Both of these items cause an insurge into the pressurizer, which lowers the pressurizer temperature (operational implication).

ANSWER CHOICE ANALYSIS:

- A. Incorrect. Xenon is burning out due to the power ascension, which will cause RCS temperature to increase. The rise in RCS temperature will cause the RCS volume to expand coupled with the Safety Valve leaking causes an above average insurge into the Pzr, which will drop the average water temperature in the Pzr initially beyond the heaters capacity to compensate.
- B. Correct. See analysis for A above.
- C. Incorrect. See analysis for A above.
- D. Incorrect. See analysis for A above.

REFERENCES:

1. NONE

K/A CATALOGUE QUESTION DESCRIPTION:

027 Pressurizer Pressure Control System (PZR PCS) Malfunction

Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Expansion of liquids as temperature increases.

Answer: B

## 30. 034A1.02 2

Operators are filling the refueling cavity using Spent Fuel Cooling Pump B per SOP-123, Spent Fuel Cooling System.

In order to move irradiated fuel per Technical Specification 3.9.9, Refueling Cavity level must be maintained GREATER than or equal to \_\_\_\_\_, however, Refueling Cavity level must not EXCEED \_\_\_\_\_, otherwise water may enter the Refueling Cavity ventilation intakes.

- A. 461'                461' 3.5"
- B. 461'                461' 8"
- C. 461' 6"            461' 8"
- D. 461' 8"            462'

Notes

436' 7.43": is RV level for shielding considerations during head lift.

457' 6": is Fuel Transfer Canal minimum level to minimize airborne activity.

461': equals 23' above RV flange. Is Fuel Xfer Canal Lvl Hi/Lo low alarm setpoint

461' 3.5": Is Refuel Cav Lvl Hi/Lo low alarm setpoint

461' 6": Is normal refueling cavity skimmer trough level

461' 7": Is Refuel Cav Lvl Hi/Lo high alarm setpoint

461' 8": Is location of Refueling Cavity ventilation intakes

462' 0": Is Fuel Xfer Canal Lvl high alarm setpoint.

DISTRACTORS:

A INCORRECT        1. RC level is at the minimum required to move irradiated fuel (must be 23' above the top of the reactor pressure vessel flange = Reactor Cavity level of 461'). 2. RC level is **less** than the level of the RC ventilation intakes (461' 8").

B CORRECT RC level must be a minimum of 461' but should not exceed 461'8".

C INCORRECT        1. RC level is **above** the minimum needed to move fuel. 2. RC level is at the level of the RC ventilation intakes..

D INCORRECT        1. RC level is **above** the minimum needed to move fuel. 2. RC level is **above** the level of the RC ventilation intakes..

REFERENCES:

1. SOP-123, Spent Fuel Cooling System
2. GOP-7, Core Refueling
3. XCP-609, 2-6, Refuel Cav Lvl Hi/Lo
4. XCP-612, 1-6, Fuel Xfer Canal Lvl Hi/Lo

5. Summer Tech Spec 3.10

K/A CATALOGUE QUESTION DESCRIPTION:

- Fuel Handling Equipment System (FHES); Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Fuel Handling System controls including: Water level in the refueling canal.

Answer: B

31. 035K6.02 1

The plant is operating at 100% power, with all control switches in their normal positions, when PT-2000, Steamline Pressure Transmitter for Loop 'A' fails high.

Assuming NO operator action, which ONE of the following describes the response of the 'A' S/G PWR RELIEF?

- A. The 'A' S/G PWR RELIEF will open and remain open until after the reactor trips and P-12 is received.
- B. The 'A' S/G PWR RELIEF will open and remain open until the reactor trips and P-4 is received.
- C. The 'A' S/G PWR RELIEF will open and remain open until actual 'A' S/G pressure reaches the PORV controller setpoint.
- D. The 'A' S/G PWR RELIEF will remain closed.

DISTRACTORS:

- A Incorrect. The PORV I/P converter (overpressure protection mode) bypasses the P-12 blocking solenoid valves.
- B Correct. With no operator action, actual 'A' S/G pressure will decrease until a Low Steamline Pressure SI (and reactor trip) occurs.
- C Incorrect. With PT-2000 failed high, indicated 'A' S/G pressure never goes below the PORV controller setpoint.
- D Incorrect. S/G PORV control transfer switches are placed in the AUTO position during normal operation and will respond to a failure of their associated pressure transmitters.

REFERENCES:

- 1. TB-2, "Main Steam System."

K/A CATALOGUE QUESTION DESCRIPTION:

- Steam Generator System (S/GS); Knowledge of the effect of a loss or malfunction on the following will have on the S/GS: Secondary PORV.

Answer: A

32. 038EK3.08 2

Plant conditions are as follows:

- The unit experienced a Steam Generator Tube Rupture.
- The crew is performing the actions of EOP-4.0, "Steam Generator Tube Rupture."
- The "target" core exit TC temperature for RCS cooldown was determined to be 498°F based on the ruptured SG pressure.
- A cooldown to the "target" TC temperature using the Steam Dump is in progress.

The following plant parameters are observed:

- FI-943 indicates 200 gpm injection flow.
- Pressurizer level is 17% and going DOWN.
- RCS pressure is 1375 psig and going DOWN.

Which ONE of the following is the correct response, and the correct reason for the response, for the plant conditions given above?

- A. Trip all RCPs because pressurizer level can not be maintained greater than 18%.
- B. Trip all RCPs because EOP-4.0, Step 1 criteria for stopping RCPs has been met.
- C. Leave the RCPs running because the cooldown must be stopped and they will be needed to prevent saturated conditions during the recovery.
- D. Leave the RCPs running because this is an operator initiated evolution.

DISTRACTORS:

A INCORRECT      The given conditions AND the subcooling of the RCS does not constitute trip criteria.

B INCORRECT      SI flow AND RCS pressure < 1400 psig is trip criteria UNLESS a controlled cooldown is in progress. A controlled cooldown is in progress.

C INCORRECT      EOP-4.0 does not direct stopping the cooldown to restore parameters.

D CORRECT IAW EOP-4.0.

REFERENCES:

1. EOP-4.0, "Steam Generator Tube Rupture," pages 2, 10, 11, and Reference Page.
2. Lesson Plan for EOP-4.0, "Steam Generator Tube Rupture," pages 12 - 14, and 24.
3. EOP-12.0, "Monitoring of Critical Safety Functions," Attachment 6, "Inventory."
4. EOP-18.1, "Response to Low Pressurizer Level," pages 4 & 5.
5. EOP-1.0, "Reactor Trip/Safety Injection Actuation," page 13 and the Reference Page.
6. EOP-2.0, "Loss of Reactor or Secondary Coolant," page 6 and the Reference Page.



K/A CATALOGUE QUESTION DESCRIPTION:

- Steam Generator Tube Rupture (SGTR); Knowledge of the reasons for the following responses as they apply to the SGTR: Criteria for securing RCP.

Answer: D

33. 039A1.10 2

The Unit is operating at 100% power.

As an 'A' SG tube leak slowly develops (from 0 gpm to a few gallons per minute), initially, the crew would expect to see elevated radiation level readings to appear first on \_\_\_\_\_. If a reactor trip is required, the crew would expect the reading on RM-A9 to \_\_\_\_\_ immediately after the trip.

- A. RM-G19A and then on RM-A9; slowly decrease and the reading on RM-G19A to drop sharply
- B. RM-A9 and then on RM-G19A; slowly decrease and the reading on RM-G19A to drop sharply
- C. RM-A9 and then on RM-G19A; drop sharply and the reading on RM-G19A to slowly decrease
- D. RM-G19A and then on RM-A9; drop sharply and the reading on RM-G19A to slowly decrease

DISTRACTORS:

A INCORRECT See distractor 'B' analysis.

B CORRECT As per GS-9, "RM-A9 (Condenser off gas) is the most sensitive indicator of a SG Tube Leak . . . expect the readings on RM-G19 to drop sharply immediately after a reactor trip because the production of short-lived N-16 drastically drops off after the trip."

C INCORRECT See distractor 'B' analysis.

D INCORRECT See distractor 'B' analysis.

REFERENCES:

1. AOP-112.2, "Steam Generator Tube Leak Not Requiring SI."
2. GS-9, "Radiation Monitoring System," pages 42, 48, & 52.
3. ARP-019, XCP-645, Annunciator Point 1-3, page 4.
4. ARP-019, XCP-646, Annunciator Point 2-1, page 8
5. TS 3.4.6.2

K/A CATALOGUE QUESTION DESCRIPTION:

- Main and Reheat Steam System (MRSS); Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: Air ejector PRM.

Answer: B

34. 040AK2.02 1

Given the following conditions:

- The plant was operating at 100% power.
- A Safety Injection has just occurred due to high Reactor Building pressure.

Which ONE of the following identifies the two parameters that can BOTH be INDEPENDENTLY used to distinguish between a steamline rupture inside containment and a LOCA inside containment?

- A. RCS temperature and RCS pressure.
- B. RCS pressure and Reactor Building high range gamma radiation.
- C. Reactor Building high range gamma radiation and Pressurizer level.
- D. RCS temperature and Reactor Building high range gamma radiation.

DISTRACTORS:

A INCORRECT. While RCS temperature will decrease significantly for a SLR but not for a LOCA, RCS Pressure will decrease significantly for both.

B INCORRECT While RB high range gamma will be significantly higher for a LOCA, RCS pressure will decrease significantly for both.

C INCORRECT While RB high range gamma radiation will be significantly higher for a LOCA pressurizer level will decrease significantly for both.

D CORRECT. BOTH RCS temperature and RB high range gamma will differ significantly for a SLR and for a LOCA (RCS temp and RB gamma BOTH be lower for the SLR).

REFERENCES:

1. EOP-2.0LP, Loss of Reactor or Secondary Coolant
2. GS-9, Radiation Monitoring System

K/A CATALOGUE QUESTION DESCRIPTION:

- Steam Line Rupture; Knowledge of the interrelations between the Steam Line Rupture and the following: Sensors and detectors.

Answer: D

35. 045K5.17 2

The reactor is operating at 95% power with steady-state conditions, equilibrium Xenon, and a negative MTC.

Assume NO change in control rod position and disregard the effects of Xenon.

In order to maintain the current RCS Tavg, an increase in turbine load will require a \_\_\_\_\_ boron concentration, causing moderator temperature coefficient to become \_\_\_\_\_.

- A. lower; more negative (less positive)
- B. lower; less negative (more positive)
- C. higher; more negative (less positive)
- D. higher; less negative (more positive)

DISTRACTORS:

A CORRECT As power is increased, Tavg will decrease. A higher boron concentration causes a more pronounced increase in thermal utilization when coolant temperature increases, tending to make MTC positive. So in this instance, the opposite would be true.

B INCORRECT A higher boron concentration causes a more pronounced increase in thermal utilization when coolant temperature increases, tending to make MTC positive.

C INCORRECT Tavg will decrease.

D INCORRECT Tavg will decrease.

REFERENCES:

Note: Licensee did not include the following training material with their exam material submittal:

RT-10, Reactivity and Fuel Temperature Effects

RT-11, Moderator Temperature Coefficient and Total Power Defect

RT-17, Reactivity Control During Pwr Operation

K/A CATALOGUE QUESTION DESCRIPTION:

- Main Turbine Generator (MT/G) System; Knowledge of the operational implications of the following concepts as they apply to the MT/G System: Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases.

Answer: A

36. 051AA1.04 2

Given the following conditions:

- The plant is stable at 90% power
- The main turbine is on the load limiter
- Tavg - Tref mismatch is -0.8°F
- Bank D rods are at 200 steps with the Rod Control Bank Selector switch in AUTO
- No plant evolutions are in progress.

Which ONE (1) of the following describes the effect on rod control if a loss of condenser vacuum started to occur? (Assume **NO** operator action, the turbine trip setpoint is not reached, and feedwater temperature is unaffected.)

- A. Bank D rods would step IN since Tref would be decreasing.
- B. Bank D rods would step OUT since Tref would be increasing.
- C. Bank D rods would remain at 200 steps because a Tavg /Tref mismatch would not occur.
- D. Bank D rods would remain at 200 steps because the main turbine is on the load limiter.

DISTRACTORS:

A INCORRECT

B INCORRECT

C CORRECT

D INCORRECT

REFERENCES:

1. AOP-206.1, "Decreasing Main Condenser Vacuum."

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Condenser Vacuum; Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.

Answer: C

## 37. 054AK3.01 1

The following conditions exist:

- The plant is at 100% power.
- A total loss of feed has occurred.
- Steam generator lo-lo level alarms have come in.
- An Automatic Reactor Trip did not occur.
- A Manual Reactor Trip is initiated.

Which ONE of the following describes a correct method of verifying that the reactor is tripped, and the reason for tripping the reactor.

- A. Verify Rod all bottom lights lit, OR RCS Temperature trending down; to ensure an RCS over pressurization event will not occur.
- B. Verify all reactor trip AND bypass breakers open, AND SUR decreasing at -0.33 dpm; to ensure only decay and RCP heat are being added to the RCS.
- C. Verify all reactor trip AND bypass breakers open, AND RCS Temperature trending down; to ensure an RCS over pressurization event will not occur.
- D. Verify Reactor Power trending down OR All rod bottom lights lit; to ensure only decay heat and RCP heat is being added to the RCS.

DISTRACTORS:

A INCORRECT      RCS temperature trending down is not an indication of a Reactor trip, and this is the wrong reason according to the WOG and lesson plan.

B CORRECT These are indications that a reactor trip has occurred, and this is the correct reason for performing the trip IAW the WOG, and Lesson Plan.

C INCORRECT      Reactor Power trending down is one indication that a trip may have occurred, but is also an indication of just a down power condition, and temperature can be indications of the same thing, and this is not the correct reason for verifying the reactor tripped.

D INCORRECT      The procedure requires both of these actions to be performed to verify that the reactor is tripped.

REFERENCES:

1. EOP 1.0 "Reactor Trip and Safety Injection."
2. EOP-13.0 "RESPONSE TO ABNORMAL NUCLEAR POWER GENERATION."
3. Lesson Plan EOP-13.0 objective 2040.

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Main Feedwater (MFW); Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): Reactor and/or turbine trip, manual and automatic.

Answer: B

38. 055EA2.05 2

Which ONE of the following reflects the minimum voltage at which operators may maintain full load on the 1A and 1B batteries and the approximate time they would expect to reach this voltage under a Loss of ALL AC power condition (assuming full load is maintained)?

- A. 111 VDC; 4 hours
- B. 111 VDC; 2 hours
- C. 108 VDC; 4 hours
- D. 108 VDC; 2 hours

DISTRACTORS:

A INCORRECT; This is the minimum voltage per STP-501.004 for performing a battery capacity test. This is the correct length of time with both batteries available and fully loaded.

B INCORRECT; This is the minimum voltage per STP-501.004 for performing a battery capacity test. The length of time is incorrect.

C CORRECT; 108 VDC is the value given per EOP-6.0. The time is the correct length of time with both batteries available and fully loaded.

D INCORRECT; 108 VDC is the value given per EOP-6.0. The length of time is incorrect.

REFERENCES:

1. EOP-6.0, "Loss of All ESF Power," fold-out page.
2. STP-501.004, "Battery Capacity Test."

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Offsite and Onsite Power (Station Blackout); Ability to determine or interpret the following as they apply to a Station Blackout: When battery is approaching fully discharged.

Answer: C



39. 056G2.1.28 2

With the plant operating at 55% power, the Deaerator Storage Tank (DAST) Level switch that actuates on HI-HI DAST LEVEL directly \_\_\_\_\_ in order to \_\_\_\_\_

- A. trips all operating Condensate Pumps;  
protect against a flow controller failure that overfills the DAST.
- B. trips all but one Condensate Pump;  
protect against a flow controller failure that overfills the DAST.
- C. starts only the 'A' Exhaust Hood Spray Pump;  
protect against loss of water to the Feedwater Pump seals.
- D. starts both Exhaust Hood Spray Pumps;  
protect against loss of water to the Feedwater Pump seals.

DISTRACTORS:

A CORRECT As per TB-6, "Condensate System," page 29.

B INCORRECT This would be correct for the trip that occurs at the 10'6" level.

C INCORRECT This pump is started automatically if discharge pressure at the pump decreases to 160 psig as sensed by pressure sensor PS-3056A. The low pressure of 160 psig indicates that inadequate condensate pump discharge pressure exists to supply the feedwater pump seals. The purpose of the Exhaust Hood Spray Subsystem is as stated in this distractor.

D INCORRECT The 'B' Exhaust Hood Spray Pump is automatically started when discharge pressure at the pump drops to 150 psig as sensed by pressure sensor PS-3056B. The purpose of the Exhaust Hood Spray Subsystem is as stated in this distractor.

REFERENCES:

1. TB-6, "Condensate System," pages 29, 38, 39, 40, and 50.

K/A CATALOGUE QUESTION DESCRIPTION:

- Condensate System; Knowledge of the purpose and function of major system components and controls.

Answer: A

## 40. 057AG2.4.4 2

The following plant conditions exist:

- The plant tripped from MODE 1
- Voltage on Buses 1DA and 1DB is zero
- EOP-6.0, Loss of All ESF AC Power, has been entered.
- An SI signal has been generated.
- Attempts to restore ESF power have been unsuccessful.
- All ESF equipment has been placed in pull-to-lock.

IF DC power supplies start degrading, which EOP provides direction to mitigate the conditions and why are the actions, if any, necessary?

- A. EOP-6.2, 'Loss of All ESF AC Power Recovery with SI Required'; no specific actions are required for DC power supplies. Auxiliary Building batteries are designed for this condition.
- B. EOP-1.5, 'Rediagnosis'; actions serve to maintain DC voltage.
- C. EOP-6.0, 'Loss of All ESF AC Power'; actions serve to maintain DC voltage.
- D. SAMG's; conditions are outside design bases and actions will be dictated by TSC.

DISTRACTORS:

A INCORRECT Operators would remain in EOP-6.0 and EOP-6.0 provides direction to maintain DC voltage above 108 VDC.

B INCORRECT Operators would remain in EOP-6.0.

C CORRECT EOP-6.0 provides direction to maintain DC voltage above 108 VDC.

D INCORRECT Direction to minimize DC loads is provided in EOP-6.0.

REFERENCES:

1. EOP-6.0, "Loss of All ESF AC Power."
2. GS-3, "DC Power."

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Vital AC Instrumentation; Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Answer: C

41. 058AA2.01 2

The Unit is operating in Mode 1 when the following annunciators actuate:

- INV 1/2 TROUBLE
- INV 1/2 AC INPUT LOSS

Which ONE of the following describes what could have caused BOTH the annunciators and the power source to the inverter based on that condition?

- A. Bus volts on XIT-5901 dropped to 120 VDC;  
Power is now being supplied from alternate source 1FA
- B. Bus volts on XIT-5901 dropped to 110 VDC;  
Power is now being supplied from alternate source 1FA
- C. Bus volts on XIT-5903 dropped to 110 VDC;  
Power is now being supplied from alternate source 1FB
- D. Bus volts on XIT-5903 dropped to 120 VDC;  
Power is now being supplied from alternate source 1FB

DISTRACTORS:

A INCORRECT      XIT-5901 could be a source of either alarm, but voltage would have had to have dropped to = 120VDC.

B CORRECT Per ARP-001, XCP-636, Annunciator Point 1-5, page 7. If the cause of the alarms are low DC voltage, the INV 1/2 TROUBLE alarm cannot actuate at 110 VDC without the INV 1/2 AC INPUT LOSS alarm at 120VDC since nominal DC bus voltage is about 135 VDC. Also, you cannot get a DC bus voltage this low without first having a low AC source voltage, which will cause the swap to the alternate AC source

C INCORRECT      This would be correct if annunciator INV 3/4 had actuated.

D INCORRECT      This would be correct if annunciator INV 3/4 had actuated

REFERENCES:

1. ARP-001, Panel XCP-636, Annunciator Point 1-5, page 7.
2. ARP-001, Panel XCP-637, Annunciator Point 1-5, page 7.

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of DC Power; Ability to determine and interpret the following as they apply to the Loss of DC Power: That a loss of dc power has occurred; verification that substitute power sources have come on line.

Answer: B

42. 059G2.1.23 2

Following a small break LOCA, which of the following describes the minimum actions that would be necessary to allow a start of a Main Feedwater Pump during the subsequent plant startup?

- A. SI will have to be reset.
- B. Feedwater Isolation will have to be reset.
- C. SI will have to reset and the reactor trip breakers will have to be shut.
- D. SI will have to be reset and Feedwater Isolation will have to be reset.

DISTRACTORS:

A CORRECT

B INCORRECT      FWI does not trip MFPs

C INCORRECT      P-4 W/ LOW Tavg is a FWI signal, but will not cause a MFP trip

D INCORRECT      FWI does not trip MFPs

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Main Feedwater (MFW) System; Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Answer: A

43. 061K5.03 2

Currently, all three EFW pumps are operating supplying feed to all three steam generators.

Which of the following describes the affect on pump head for each of the pumps as the air signal to flow control valve IFV-3536, TD EFP TO SG A, is increased?

	<u>MDEFW 'A' Pump Head</u>	<u>MDEFW 'B' Pump Head</u>	<u>TDEFW Pump Head</u>
A.	decreases	decreases	increases
B.	increases	increases	decreases
C.	increases	increases	increases
D.	unaffected	unaffected	increases

DISTRACTORS:

A CORRECT All six EFW flow control valves are identicle, air-operated, globe valves that fail open on a loss of air signal. As the air signal to any of the valves is increased, the valve moves in the closed position. The MDEFW pumps have a cross-connect line on the upstream side of their flow control valves. Any movement by their associated flow control valves will affect pump head equally for these two pumps. The downstream lines from each of these valves join a common discharge header. The discharge of the TDEFW pump joins this common header AFTER passing through its flow control valve.

B INCORRECT

C INCORRECT

D INCORRECT

REFERENCES:

1. IB-3, "Emergency Feedwater System," page 30 & fig IB-3.1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Auxiliary/Emergency Feedwater (AFW) System; Knowledge of the operational implications of the following concepts as they apply to the AFW: Pump head effects when control valve is shut.

Answer: A

## 44. 062A2.06 2

The unit is stable in Mode 3 with a full load test of diesel generator A in progress. A loss of offsite power to XSW1DA occurs, followed by a trip of Diesel Generator A. Alternate offsite power is available and it is decided to energize XSW1DA from its alternate feed per AOP-304.1(A), "Loss of bus 1DA with the Diesel Not Available."

The operator places the control switch for the alternate feeder breaker to XSW1DA in CLOSE before de-energizing the train A ESF load sequencer.

Which ONE of the following describes the system response and the subsequent actions, if any, that the crew will need to take to mitigate that response?

- A. The alternate feeder breaker will fail to close.  
The crew will need to go back and de-energize the train A ESF load sequencer.
- B. The 'A' diesel generator will receive an immediate start signal.  
The crew will not need to take any subsequent actions.
- C. The components in load block 1 of the ESF load sequencer will immediately start.  
The crew will not need to take any subsequent actions.
- D. 1DA loads will fail to shed.  
The crew will need to go back and de-energize the train A ESF load sequencer.

DISTRACTORS:

A CORRECT

B INCORRECT EDG starts on low volts or SI.

C INCORRECT Requires voltage.

D INCORRECT Should have already happened on loss of bus.

REFERENCES:

1. AOP-304.1(A)
2. Lesson Plan GS-2, pages 21, 25, 27, 42, 51, 54.

K/A CATALOGUE QUESTION DESCRIPTION:

- AC Electrical Distribution System; Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Keeping the safeguards buses electrically separate.

Answer: A

45. 062A3.04 2

Inverter XIT5901 is being returned to service after power to the inverter had been lost. All initial conditions required to return the inverter to service have been met.

Step III.N.2.1 of SOP-310, 120 VAC INSTRUMENT AND CONTROL SYSTEM, requires the operator to "Close the NORMAL AC SOURCE Breaker on the inverter front."

Which ONE of the following describes the status of the DC BUS CHARGED light as it relates to the operation of the above breaker?

- A. It should light immediately upon closing the breaker and indicates charged capacitors.
- B. It should extinguish immediately upon closing the breaker and indicates that the DC bus is no longer supplying power to the inverter.
- C. It should light within 10 seconds of closing the breaker and indicates charged capacitors.
- D. It should extinguish within 10 seconds of closing the breaker and indicates that capacitors have completed charging.

DISTRACTORS:

A INCORRECT It should initially be dim. Upon closing the breaker, it should light within 10 seconds and indicates charged capacitors.

B INCORRECT It should light within 10 seconds after closing the breaker to indicate charged capacitors.

C CORRECT The light should initially be extinguished. After closing the breaker, it should light within 10 seconds and indicates charged capacitors.

D INCORRECT It should light within 10 seconds.

REFERENCES:

1. SOP-310, "120 VAC Instrument and Control System," pages 22 - 24 and page 1 of Enclosure A.

K/A CATALOGUE QUESTION DESCRIPTION:

- AC Electrical Distribution System; Ability to monitor automatic operation of the ac distribution system, including: Operation of inverter (e.g. precharging synchronizing light, static transfer).

Answer: C

46. 062AA1.07 2

**EACH** of the following will send an auto start signal to the Service Water pumps **EXCEPT**:

- A. A low flow on FI-4468, -4498, Service Water from RBCU flow instruments (<2000 GPM).
- B. A Condensate Storage Tank low level (2/4) which opens XVG-1037 A/B, SW to EFW Isolation valves.
- C. A Loss of Site Power followed by a SI.
- D. A SI followed by a Loss of Site Power.

DISTRACTORS:

A CORRECT

B INCORRECT

C INCORRECT

D INCORRECT

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Nuclear Service Water; Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): Flow rates to the components and systems that are serviced by the SWS; interactions among the components.

Answer: A



47. 063K4.01 1

Which one of the following is the source of power for safety-related 125 VDC distribution panel DPN-1HB if the DC output breaker on Battery Charger XBC-1B is inadvertently opened (assume NO operator action)?

- A. 1DB2Y through Battery Charger XBC 1A-1B.
- B. 125 VDC Battery through a 10 KVA inverter.
- C. 1DA2Y through Battery Charger XBC 1A-1B.
- D. 125 VDC Battery 1B.

DISTRACTORS:

A INCORRECT

B INCORRECT

C INCORRECT

D CORRECT

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- DC Electrical Distribution System; Knowledge of DC electrical system design features(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control.

Answer: D

48. 064K6.07 1

A plant trip and loss of all AC has occurred.

- The 'B' D/G failed to start automatically and **CANNOT** be started from the Control Room.
- An operator has attempted to start the 'B' D/G locally by manually depressing only one of the manual air start valves for 'B' D/G, but the D/G does **NOT** start.

Which ONE of the following is a possible cause of the 'B' D/G **NOT** starting?

- A. Only one main air start valve was overridden.
- B. The Local-Remote switch is in MAINTENANCE.
- C. Pressure in the "B" D/G air receivers is less than 175 psig.
- D. The barring device interlock is failed in the "ENGAGED" position.

DISTRACTORS:

A INCORRECT Overriding only one main air start valve is all that is necessary to start the D/G since the two air start valves are in parallel.

B INCORRECT The MAINTENANCE position allows a test start but blocks generator actuation by blocking closure of the D/G breaker. The diesel will start, but will not load electrically.

C CORRECT Factory testing with air receiver pressure less than 225 psig resulted in prolonged diesel start times. 175 psig was selected as it is sufficiently low to be "a possible cause" of the D/G not starting and the 75 is similar to the 75 in the DG START AIR PRESS LO annunciator setpoint of 275 psig.

D INCORRECT "If the diesel must be emergency started manually by using the provided tool to open the main air start valves, the barring device interlock is bypassed" and the diesel would have started.

REFERENCES:

1. IB-6, "Diesel Generator System," pages 18 - 20, 62, & 63.

K/A CATALOGUE QUESTION DESCRIPTION:

- Emergency Diesel Generator (ED/G) Systems; Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers.

Answer: C

49. 064K6.08 2

Given the following conditions:

- A loss of offsite power has occurred.
- Both DGs are running at near full load.
- Due to problems with the 'B' fuel oil transfer pumps, the B DG day tank is unable to be replenished.
- The DG B OIL DAY TK LVL LO-LO annunciator is received on the MCB.

If the conditions given above remain unchanged, which ONE of the following is true regarding the operation of the EDG?

- A. The crew should unlock and open the fuel oil transfer cross-connect valve to allow the 'A' fuel oil transfer pumps to refill the B DG Day Tank while monitoring the B DG Day Tank level to prevent overfilling the tank.
- B. The crew should make up the ALT FILL connection, then unlock and open the B DG fuel oil transfer pump bypass valve to allow the engine driven fuel oil pump to take a suction directly from the discharge of the DG Fuel Oil Un-loading Pump.
- C. The crew can allow the B DG to continue to run for approximately 90 minutes longer prior to having to secure the DG due to loss of fuel.
- D. The crew can allow the B DG to continue to run for approximately 30 minutes longer prior to having to secure the DG due to loss of fuel.

DISTRACTORS:

A INCORRECT      The only fuel oil transfer system cross-connect valve is located on the suction side of the transfer pumps.

B INCORRECT      The ALT FILL connection does not align to the suction of the engine driven fuel oil pump and the Fuel Oil Un-loading Pump can only discharge directly to either of the Fuel Oil Storage Tanks or back to the Truck Un-load connection.

C INCORRECT      Per IB-5, "the low-low alarm indicates that approximately 30 minutes of full-load running time remains." Since this alarm actuates at a Day Tank level of 235 gallons and the diesel uses 5 pgm at full load ( $235/5=47$ ), a band of 30 to 45 minutes was used.

D CORRECT      The EDG may not be immediately secured; however, as the engine begins to run out of fuel, it will slow down and generator voltage and frequency will drop, causing increased current in pump motors.

REFERENCES:

1. IB-5, "Diesel Generator System," pages 30 - 32, 86, and Figure IB5.8.

K/A CATALOGUE QUESTION DESCRIPTION:

- Emergency Diesel Generator (ED/G) System; Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Fuel oil storage tanks.

Answer: D

50. 065AK3.04 1

The plant is at 100% power with the "B" RB Instrument Air compressor tagged out. The "A" RB Instrument Air compressor just tripped on high discharge temperature.

Assuming no operator action, which ONE of the following describes the response of the RB Instrument Air System and why?

- A. RB air header pressure decreases until Air Valve, IPV-2659 automatically opens at 90 psig. This will supply Service Air to maintain a sufficient supply of air.
- B. RB air header pressure decreases until Air Valve, IPV-2659 automatically opens at 93 psig. This will supply Service Air to maintain a sufficient supply of air.
- C. RB air header pressure decreases until Air Valve, IPV-2659 automatically opens at 90 psig. This will supply Station Instrument Air to maintain a consistent supply of dry, clean air.
- D. RB air header pressure decreases until Air Valve, IPV-2659 automatically opens at 93 psig. This will supply Station Instrument Air to maintain a consistent supply of dry, clean air.

DISTRACTORS:

A INCORRECT; Backup air supply is from the Station Instrument air system to ensure a dry air supply.

B INCORRECT; Backup air supply is from the Station Instrument air system to ensure a dry air supply.

C CORRECT

D INCORRECT; This pressure is the pressure at which the standby RB instrument aircompressor would have started if available.

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Instrument Air; Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Cross-over to backup air supplies.

Answer: C

51. 071K3.05 2

The following conditions exist:

- A waste gas release is in progress.
- RM-A10 is in service, but has failed as is during the release.

Given this failure, the release will be monitored by \_\_\_\_\_; if its setpoint is exceeded, \_\_\_\_\_.

- A. RM-G10, Auxiliary Building Waste Gas Decay Tank Area; RM-G10 will alarm and close HCV-014, VENT STACK HAND CONTROL VALVE, and terminate the release.
- B. RM-G10, Auxiliary Building Waste Gas Decay Tank Area; RM-G10 will alarm but no automatic actions will occur.
- C. RM-A3, Main Plant Vent Exhaust Monitor; RM-A3 will alarm and close HCV-014, VENT STACK HAND CONTROL VALVE, and terminate the release.
- D. RM-A3, Main Plant Vent Exhaust Monitor; RM-A3 will alarm but no automatic actions will occur.

DISTRACTORS:

A INCORRECT RM-G10 monitors the waste gas decay tank area and would not indicate upscale conditions unless a leak was in progress, and has no automatic actions.

B INCORRECT RM-G10 monitors the area but should not upscale unless a leak occurs.

C CORRECT If its setpoint is exceeded, RM-A3 will close HCV-014.

D INCORRECT The release will be monitored by RM-A3, however it does have automatic functions.

REFERENCES:

1. Lesson Plan GS-9 Radiation Monitoring Systems, objective GS-9-18.

K/A CATALOGUE QUESTION DESCRIPTION:

- Waste Gas Disposal System (WGDS); Knowledge of the effect that a loss or malfunction of the Waste Gas Disposal System will have on the following: ARM and PRM system.

Answer: C

## 52. 072K4.03 2

The following plant conditions exist:

- A core offload is in progress during a refueling outage (fuel being moved from core to SFP).
- Ventilation systems are in their normal configuration for these activities.
- Annunciator MANIP CRN RM-G17A HI RAD actuates.
- No other alarms annunciate.

Which ONE of the following correctly describes the automatic actions that result from the above conditions?

- A. Reactor Building Purge Supply valve (XVB-1A) and Reactor Building Purge Exhaust valve (XVB-2A) receive a close signal; Reactor Building Purge Supply valve (XVB-1B), Reactor Building Purge Exhaust valve (XVB-2B), Alternate Purge Supply Isolation valves (XVG-6056 and XVG-6057) and Alternate Purge Exhaust Isolation valves (XVG-6066 and XVG-6067) do not receive a close signal.
- B. Reactor Building Purge Supply valves (XVB-1A and XVB-1B), Reactor Building Purge Exhaust valves (XVB-2A and XVB-2B), Alternate Purge Supply Isolation valves (XVG-6056 and XVG-6057) and Alternate Purge Exhaust Isolation valves (XVG-6066 and XVG-6067) all receive a close signal.
- C. Reactor Building Purge Supply valves (XVB-1A and XVB-1B) receive a close signal; Reactor Building Purge Exhaust valves (XVB-2A and XVB-2B), Alternate Purge Supply Isolation valves (XVG-6056 and XVG-6057) and Alternate Purge Exhaust Isolation valves (XVG-6066 and XVG-6067) do not receive a close signal.
- D. Reactor Building Purge Supply valve (XVB-1A), Reactor Building Purge Exhaust valve (XVB-2A), Alternate Purge Supply Isolation valve (XVG-6056) and Alternate Purge Exhaust Isolation valve (XVG-6066) all receive a close signal; Reactor Building Purge Supply valve (XVB-1B), Reactor Building Purge Exhaust valve (XVB-2B), Alternate Purge Supply Isolation valve (XVG-6057) and Alternate Purge Exhaust Isolation valve (XVG-6067) do not receive a close signal.

NOTE:

The figure (GS 9.23) and the table (Table GS9.1) and text of the lesson plan (Page 21 of 53) do not appear to provide consistent information. The figure implies that RM-G17A/B will isolate both Purge and Alternate Purge, but the table and text do not state that Alternate Purge is isolated. Licensee will need to clear up this issue and question may need to be revised accordingly.

K/A MATCH ANALYSIS

The question tests knowledge of design features in the ARM system which will isolate ventilation when radiation is detected, thus matching the K/A.

ANSWER CHOICE ANALYSIS:

A. Correct. See Page 21 and 48 of referenced text.

B. Incorrect. See Page 21 and 48 of referenced text. This is action if high radiation on the area rad monitors. Plausible due to memory nature of the item and the fact that the choice is partially correct.

C. Incorrect. See Page 21 and 48 of referenced text. This is action if high radiation on both RM-G17A and B. Plausible due to memory nature of the item and the fact that the choice is partially correct.

D. Incorrect. See Page 21 and 48 of referenced text. This ia the action if high radiation on area monitor A train. Plausible due to memory nature of the item and the fact that the choice is partially correct.

REFERENCES:

1. VC Summer Training Material, General Systems GS-9, Radiation Monitoring System, Rev. 7, 02/28/2000.

K/A CATALOGUE QUESTION DESCRIPTION:

072 Area Radiation Monitoring (ARM) System

K4.03 Knowledge of ARM System design feature(s) and/or interlock(s) which provide for the following: Plant ventilation systems.

Answer: A



## 53. 073K5.03 2

The Unit is operating at 100% power. The operating crew entered SAP-154, "Failed Fuel Action Plan," when annunciator RC LTDN HI RNG RM-L1 HI RAD alarms. One of the procedure steps within SAP-154 specifies that Health Physics initiate surveys of plant areas.

Which ONE of the following is the primary reason for performing those surveys?

- A. Radiation levels may have changed access requirements.
- B. Confirmation of RM-L1 response.
- C. The surveys are used to determine the extent of the failed fuel.
- D. Auxiliary Building radiation levels are used to determine the need for additional letdown flow or a change in demineralizer alignment.

DISTRACTORS:

A CORRECT Most of the actions taken in SAP-154, such as step 7.3.4, are for the purpose of determining and revising radiation postings and RCA boundaries.

B INCORRECT The alarm is verified IAW ARP-019, XCP-642, AP 1-5 by observing RM-L1 and R/R-6 for increasing radiation.

C INCORRECT Extent of failed fuel is determined through analysis of RCS samples.

D INCORRECT RCS activity levels are used to determine the need to change CVCS configuration.

REFERENCES:

1. ARP-019, XCP-642, page 7 and 8.
2. SAP-154, "Failed Fuel Action Plan," pages 6 - 10.
3. GS-9, "Radiation Monitoring System," pages 21 - 23.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: Relationship between radiation intensity and exposure limits.

Answer: A

54. 075K2.03 1

Which ONE of the following busses provides power to Service Water Pump C (XPP-0039C) when aligned to Service Water Loop B per SOP-117, Service Water System?

- A. 7200 V bus 1EA
- B. 7200 V bus 1EB
- C. 7200 V bus 1DB
- D. 7200 V bus 1C

DISTRACTORS:

A Incorrect. Plausible because this is the power supply to the C Service Water Pump when aligned to the A Service Water Loop.

B Correct per SOP-117, Attachment VI.

C Incorrect. Plausible because this is the power supply for Component Cooling Water Pump C when aligned to Component Cooling Loop B.

D Incorrect. Plausible because this is the power supply for Circulating Water Pump C.

REFERENCES:

1. SOP-117, Service Water System
2. IB-1, Service Water System

K/A CATALOGUE QUESTION DESCRIPTION:

- Circulating Water System; Knowledge of bus power supplies to the following: Emergency/essential SWS pumps.

Answer: B

## 55. 076A1.02 2

The crew is performing actions per EOP-17.0, *Response to High Reactor Building Pressure*, following a LOCA inside containment when the following occurs:

- Annunciator SWBP/A DISCH FLO LO actuates.
- Annunciator SWBP A TRIP actuates.
- Concurrent with the above annunciators, the 1DB1 bus lost power due to an electrical fault.

Which ONE of the following describes how RBCU cooler service water return temperatures will respond given the above information with no operator action?

Train 'A' RBCU service water return temperature will \_\_\_\_\_.  
 Train 'B' RBCU service water return temperature will \_\_\_\_\_.

- A. decrease  
decrease
- B. remain relatively unchanged  
increase
- C. increase  
remain relatively unchanged
- D. remain relatively unchanged  
remain relatively unchanged

DISTRACTORS:

A INCORRECT See distractor analysis for answer D.

B INCORRECT See distractor analysis for answer D.

C INCORRECT See distractor analysis for answer D.

D CORRECT With the loss of 1DB1, power to the train 'B' service water booster pump (SWBP) is lost. The annunciators provide clear indication that the running 'A' train SWBP is lost which would result in its associated valves shutting automatically. These conditions would result in both SWBP trains being isolated. With no flow through either train, temperatures would remain relatively unchanged.

REFERENCES:

1. AB-17, "Reactor Building Ventillation System," pages 14 & 15.
2. IB-1, Service Water System, pages 23 - 25, 34, & 40, figures IB-1.1 - IB-1.3.
3. ARP-001-XCP-606, Annunciator Point 1-4, page 6.
4. EOP-17.0, "Response to High Reactor Building Pressure," Steps 3 & 4, page 4.

K/A CATALOGUE QUESTION DESCRIPTION:

- Service Water System (SWS); Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including reactor and turbine building closed cooling water temperatures.

Answer: D

## 56. 076A3.02 2

The unit is in MODE 3. Maintenance was just completed on the 'A' Train of the Service Water (SW) system with conditions as follows:

- A common cause problem had required pump 'A' and pump 'C' to be tagged.
- A procedure violation has resulted in the SW pump breakers 'A' and 'C' being racked up on the 'A' train bus with both switches in NORMAL-AFTER-STOP following the maintenance.
- A Loss of Off-Site Power occurs.

Which ONE of the following describes which SW pump(s), if any, that will start to provide cooling water to the 'A' Diesel Generator (DG) under these conditions?

- A. Neither SW pump 'A' or 'C' .
- B. Only SW pump 'A'
- C. Only SW pump 'C'
- D. Both SW pumps 'A' and 'C'

DISTRACTORS:

A CORRECT If both SW pump 'A' and 'C' breakers are racked up on the train 'A' bus and neither pump was running (neither MCB handswitch in after-start) the neither SW pump will start on a LOSP or a SI signal. The statement in the stem that both switches are "in NORMAL-AFTER-STOP following maintenance" provides information that neither MCB handswitch is in "after-start."

B INCORRECT SW pump 'A' will not be running. See distractor 'A' analysis.

C INCORRECT SW pump 'C' will not be running. See distractor 'A' analysis.

D INCORRECT See distractor 'A' analysis.

REFERENCES:

1. IB-1, "Service Water System," pages 24, 25, 31 - 34, 38, 39, Figures IB-1.2, 1.3, 1.5, 1.6.
2. SOP-117, "Service Water System," rev 18, page 1 precaution 2, pages 22 & 23.
3. Tech Spec 3.7.4, "Service Water System."

K/A CATALOGUE QUESTION DESCRIPTION:

- Service Water System; Ability to monitor automatic operation of the SWS, including: Emergency heat loads.

Answer: A

57. 078K4.01 1

Given the following conditions:

- Instrument Air Compressor "A" (XAC-3A) is running, its MCB switch is in NORMAL-AFTER-START.
- Instrument Air Compressor "B" (XAC-3B) is NOT running, its MCB switch is in NORMAL-AFTER-STOP.
- The supplemental (Breathing Air) compressor is aligned to the Instrument air header but is not running.
- The supply breaker to Instrument Air Compressor "A" trips due to overload and the operator IMMEDIATELY takes the MCB hand switch to STOP.
- No other operator action is taken and Instrument Air header pressure is now 67 psig.

Which one of the following describes the expected status of the air compressors?

- A. No instrument air compressors are running. Manual action must be taken to start the instrument air compressors.
- B. Only the "B" instrument air compressor is running.
- C. Only the supplemental instrument air compressor is running.
- D. Both the "B" instrument air compressor and the supplemental air compressor are running.

DISTRACTORS:

A CORRECT. See B and C. The B IA compressor or supplemental IA compressor must be manually started.

B INCORRECT. The "B" IA compressor will not start in standby with the "A" IA compressor control switch in STOP.

C INCORRECT. The supplemental IA compressor will not start in standby with none of the IA compressor control switches in N-A-S.

D INCORRECT. See B and C.

REFERENCES:

1. TB-12, Revision 7, pages 13,14,22

K/A CATALOGUE QUESTION DESCRIPTION:

- Instrument Air System (IAS); Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control.

Answer: A

58. 103K3.02 1

Which ONE of the following conditions represents a loss of containment integrity per Technical Specifications?

- A. With the reactor at 20% power, an electrician opens the outer airlock door without prior pressure equalization.
- B. With RCS temperature at 280°F, an audit of the completed work package to replace the equipment hatch determines that the seal O-rings will not perform their design function.
- C. During an operability test of two normally open, redundant containment isolation valves with the RCS temperature at 380°F, one of the valves fails to close automatically.
- D. During an Integrated Leakage Rate Test with the RCS at 180° F, containment leakage exceeds the maximum allowable Technical Specification leakage rate.

DISTRACTORS:

A INCORRECT

B CORRECT

C INCORRECT

D INCORRECT

REFERENCES:

1. T.S. 3.6.1.1 and definition 1.7, Containment Integrity.

K/A CATALOGUE QUESTION DESCRIPTION:

- Containment System; Knowledge of the effect that a loss or malfunction of the containment system will have on the following: Loss of containment integrity under normal operations.

Answer: B

## 59. G2.1.1 2

The plant has just stabilized at 200 oF following a plant heatup. The only two people in the control room are the SS and the NROATC. The SS is monitoring an I&C activity on the NIS Panel. The NROATC momentarily leaves the Area of Continuous Attention to verify receipt of an annunciator without first obtaining a qualified individual to relieve him.

Which ONE of the following correctly describes whether the above NROATC actions were conducted in accordance with SAP-200 (Conduct of Operations)?

- A. The NROATC's actions were NOT in violation of SAP-200 because he was only outside of the Area of Continuous Attention momentarily.
- B. The NROATC's actions were NOT in violation of SAP-200 because the SS was immediately available, as defined in SAP-200, to manipulate the controls.
- C. The NROATC's actions were in violation of SAP-200 because he must be immediately available, as defined in SAP-200, to manipulate the controls.
- D. The NROATC's actions were in violation of SAP-200 because he left the Area of Continuous Attention without first obtaining a qualified relief.

K/A MATCH ANALYSIS

Knowledge being tested comes directly from SAP-200, Conduct of Operations, under the RO's responsibilities.

ANSWER CHOICE ANALYSIS:

- A. Correct. Plant is in Mode 5 at 200F. SAP-200, Step 6.6.8, states that an RO may momentarily enter the Area of Secondary Attention in order to verify receipt of an alarm.
- B. Incorrect. In order for the SS to be in a position, as defined by SAP-200, to immediately manipulate the controls he should be in the Green Carpeted area (SAP-200, Step 6.6.6).
- C. Incorrect. NROATC's actions were OK, as stated in "A" above. Plausible because this would be correct if in Mode 4.
- D. Incorrect. NROATC's actions were OK, as stated in "A" above. Plausible because this would be correct if in Mode 4.

REFERENCES:

- 1. Technical Specifications Table 1.1, Operational Modes.
- 2. Station Administrative Procedure, SAP-200, Conduct of Operations, Rev. 8, 08/19/2000.

K/A CATALOGUE QUESTION DESCRIPTION:

G2.1.1 - Knowledge of conduct of operations requirements.

Answer: A



## 60. G2.1.29 4

A manual-handwheel operated, rising stem gate valve through which fluid is NOT flowing is to be verified OPEN as a part of a routine system lineup verification.

- The valve is located in a cubicle designated as a high radiation area, with the highest exposure reading being 225 mRem/hr, occurring on contact with the bonnet of the valve.

- The cycling of the valve (full open - full shut - full open) is known to take 3 minutes in the area.

- The boundary for the high radiation area is located approximately 3 feet from the valve, which is in plain view from the boundary.

Given the above conditions and in accordance with SAP-153, "Independent Verification," which ONE of the following describes how an Independent Verification should be performed for this valve?

- A. The amount of radiation exposure expected to be received is sufficient to allow the Shift Supervisor to waive the requirement for independent verification. The valve position may be verified by initiating flow through the valve and observing system process parameters indicating flow through the valve.
- B. The amount of radiation exposure expected to be received is sufficient to allow the Shift Supervisor to waive the requirement for independent verification. The valve position may be verified by observing the valve's stem position from the boundary of the high radiation area.
- C. The valve handwheel should be turned in the clockwise direction until movement of the stem is detected and then returned to its full open position.
- D. Since the valve is located in a high radiation area and this is a routine system lineup verification, the Independent Verification need not be performed.

DISTRACTORS:

A INCORRECT      Greater than 10 mrem would have to be received in order for the Shift Supervisor to waive the requirement for independent verification. Under the conditions given, 11.25 mrem would be received if the valve were to be cycled through its full range of travel. IAW section 6.4.1 of SAP-153, "Valves to be verified open will be manipulated in the closed direction only as necessary to remove any slack from the operating mechanism and verify valve stem movement. The valve will then be fully opened, subject to normal precautions on backseating valves." If the operator followed the requirements of SAP-153, the time needed to properly verify the valve's position would require far less than the time stated to perform a complete cycle of the valve.

B INCORRECT      The Shift Supervisor may not waive the requirements (see distractor analysis for 'A' above). The remainder of this distractor is plausible in that it is possible to determine the position of a rising stem valve by visually observing stem position.

C CORRECT The operator would not expect to receive an exposure exceeding 10 mrem, "Valves to be verified open will be manipulated in the closed direction only as necessary to remove any slack from the operating mechanism and verify valve stem movement. The valve will then be fully opened, subject to normal precautions on backseating valves." This operation should take less than 2 minutes to complete resulting in radiation exposure of only 7.5 mRem or less.

D INCORRECT During the performance of routine system lineup verifications, the first individual performing the check is considered to be the independent verifier, and an additional SECOND check need not be performed. (SAP-153 Step 6.2.1.)

REFERENCES:

1. SAP-153, "Station Administrative Procedure," pages 6 & 8.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of how to conduct and verify valve lineups.

Answer: C

## 61. G2.1.3 1

The NROATC desires to leave the control room for approximately 15 minutes to view a training tape in the Operations Manager's Office.

Which ONE of the following describes the **MINIMUM** items that a unexpected or temporary relief should include per SAP-200, Conduct of Operations?

- A. Discuss existing plant conditions; anticipated evolutions; and complete a turnover sheet.
- B. Discuss existing plant conditions and anticipated evolutions; review the Main Control board controls, instrumentation and annunciators.
- C. Discuss existing anticipated evolutions; review the Main Control board controls, instrumentation and annunciators; and log the turnover in the Station Log Book.
- D. Discuss existing plant conditions; review the Main Control board controls, instrumentation and annunciators; and complete a turnover sheet.

DISTRACTORS:

- A INCORRECT      Logging the turnover is only required if the NROATC is leaving the site.
- B CORRECT IAW SAP-200 these are the minimum actions required for a temporary relief.
- C INCORRECT      Logging is not required and all the actions are not listed.
- D INCORRECT      A turnover sheet is not required and the turnover does not have to be logged.

REFERENCES:

1. SAP-200, pages 7 and 8.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of shift turnover practices.

Answer: B

## 62. G2.2.11 2

Which ONE of the following correctly describes the MINIMUM review/approval required for a temporary procedure change, and when final approval is required, per SAP-0139, Document Review and Approval Process?

- A. A Qualified Reviewer and responsible Discipline Supervisor; final approval is required to occur any time within 30 days.
- B. A member of Plant Management Staff who is a Qualified Reviewer and the duty Shift Supervisor; final approval is required to occur any time within 60 days, with the responsible Discipline Supervisor able to grant an additional 30 days.
- C. A Qualified Reviewer and responsible Discipline Supervisor; final approval is required to occur any time within 60 days, with the responsible Discipline Supervisor able to grant an additional 30 days.
- D. A member of Plant Management Staff who is a Qualified Reviewer and the duty Shift Supervisor; final approval is required to occur any time within 30 days.

DISTRACTORS:

A INCORRECT      A shift supervisor is required to approve the temporary change procedure change.

B INCORRECT      The time required for final approval is 30 days, with the responsible Discipline Supervisor able to grant an additional 30 days (for a total of 60 days, NOT 60 + 30 = 90 days per distractor).

C INCORRECT      The time required for final approval is 30 days and the SS is required to approve the temporary change.

D CORRECT The SS and a qualified reviewer must approve, and final approval is required within 30 days.

REFERENCES:

1. SAP-139, "Procedure Development, Review, Approval, and Control", pages 31 & 32.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the process for controlling temporary changes.

Answer: D

## 63. G2.2.25 1

Which ONE of the following correctly states the basis for the Technical Specification Reactor Core Safety Limit (Applicable in Modes 1 and 2) and parameters that are used with the Technical Specifications to ensure that the Safety Limit is not violated?

- A. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime. Parameters used with the Technical Specifications to ensure that the limit is not violated include: Reactor Thermal Power, Highest Operating Loop RCS Average Temperature, and Pressurizer Pressure.
- B. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime. Parameters used with the Technical Specifications to ensure that the limit is not violated include: Reactor Thermal Power, Highest Operating Loop RCS Hot Leg Temperature, and Pressurizer Pressure.
- C. Overheating of the fuel cladding is prevented by restricting fuel operation to within the film boiling regime. Parameters used with the Technical Specifications to ensure that the limit is not violated include: Reactor Thermal Power, Highest Operating Loop RCS Average Temperature, and Pressurizer Pressure.
- D. Overheating of the fuel cladding is prevented by restricting fuel operation to within the film boiling regime. Parameters used with the Technical Specifications to ensure that the limit is not violated include: Reactor Thermal Power, Highest Operating Loop RCS Hot Leg Temperature, and Pressurizer Pressure.

K/A MATCH ANALYSIS

The question is testing knowledge directly from the TS Bases. The material being tested is of a basic nature that the RO should know. Some of the knowledge is supported by GFE type knowledge and the other part is simply knowing what parameters they monitor to ensure that MNDBR is not violated. Supporting the closed book nature of this question is that it is a one hour or less TS action.

ANSWER CHOICE ANALYSIS:

- A. Correct. See TS 2.1 Safety Limits and its associated Basis.
- B. Incorrect. Plausible because hot leg temps are higher than ave temps, thus applicant could reason that core limits would be ensured by using this parameter to compare against TSs.
- C. Incorrect. Plausible because applicant may confuse film and nucleate boiling.
- D. Incorrect. Plausible because of same reasons in B and C above.

REFERENCES:

1. Technical Specification 2.1 and Basis

K/A CATALOGUE QUESTION DESCRIPTION:

G2.2.25

Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.

Answer: A

64. G2.2.28 1

The following plant conditions exist:

- MODE 6 with CORE ALTERATIONS in progress.
- The REFUEL CAV LVL HI/LO annunciator is actuated.
- RMG-17A & B (RB Manipulator Crane monitors) have high radiation alarms.
- The SFP gate is installed.

Which one (1) of the following would require immediate evacuation of the Reactor Building?

- A. Low pressure alarm on the SFP gate boot seals.
- B. Leaking of the SFP.
- C. Readings on RMG-17A(B) 25 R/hr.
- D. Actuation of the SFP LVL HI/LO annunciator.

DISTRACTORS:

A INCORRECT      Since corrective actions can be taken to repressurize the seal without evacuation of RB. An initial condition of "SFP gate installed" makes this choice a viable distractor.

B INCORRECT      Because SFP can be isolated from RB even if it is leaking. CORE ALTERATIONS was used vs. fuel shuffle to eliminate questions about the credibility of the SFP gate being installed during fuel movement.

C CORRECT AOP-123.1 Caution states that RB should be evacuated if dose rates > 20 R/hr.

D INCORRECT      Because SFP can be isolated from RB even if it is leaking. CORE ALTERATIONS was used vs. fuel shuffle to eliminate questions about the credibility of the SFP gate being installed during fuel movement.

REFERENCES:

1. AOP-123.1, "Decreasing Level in the Spent Fuel Pool or Refueling Cavity During Refueling."

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of new and spent fuel movement procedures.

Answer: C

## 65. G2.3.1 1

An onshift Reactor Operator (RO) has the following recent dose history (TEDE):

- Year 2004 = 4020 mrem
- Year to date 2005 = 459 mrem

The RO is directed to perform a job on a component (considered a point source) that has a dose rate of 4400 mrem / hour at one foot. The RO will perform all of the work at 18 inches from the component and the work will take 45 minutes to complete.

Which ONE of the following correctly states the highest level of required approval/notification needed prior to beginning work?

- A. The RO's Supervisor and the Manager of Health Physics Services
- B. The RO's Department Manager and the HP Manager
- C. The General Manager, Nuclear Plant Operations
- D. The NRC

K/A MATCH ANALYSIS

The question tests knowledge of the facility requirements that are related to the 10CFR20 requirements.

ANSWER CHOICE ANALYSIS:

A. Incorrect. The Dept. Manager must sign. This is a higher level than his Supervisor. Plausible because this would be correct if the applicant does not add the 459 mrem.

B.  $(1/1.5)^2 \times (4400 \text{ mrem/hr}) \times (45 \text{ minutes}) \times (1 \text{ hr} / 60 \text{ minutes}) = 1467 \text{ mrem}$   
 $1500 \text{ mrem} + 459 \text{ mrem} = 1926 \text{ mrem}$ . HPP-153, Step 4.1, gives the admin limit as 1000 mrem. HPP-153, Step 3.3.1 and 3.3.2 state that the Manager of HPS must either sign or be notified by phone and approve per telecon. HPP-153, Attachment 1, states that the individual's manager (likely the Operations Manager) and the MP Manager must approve for > 1500 mrem, but < 2000 mrem.

C. Incorrect. Plausible because if the applicant does not account for only working 3/4 of an hour (rather than a full hour), then this answer would be correct due to calculating > 2000 mrem.

D. Incorrect. Plausible because NRC notification (vice approval) would be necessary if the 2004 accumulated dose were added to the current year dose.

REFERENCES:

1. Vogtle 2005-301 Exam Question, G2.3.1
2. Health Physics Procedure, HPP-153, Administrative Exposure Limits, Rev. 14.

K/A CATALOGUE QUESTION DESCRIPTION:

G2.3.1

Knowledge of 10 CFR: 20 and related facility radiation control requirements.

Answer: B

66. G2.3.10 3

Given the following conditions at a work site:

- Airborne activity - 3 DAC
- Radiation level - 40 mrem/hr.
- Radiation level with shielding - 10 mrem/hr.
- Time to place shielding - 15 minutes.
- Time to conduct task WITH respirator - 1 hour.
- Time to conduct task WITHOUT respirator - 30 minutes.

Assumptions:

- The airborne dose with a respirator will be zero.
- A dose rate of 40 mrem/hr will be received while placing the shielding.
- All tasks will be performed by one worker.
- Shielding can be placed in 15 minutes with or without a respirator.
- The shielding will not be removed

Which ONE of the following would result in the lowest whole body dose?

- A. Conduct task WITHOUT respirator or shielding.
- B. Conduct task WITH respirator and WITHOUT shielding.
- C. Place shielding while wearing respirator and conduct task WITH respirator.
- D. Place shielding while wearing respirator and conduct task WITHOUT respirator.

DISTRACTORS:

- A INCORRECT       $20 \text{ mrem (conduct task)} + 3.75 \text{ mrem (airborne)} = 23.75 \text{ mrem.}$
- B INCORRECT       $40 \text{ mrem (conduct task)} + 0 \text{ mrem (airborne)} = 40 \text{ mrem.}$
- C INCORRECT       $10 \text{ mrem (place shielding)} + 10 \text{ (conduct task)} + 0 \text{ mrem (airborne)} = 20 \text{ mrem.}$
- D CORRECT       $10 \text{ mrem (place shielding)} + 5 \text{ mrem (conduct task)} + 3.75 \text{ mrem (airborne)} = 18.75 \text{ mrem.}$  NOTE:  $3 \text{ DAC} \times 2.5 \text{ mrem} = 7.5 \text{ mrem}$

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

Answer: D



The crew has entered EOP-6.0, "Loss of All ESF AC Power." Plant conditions are as follows:

- Steam Generators must be depressurized by local operation of affected Steamline PORV(s)..
- Personnel are on station to operate PORV(s) locally.

Given the above conditions, should S/Gs be depressurized at the maximum rate? Why or why not?

- A. Yes, provided local communications have been established and the cooldown is stopped if Reactor Vessel Head voiding occurs.
- B. Yes, provided local communications have been established and RCS pressure remains above 140 psig.
- C. No, Reactor Vessel Head voiding may occur.
- D. No, a cooldown rate of 100°F/hr must not be exceeded until local communications have been established.

DISTRACTORS:

A INCORRECT IAW LP-EOP-6.0, "Maximum rate means not to be limited to TS limit of 100°F/hr.

B CORRECT

C INCORRECT Per EOP-6.0, Note - Step 19, depressurization should NOT be stopped to prevent this condition.

D INCORRECT This value is above P-12.

REFERENCES:

1. LP-EOP-6.0, "Instructor's Lesson Plan for Loss of All ESF AC Power," pages 10, 20, 31, and 33.
2. EOP-6.0, "Loss of All ESF AC Power," step 19.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of communications procedures associated with EOP implementation.

Answer: B

## 68. G2.4.2 1

The following conditions exist:

- Unit is at 5% reactor power following a start up.
- A Pressurizer Spray valve fails open.

Which one of the following would be the first to trip the reactor? (Assume no operator action).

- A. Pressurizer Pressure Low Reactor Trip.
- B. OT Delta T Reactor Trip.
- C. Pressurizer High Water Level Reactor Trip.
- D. Pressurizer Pressure Low Safety Injection.

DISTRACTORS:

A INCORRECT This would trip the reactor first if reactor power was greater than 10%.

B INCORRECT With the RCS delta T at a very low power level it would take a very long time and pressure would have to decrease to much less than the 1850 psig setpoint.

C INCORRECT This trip is disabled when less than 10% reactor power (P-7).

D CORRECT With the plant in this condition this will be the first setpoint that will trip the reactor.

REFERENCES:

1. Lesson Plan IC-3, "Instrumentation and Control," Enabling objective IC-3-19, Lesson Material page 18.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.

Answer: D

69. W/E04EA2.1 4

The following conditions exist:

- A Reactor Trip and Safety Injection has occurred.
- EOP-1.0 "Reactor Trip/Safety Injection Actuation has been entered.
- Pressurizer Pressure is 1850 psig and decreasing.
- Steam Generator pressures are all 850 psig and stable.
- Steam Generator Levels are all approximately 20% and rising.
- Containment Pressure indicates 0.25 psig.
- RM-A3, MAIN PLANT VENT EXH ATMOS, is in alarm.
- XCP-631-6-1, AB SUMP LVL HI, is lit.

Which ONE of the following describes the correct procedure that should be entered next?

- A. EOP- 2.0 "Loss of Reactor or Secondary Coolant."
- B. EOP-3.0 "Faulted Steam Generator Isolation."
- C. EOP-2.5 "LOCA Outside Containment."
- D. EOP-2.1 "Post-LOCA Cooldown and Depressurization."

DISTRACTORS:

A INCORRECT      A loss of RCS inventory is occurring, however conditions in containment do not indicate that the leak is in Containment, and S/G conditions are normal for this condition.

B INCORRECT      None of the indications provided in the stem indicate a Faulted S/G.

C CORRECT In accordance with Step 23 of EOP-1.0, the two alarms, RM-A3 and XCP-631-6-1, provide indication that an RCS leak exists outside containment and support this transition. None of the other indications trigger a transition out of EOP-1.0 either before or after step 23.

D INCORRECT      If a small break LOCA was believed to be in progress this would be the procedure to enter after EOP2.0.

REFERENCES:

1. Lesson Plan EOP-2.5 "LOCA Outside Containment". Objective 3
2. EOP-2.5 "LOCA Outside Containment," Step 23, page 14.

K/A CATALOGUE QUESTION DESCRIPTION:

- LOCA Outside Containment; Ability to determine and interpret the following as they apply to the (LOCA Outside Containment): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Answer: C

## 70. W/E07EK3.2 1

While responding to a plant event with RCS pressure at 300 psig, the crew received a YELLOW condition on the Status Tree for Core Cooling and transitioned to EOP-14.2, "Response to Saturated Core Cooling."

Which ONE of the following correctly describes the basis for making this transition?

- A. It will enable the crew to maintain minimum RCS subcooling by verifying RHR is in the cooldown mode.
- B. It will enable the crew to maintain minimum RCS subcooling by verifying/establishing SI flow.
- C. It will enable the crew to prevent further degradation of core cooling by starting a RCP.
- D. It will enable the crew to prevent further degradation of core cooling by establishing a vent path.

DISTRACTORS:

A INCORRECT The first step in EOP-14.2 is to verify that the RHR system has NOT been placed in service in the cooldown mode. The stem includes a mention of RCS pressure being > 250 psig to preclude this as a possible answer since Step 2 of EOP-14.2 states that "if RCS pressure is < 250 psig, verify RHR flow . . ."

B CORRECT This is the purpose as stated in the bases and Lesson Plan. Verifying SI flow is the second step in EOP-14.2.

C INCORRECT While this is the bases, EOP-14.2 does not direct starting RCPs even though having no running RCPs is one of the plant conditions that would result in receiving the Yellow path as mentioned in the stem.

D INCORRECT While this is the bases, all potential vent paths are checked closed to terminate loss of RCS inventory.

REFERENCES:

1. EOP-14.2, "Response to Saturated Core Cooling."
2. Lesson Plan EOP-14.2, "Response to Saturated Core Cooling."

K/A CATALOGUE QUESTION DESCRIPTION:

- W/E07EK3.2: Normal, abnormal and emergency operating procedures associated with Saturated Core Cooling.

Answer: B

## 71. W/E09EG2.4.49 1

The crew has entered EOP-1.3, "Natural Circulation Cooldown." The crew is at Step 4, ready to initiate RCS cooldown. The following conditions exist:

- RCP seal cooling had previously been lost to all RCPs.
- RCS subcooling is 29°F and slowly decreasing.
- PZR level is 12% and decreasing.
- RCP seal cooling was just restored to all RCPs.

Which ONE of the following EOP-1.3 actions should the crew take given the above conditions?

- A. Actuate SI and return to EOP-1.0, "Reactor Trip/Safety Injection Actuation."
- B. Restart an RCP.
- C. Have Engineering perform a seal evaluation and then restart an RCP.
- D. Initiate the RCS cooldown per Step 4 of EOP-1.3.

DISTRACTORS:

A CORRECT; The reference page for EOP-1.3 directs operators to actuate SI if either RCS subcooling is < 30°F OR PZR level can NOT be maintained > 12%.

B INCORRECT; While the reference page directs starting of a RCP if conditions can be established for starting a RCP during the procedure, the second caution statement of the procedure states that if RCP seal cooling had previously been lost, the affected RCP(s) should not be restarted prior to an Engineering evaluation

C INCORRECT; This is correct action for return of seal cooling, however initiating SI takes precedence.

D INCORRECT; The crew should initiate SI per the reference page due to loss of Subcooling.

REFERENCES:

1. EOP-1.3, "Natural Circulation Cooldown," pages 1, 2, and the reference page.
2. Lesson Plan for EOP-1.3, pages 8 - 10.

K/A CATALOGUE QUESTION DESCRIPTION:

- Natural Circulation Operations; Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Answer: A

## 72. W/E10EK2.2 1

EOP-1.4, "Natural Circulation Cooldown with Steam Void in Vessel," Step 2 states "Establish PZR level to accommodate void growth." Prior to this step there is a note that states "Saturated conditions in the PZR should be established before decreasing PZR level."

Which ONE of the following choices is correct with respect to the thermodynamic relationship between Pressurizer pressure and Pressurizer level and their effect on the plant?

If the Pressurizer is not saturated, decreasing Pressurizer level (using charging and letdown) will cause the Pressurizer pressure to \_\_\_\_\_ than if the Pressurizer were saturated. Though Pressurizer pressure still decreases when level is reduced under saturated conditions, the rate of decrease is \_\_\_\_\_ since vapor is created as the pressure drops.

- A. increase slower;      faster
- B. increase slower;      slower
- C. decrease faster;      faster
- D. decrease faster;      slower

DISTRACTORS:

A INCORRECT

B INCORRECT

C INCORRECT

D CORRECT To reduce the PZR level in a controlled manner, saturated conditions should first be established. If the PZR is not saturated, decreasing PZR level (using charging and letdown) will cause PZR pressure to **decrease faster** than if the PZR were saturated. Though the PZR pressure still decreases when level is reduced under saturated conditions, the rate of decrease is **slower** since vapor is created as the pressure drops.

REFERENCES:

1. EOP-1.4, "Natural Circulation Cooldown with Steam Void in Vessel," page 3.
2. Lesson Plan for EOP-1.4, pages 10 & 11.

K/A CATALOGUE QUESTION DESCRIPTION:

- Natural Circulation with Steam Void in Vessel with/without RVLIS; Knowledge of the interrelations between the (Reactor Trip or Safety Injection/Rediagnosis) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Answer: D

## 73. W/E12EK2.1 1

- EOP-3.1 "Uncontrolled Depressurization Of All Steam Generators" is in progress.
  - The crew is at the step: Check if SI flow should be reduced.

Which ONE of the following sets of parameters will be used to determine if SI flow should be reduced in accordance with EOP-3.1?

- A. pressurizer level, RCS pressure, EFW flow.
- B. RCS pressure, EFW flow, RCS subcooling.
- C. pressurizer level, secondary heat sink adequate, RCS subcooling.
- D. RCS subcooling, RCS pressure, pressurizer level.

DISTRACTORS:

A Incorrect, the EOP directs the operator to check RCS subcooling, RCS pressure, and Pressurizer level.

B Incorrect, the EOP directs the operator to check RCS subcooling, RCS pressure, and Pressurizer level.

C Incorrect, the EOP directs the operator to check RCS subcooling, RCS pressure, and Pressurizer level.

D Correct, the EOP directs the operator to check RCS subcooling, RCS pressure, and Pressurizer level.

REFERENCES:

1. EOP-3.1

K/A CATALOGUE QUESTION DESCRIPTION:

**WE12EK2.1** Knowledge of the interrelations between the (Uncontrolled Depressurization of all Steam Generators) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Answer: D

## 74. W/E13EK2.2 2

- A reactor trip and loss of off-site power has occurred.
  - EOP-15.1 " Response to Steam Generator Overpressure" has been entered to reduce pressure in the "A" S/G.
  - "A" S/G narrow range level is 85%.

Which ONE of the following describes the methods available, and the order they should be used to reduce pressure in the "A" S/G, in accordance with EOP 15.1?

- A. dump steam to the condenser, dump steam via PORVs to atmosphere, TDEFW pump start, isolate EFW flow.
- B. dump steam to the condenser, dump steam via PORVs to atmosphere, isolate EFW flow, cool down RCS .
- C. dump steam via PORVs to atmosphere, TDEFW pump start, isolate EFW flow.
- D. dump steam via PORVs to atmosphere, isolate EFW flow, cool down RCS .

DISTRACTORS:

A Incorrect, steam dumps are not available with a loss of off-site power, and A S/G does not supply the TDEFW pump.

B Incorrect, condenser steam dumps are not available with a loss of off-site power because Circ Water will be lost and C-9 will eventually be lost.

C Incorrect, TDEFW is not supplied by the A S/G.

D Correct, this is the available methods and the correct order IAW EOP-15.1.

REFERENCES:

1. EOP-15.1 " Response to Steam Generator Overpressure".
2. Summer Bank Question EOPS 095.

K/A CATALOGUE QUESTION DESCRIPTION:

**WE13EK2.2** Knowledge of the interrelations between the (Steam Generator Overpressure) and the following: facility's heat removal systems including primary coolant, emergency coolant, the decay heat removal systems, and the relations between the proper operation of these systems to the operation of the facility. (3.0/3.2)

Answer: D



## 75. W/E15EK3.3 1

- Operators are responding to a Large Break LOCA
  - RCS pressure blew down to Reactor Building pressure about 15 minutes ago.
  - The crew has completed transferring both the Safety Injection System and RB Spray System to Cold Leg Recirculation mode per EOP-2.2, Transfer to Cold Leg Recirculation.
  - The STA reports that reactor building sump level is 423 feet and increasing
  - Annunciator XCP-604 point 3-1 "**SW FR RBCU 1A/2A FLO LO**" is illuminated
  - Annunciator XCP-604 point 3-2 "**SW FR RBCU 1A/2A PRESS LO**" is illuminated

Which ONE of the following describes the event that has occurred, the action that is required to be performed, and the reason for performing the action?

- A. The "A" SW Booster pump has tripped.  
Determine and correct the cause and start the "A" SW Booster pump.  
To ensure that reactor building integrity is maintained.
- B. The "A" RBCU has ruptured.  
Secure and isolate the "A" SW Booster pump.  
To prevent flooding of vital equipment.
- C. The "A" SW Booster pump has tripped.  
Ensure the "B" SW Booster pump is operating.  
To ensure that reactor building temperature is maintained within limits.
- D. The "A" RBCU has ruptured.  
Secure and isolate the "A" SW Booster pump.  
To maintain reactor building integrity.

DISTRACTORS:

- A Incorrect, the RBCU has ruptured, the pump should be secured and isolated to reduce flooding.
- B Correct, the RBCU has ruptured, and this is the correct action and reason.
- C Incorrect, the RBCU has ruptured, the pump should be secured and isolated to reduce flooding. Sprays along with the other train of RBCU will maintain reactor building temperature.
- D Incorrect, the "A" RBCU has ruptured, but the reason for isolation is to stop reactor building flooding and protect vital equipment.

REFERENCES:

1. EOP-17.1 "Response to Reactor Building Flooding".
2. APP-001 XCP-604 3-1
3. APP-001 XCP-604 3-2

K/A CATALOGUE QUESTION DESCRIPTION:

**WE15EK3.3** Knowledge of the reasons for the following responses as they apply to the (Containment Flooding) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations. (2.9/2.9)

Answer: B

## 76. 002A2.04 1 - SRO ONLY

A large LOCA has occurred. Which ONE of the following actions are correct given the following conditions:

- RWST level is 17% and continues to decrease.
- RHR sump level is 410 feet and increasing.
- All RCPs were tripped (by procedure) when RCS pressure dropped below 1400 psig
- The crew is currently performing the actions of EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT

The following EOPs are being considered:

- EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION
- EOP-2.4, LOSS OF EMERGENCY COOLANT RECIRCULATION

Transition to:

- A. EOP-2.4 from EOP-2.0. When RHR sump level reaches the required level, transition to EOP-2.2.
- B. EOP-2.4 from EOP-2.0. When RHR sump level reaches the required level, return to EOP-2.0 and transition to EOP-2.2.
- C. EOP-2.2 from EOP-2.0 then transition to EOP-2.4. When RHR sump level reaches the required level, return to EOP-2.0 and transition to EOP-2.2.
- D. EOP-2.2 from EOP-2.0 then transition to EOP-2.4. When RHR sump level reaches the required level, transition back to EOP-2.2.

DISTRACTOR:

A and B. Incorrect: The transition is not made directly to EOP-2.4 from EOP-2.0 unless coolant recirculation was established and subsequently lost, this is not the case.

C. Incorrect: The transition from EOP-2.4 is made back to the procedure step in affect which would have been in EOP-2.2 not EOP-2.0.

D. Correct.

REFERENCE:

EOP 2, page 4 of 32

EOP 2.2, page 3 of 13

EOP 2.4, page 4 of 29

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Coolant System (RCS); Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of heat sinks.

Answer: D

## 77. 003A2.03 2 - SRO ONLY

The following conditions exist:

- Reactor Power is 9%.
- A Total Loss of All Service Water has occurred.
- AOP-117.1, "Total Loss of Service Water," has been entered.
- RCP temperatures are beginning to rise.
- Service Water can not be restored.

Which ONE of the following describes the action(s) the operators must take **and** the sequence of those actions (in accordance with AOP-117.1)?

- A. Initiate a reactor plant shutdown per GOP-4B, POWER OPERATION (MODE 1 - DESCENDING). Stop up to TWO RCPs. Isolate unnecessary CCW loads, and ensure FS is aligned to the D/Gs. When an RCP motor bearing temperatures or lower seal water bearing temperature exceeds the specified limit, stop the affected RCP.
- B. Initiate a reactor plant shutdown per GOP-4B, POWER OPERATION (MODE 1 - DESCENDING). Isolate unnecessary CCW loads, and ensure FS is aligned to the D/Gs. Secure an RCP only if motor bearing temperatures or lower seal water bearing temperature exceeds the specified limit.
- C. Initiate a reactor plant shutdown per GOP-4B, POWER OPERATION (MODE 1 - DESCENDING). Stop at least TWO RCPs. Isolate unnecessary CCW loads, and ensure FS is aligned to the D/Gs. When the running RCP motor bearing temperatures or lower seal water bearing temperature exceeds the specified limit, increase monitoring and continue pump operation until the unit is shutdown then stop the affected pump.
- D. Stop ONE RCP. Initiate a reactor plant shutdown per GOP-4B, POWER OPERATION (MODE 1 - DESCENDING). When an RCP motor bearing temperatures or lower seal water bearing temperature exceeds the specified limit, trip the reactor and stop the affected RCP.

DISTRACTOR:

A. Correct: IAW AOP-117.1, the reactor should be shutdown (not tripped). Secure up to TWO RCPs (Step 12). The affected RCP should be shutdown if RCP motor bearing temperatures exceeds **195 oF** or lower seal water bearing temperature exceeds **225oF** (Step 13).

B. Incorrect: Do not wait until temperature are exceeded to secure RCPs

C. Incorrect: Step 12 allows two RCPs to be stopped if plant conditions permit. Prudent action is to shutdown with 2 RCPs running and secure one if necessary for temperature.

D. Incorrect: Shutdown is initiated in step 3 and Step 12 secures the RCP. Reactor is not tripped unless above P-7.

REFERENCES:

GOP-4B

AOP-117.1, page 8

AOP-118.1, page 5

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Coolant Pump System (RCPS); Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Problems associated with RCP motors, including faulty motors and current, and winding and bearing temperature problems.

Answer: A

## 78. 005G2.1.27 1 - SRO ONLY

Which ONE of the following correctly describes the purpose and or function (not all inclusive) of the RHR system and one of its Mode 4 Technical Specification requirements?

- A. Hot Leg Recirculation, Refueling Cavity Cooling, Alternate Water supply to Reactor Building Coolers, Pressurizer Relief Tank Cooling. RHR can be deenergized for up to **2** hour provided that core outlet temperature is maintained at least **50oF** below saturation temperature.
- B. Cold Leg Recirculation, Hot Leg Recirculation, Simultaneous Cold Leg - Hot Leg Recirculation, Alternate Water supply to Reactor Building Coolers. RHR can be deenergized for up to **1** hour provided that core outlet temperature is maintained at least **10oF** below saturation temperature.
- C. Refueling Cavity Draining, Cold Overpressure Protection, Simultaneous Cold Leg - Hot Leg Recirculation, Pressurizer Relief Tank Cooling. RHR can be deenergized for up to **2** hour provided that core outlet temperature is maintained at least **50oF** below saturation temperature.
- D. Cold Leg Recirculation, Refueling Cavity Draining, Cold Overpressure Protection, Cold Leg Injection. RHR can be deenergized for up to **1** hour provided that core outlet temperature is maintained at least **10oF** below saturation temperature.

DISTRACTOR:

A. Incorrect: Hot Leg Recirculation, Alternate Water supply to Reactor Building Coolers, Pressurizer Relief Tank Cooling are all incorrect functions. RHR can be deenergized for up to **1** hour provided that core outlet temperature is maintained at least **10oF** below saturation temperature.

B. Incorrect: Hot Leg Recirculation, Alternate Water supply to Reactor Building Coolers are incorrect functions.

C. Pressurizer Relief Tank Cooling is an incorrect function.

D. Correct answer

REFERENCES:

AB-7, RHR system, page 9

AB-2, RCS, page 9

IB-1, SW System, page 17

TS 3.4.1.3, page 237 and 241

K/A CATALOGUE QUESTION DESCRIPTION:

- Residual Heat Removal System; Knowledge of system purpose and or function.

Answer: D

## 79. 007A2.03 2 - SRO ONLY

Plant conditions are as follows:

- The unit is in Cold Shutdown.
- The RCS is water solid with one train of RHR providing shutdown cooling.
- RHR letdown is in service with PCV-145 controlling RCS pressure in AUTO.
- ALL pressurizer PORV control switches are in AUTO.
- RCS temperature is 140 oF.
- PRT level is 78%.
- PRT pressure is 6 psig.
- PRT temperature is 95 oF

Assuming no operator action, a \_\_\_\_\_ will result in a pressure increase in the PRT and the crew can restore PRT parameters by \_\_\_\_\_.

- A. A HIGH failure of PT-444, pressurizer pressure control channel transmitter.  
Spraying down the PRT using reactor makeup water per SOP-101, Reactor Coolant System.
- B. Loss of air to HCV-142, LTDN FROM RHR.  
Draining the PRT to the Recycle Holdup Tanks per SOP-108, Liquid Waste Processing System.
- C. A HIGH failure of PT-444, pressurizer pressure control channel transmitter.  
Draining the PRT to the Recycle Holdup Tanks per SOP-108, Liquid Waste Processing System.
- D. Loss of air to HCV-142, LTDN FROM RHR.  
Spraying down the PRT using reactor makeup water per SOP-101, Reactor Coolant System.

DISTRACTORS:

A Incorrect failure. A failure of PT-444 high will not cause a pressurizer PORV to open because the P-11 signal (2/3 pressurizer protection channels less than 1985 psig) will prevent automatic operation of the pressurizer PORVs in this plant Mode. Plausible because the discharge of a pressurizer PORV will cause an increase in PRT pressure. Incorrect corrective action. ???At 180oF/6+ psig, the PRT is saturated (no vapor bubble).??? Spraying the PRT would not reduce PRT pressure (but would increase PRT pressure as PRT level increased from the addition of reactor makeup water). Plausible because this action would reduce PRT pressure following a relief or safety valve discharge at power.

B Correct failure. HCV-142 will fail shut on loss of air. A failure of HCV-142 in the closed position isolates the RHR system from the letdown system. With charging flow in manual, RCS pressure will increase until the RHR suction relief valve(s) lift, relieving to the PRT. Correct corrective action. Draining the PRT will reduce PRT pressure.

C Incorrect failure. See A. Correct corrective action. See B.

D Correct failure. See B. Incorrect corrective action. See A.

REFERENCES:

1. Panel XCP-616, Annunciator Point 4-4
2. AB-2, Reactor Coolant System, Pressurizer Relief Tank
3. AB-7, Residual Heat Removal System
4. SOP-101, Reactor Coolant System

K/A CATALOGUE QUESTION DESCRIPTION:

- Ability to (a) predict the impacts of the following malfunctions or operations on the P S (Pressurizer Relief Tank / Quench Tank System); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Overpressurization of the PZR (3.6/3.9)

Answer: B



## 80. 007EA2.01 2 - SRO ONLY

At 50% power, the plant experienced a loss of BOTH running Main Feedwater Pumps with a concurrent failure of the Reactor trip breaker A to open. The crew is performing the immediate actions of EOP-1.0, "Reactor Trip/Safety Injection Actuation."

Current plant conditions are as follows:

- The Integrated Plant Computer System has failed.
- SG LO-LO Level annunciators are lit.
- Reactor Power is 7% and slowly decreasing.
- All EFW Pumps failed to start.

Which ONE of the following describes the procedure path based on the above information?

- A. Remain in EOP-1.0, until directed to monitor Critical Safety Functions then transition to EOP-15.0, "Response To Loss of Secondary Heat Sink."
- B. Directly enter EOP-15.0, "Response To Loss of Secondary Heat Sink."
- C. Remain in EOP-1.0, until directed to monitor Critical Safety Functions then transition to EOP-13.0, "Response To Abnormal Nuclear Power Generation."
- D. Transition from EOP-1.0 to EOP-13.0, "Response To Abnormal Nuclear Power Generation."

DISTRACTORS:

- A INCORRECT      Should transition directly to EOP-13.0.
- B INCORRECT      Should transition directly to EOP-13.0.
- C INCORRECT      Should transition directly to EOP-13.0.
- D CORRECT      Should transition directly to EOP-13.0. Since there are no given conditions that would warrant an SI, the CRS should follow the Alternative Action for Step 5 of EOP-1.0 and transition to EOP-1.1. Upon transition from EOP-1.0, the STA begins monitoring of CSFs, and should inform CRS of Red path to EOP-13.0 based on power >5%.

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Reactor Trip; Ability to determine or interpret the following as they apply to a reactor trip: Decreasing power level, from available indications.

Answer: D

## 81. 008A2.04 2 - SRO ONLY

The Unit is operating at 100% power with all systems in normal lineups when the following annunciators actuate:

- LTDN/SL WTR HX FLO LO TEMP HI
- CC LOOP A RM-L2A HI RAD
- CC SRG TK VENT 7096 CLSD HI RAD
- CCW SRG TK LVL HI/LO/LO-LO

NO other annunciators are lit and all associated automatic functions have occurred.

Which ONE of the following is the correct cause and action?

- A. A leak exists in the Letdown HX; verify closure of PVT-8152, LTDN LINE ISOL, per SOP-102, CHEMICAL AND VOLUME CONTROL SYSTEM, and manually shut PVV-7096, CC SURGE TK VLV
- B. A leak exists in the Letdown HX; manually close PVT-8152, LTDN LINE ISOL, per SOP-102, CHEMICAL AND VOLUME CONTROL SYSTEM, and verify closure of PVV-7096, CC SURGE TK VLV
- C. RCP "A" thermal barrier has been breached. Conduct a normal shutdown per GOP-4B, POWER OPERATION (MODE 1 - DESCENDING), Stop RCP A within 8 hours per SOP-101, REACTOR COOLANT SYSTEM.
- D. A Phase "B" Containment Isolation has actuated due to RM-L2A&B (Component Cooling) alarming. Immediately trip the reactor and trip ALL RCPs and enter EOP 1.0.

DISTRACTOR:

A. Incorrect. PVT-8152 must be manually shut and PVV-7096 should close automatically and be verified closed.

B. Correct:

C. Incorrect: RCP seals have not failed nor has the thermal barrier been breached. Therefore, Stopping RCP A within 8 hours per SOP-101, REACTOR COOLANT SYSTE, does not apply.

D. Incorrect: RM-L2A&B 9 will not cause a Phase B Containment Isolation.

REFERENCES:

AOP 101, Reactor Coolant Pump Seal Failure, page 8

SOP 102.2, CHEMICAL AND VOLUME CONTROL SYSTEM, page 70,

ARP-001-XCP-601, page 16

K/A CATALOGUE QUESTION DESCRIPTION:

- Component Cooling Water System (CCWS); Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malufuncions or operations: PRMS alarm.

Answer: B

82. 009EG2.4.30 2 - SRO ONLY

Which ONE of the following identifies an event that is required to be reported to the NRC within 1 hour per EPP-002, COMMUNICATION AND NOTIFICATION.

- A. An unplanned ECCS initiation that does not discharge to the RCS during an SI surveillance test.
- B. An ECCS discharge to the RCS in response to a small break LOCA.
- C. An airborne release of > 2X Appendix B limits.
- D. A liquid release of > 2X Appendix B limits.

DISTRACTOR:

- A. Incorrect: This is a non-emergency event that does not discharge to the RCS this is a 4 hour notification requirement .
- B. Correct: A LOCA is an emergency event which requires notification.
- C. Incorrect: This is a 4 hour notification requirement
- D. Incorrect: This is a 4 hour notification requirement

REFERENCE:

EPP-002, page 27

K/A CATALOGUE QUESTION DESCRIPTION:

- Small Break LOCA; Knowledge of which events related to system operations/status should be reported to outside agencies.

Answer: B

## 83. 022AG2.4.49 1 - SRO ONLY

The plant was operating at 80% power when the following annunciators (not all inclusive) came in:

- REGEN HX LTDN OUT TEMP HI
- VCT LVL HI/LO
- CHG LINE FLO HI/LO
- PZR LCS DEV HI/LO

Charging pump amps are fluctuating between 25 and 30 amps

Charging flow is fluctuating between 25 and 30 gpm

Charging pressure is oscillating between 2500 and 2600 psig

Which ONE of the following set of actions should the supervisor direct his board operators to perform (These actions are not all inclusive)?

- A. Secure the operating charging pump, close all letdown isolation valves, and close FCV-122, charging flow control valve.
- B. Verify at least one charging pump is operating, verify FCV-122 is open, and verify CCW flow to the RCP Thermal Barriers is GREATER THAN 90 gpm on FI-7273A(B), THERM BARR FLOW GPM.
- C. Secure the operating charging pump, realign charging pump suction, and close both LCV-115B(D), RWST TO CHG PP SUCT.
- D. Verify at least one charging pump is operating, verify FCV-122 is open, and open both LCV-115C(E), VCT OUTLET ISOL.

DISTRACTOR:

A. Correct answer per AOP-102.2, page 4-6

B,C, and D. Charging flow is abnormal - must go to the RNO column. Closing both LCV-115B(D), RWST TO CHG PP SUCT, is an action if charging was initially aligned to the RWST.

REFERENCE:

AOP-102.2, page 4-6

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Reactor Coolant Makeup; Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Answer: A

## 84. 032AA2.08 3 - SRO ONLY

Refueling operations are in progress, with SR monitor N33 out of service, when power is suddenly lost to source range neutron flux monitor N31 and subsequently regained 30 minutes later.

Which ONE of the following describes the action to be taken for this situation when power is lost?

- A. Suspend all core alterations and perform an analog channel operational test of source range neutron flux monitor N31 within 8 hours prior to the initial start of core alterations.
- B. Suspend all core alterations and perform a neutron flux response time test AND operational test of source range neutron flux detector N31 within 8 hours prior to the initial start of core alterations.
- C. Determine boron concentration and perform a channel check of source range neutron flux monitor N31 within 12 hours.
- D. Determine boron concentration and perform a neutron flux response time test of source range neutron flux detector N31 within 12 hours.

DISTRACTORS:

A CORRECT T.S. 3.9.2 requires immediate suspension of CORE ALTERATIONS when one of the two SR monitors are lost

B INCORRECT Per T.S. Table 3.3-2 (\* and Note 1), neutron detectors (not the channel) are exempt from response time testing.

C INCORRECT Boron concentration measurements are only required when both monitors are down.

D INCORRECT Boron concentration measurements are only required when both monitors are down. Neutron detectors are exempt from response time testing.

REFERENCES:

1. TS 3.9.2, "Instrumentation."
2. TS 3.9.1, "Boron Concentration."
3. TS Table 3.3-2, "Reactor Trip System Instrumentation Response Times."
4. IC-8, "Nuclear Instrumentation," pages 24, 48, & 50.

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Source Range Nuclear Instrumentation; Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Testing required if power is lost, then restored.

Answer: A

85. 035G2.4.20 2 - SRO ONLY

The crew has just entered EOP-15.0, "Response to Loss of Secondary Heat Sink" from EOP-12.0, Monitoring of Critical Safety Functions.

The following conditions exist:

- WR SG "A" level is 25%
- WR SG "B" level is 12%
- WR SG "C" level is 11%
- Total Feed Flow is 290 gpm

Which ONE of the following sets of actions (not all inclusive) should be taken as directed by EOP-15.0, "Response to Loss of Secondary Heat Sink"?

- A. Ensure all EFW valves are open and establish EFW flow to at least one SG.
- B. Reset SI and establish MFW flow to either the "B" or "C" Steam Generators.
- C. Reset SI, dump steam to the condenser and feed using a condensate pump.
- D. Trip ALL RCPs, actuate SI, establish an RCS bleed path:

NOTE: No other initial conditions are needed. The caution prior to step 4 of EOP-15 is a stand alone statement. If the SRO has entered this procedure and these conditions exist, there is no other option.

DISTRACTOR:

A, B, C. Incorrect: Not allowed due to caution prior to step 4. These steps are bypassed when the CAUTION prior to Step 4 is implemented.

D Correct:

REFERENCE:

EOP-12, page 9

EOP-15, page 3 caution prior to step 4

K/A CATALOGUE QUESTION DESCRIPTION:

- Steam Generator; Knowledge of operational implications of EOP warnings, cautions, and notes.

Answer: D

## 86. 054AA2.03 2 - SRO ONLY

The following conditions exist:

- A plant startup was in progress.
- Power level was at 38%
- The reactor tripped
- SG blowdown isolation valves (PVG-503A(B)(C), A(B)(C) ISOL) closed
- Current SG narrow range levels in "A", "B", and "C" SGs are 8%, 10%, and 10%, respectively, and decreasing

Which ONE of the following correctly states the initiating event that caused the trip and the expected automatic actions based on these conditions?

- A. The operating MFP tripped and ONLY the motor driven EFW pumps have a current start signal.
- B. The operating MFP tripped and BOTH the turbine driven AND motor driven EFW pumps have a current start signal.
- C. All SG flow control valves drifted closed and AMSAC should have actuated.
- D. All SG flow control valves drifted closed and ONLY the turbine driven EFW pump has a current start signal.

Unless the applicant keys on the fact that SG blowdown isolation valves (PVG-503A(B)(C), A(B)(C) ISOL) closed, he may consider C or D.

DISTRACTOR:

- A. Incorrect: LO LO level both MDEFP AND TDEFP will start
- B. Correct:
- C. Incorrect: All SG flow control valves drifting closed could cause this. **????** However, SG blowdown isolation valves (PVG-503A(B)(C), A(B)(C) ISOL) closed which don't according to ARP XCP-624. **????** Additionally, AMSAC will not actuate since initial power was < 40%
- D. Incorrect: All SG flow control valves drifting closed could cause this. **????** However, SG blowdown isolation valves (PVG-503A(B)(C), A(B)(C) ISOL) closed which don't according to ARP XCP-624. **????** Additionally, both MDEFP AND TDEFP will start.

REFERENCE:

ARP-001-XCP-624, page 22 and 26

K/A CATALOGUE QUESTION DESCRIPTION:

- Loss of Main Feedwater (MFW); Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Conditions and reasons for AFW pump startup.

Answer: B

## 87. 068G2.1.20 2 - SRO ONLY

A Liquid Radwaste Release is been in progress:

- XCP-646 2-5, MON TK DISCH RM-L5 HI RAD, has just actuated for the second time.
- RCV00018-WL, Liquid Radioactive Waste Control Valve, indicates shut.
- Within 30 seconds of the alarm , RM-L5's reading returns to below the setpoint.

Which ONE of the following correctly states the next procedure steps to be taken.

- A. The tank must be sampled and activity levels verified, then open RCV00018-WL and resume the release per SOP-108.
- B. Verify that the RM-L5's reading is below the setpoint, then open RCV00018-WL and resume the release per SOP-108.
- C. Verify that the RM-L5's reading is below the setpoint, then open RCV00018-WL and resume the release per SOP-108. Direct Heath Physics to continue to monitor the release and reduce the release rate.
- D. Notify Health Physics and request a radiological survey. The release can not be reinitiated under the current release permit.

DISTRACTORS:

A CORRECT As per XCP-646-2-5, this is the first step of the supplemental actions.

B INCORRECT This is the action if this is the first time the release has been automatically terminated.

C INCORRECT This is the action if this is the first time the release has been automatically terminated, **????** coupled with the actions for a malfunctioning RM-L5. **????**

D INCORRECT This would be plausible if it is believed that the release can not be continued.

REFERENCES:

1. XCP-646 2-5 & 2-6, pages 12 & 13.
2. XCP-644 2-5, page 15.
3. XCP-643 4-1, page 22.

K/A CATALOGUE QUESTION DESCRIPTION:

- Liquid Radwaste System; Ability to execute procedure steps.

Answer: A



## 88. 103G2.1.30 2 - SRO ONLY

Plant conditions are as follows:

- The unit is currently in MODE 4, with temperature and pressure increasing.
- All major work inside containment was completed two hours ago and there are NO personnel inside the Reactor Building.
- An auxiliary operator has just called to report that the red indicating light above the Personnel Escape Airlock is LIT and that he was unable to operate the Fuel Handling Building door using the handwheel.

Which ONE of the following is correct regarding the status of the Personnel Escape Airlock AND Containment Integrity?

- A. The Reactor Building door is OPEN.  
The Personnel Escape Airlock is INOPERABLE.
- B. The Reactor Building door is CLOSED.  
The Personnel Escape Airlock is INOPERABLE.
- C. Only the Reactor Building door position indicator has malfunctioned.  
The Personnel Escape Airlock is OPERABLE.
- D. The Personnel Escape Airlock is OPERABLE.  
The Personnel Escape Airlock door interlock is INOPERABLE.

DISTRACTOR

- A Correct. The red bulkhead light and the inability to operate door operating handle No. 4 (after unlocking it) indicate that the remote (containment side) door is open. Per Tech Spec 3.6.1.3, Containment Air Locks, both airlock doors are required to be CLOSED in Mode 4 unless the air lock is being used for normal transit entry and exit. With NO personnel in containment for two hours, the air lock is NOT being used for normal transit entry and exit.
- B Incorrect. Incorrect equipment status, correct Tech Spec application. See A.
- C. The indicator is a positive indication of the status of the door. The door is open. The Personnel Escape Airlock is INOPERABLE.
- D. The indicator is a positive indication of the status of the door. The door is open. The Personnel Escape Airlock is INOPERABLE.

REFERENCE:

Technical Specification 3.6.1.3, Containment Air Locks

K/A CATALOGUE QUESTION DESCRIPTION:

- 103 Containment System
- G2.1.30 Ability to locate and operate components, including controls (3.9/3.4)

Answer: A

## 89. G2.1.13 2 - SRO ONLY

Which ONE of the following (as stated in SAP-200, Conduct of Operations) has the final authority, per Management Directive 11, for a case where an individual's condition for work inside the protected area is in question?

- A. General Manager, Nuclear Plant Operations
- B. Shift Supervisor
- C. Management Duty Supervisor
- D. Security Manager

DISTRACTOR:

- A. Incorrect: per SAP 200, Paragraph 6.5.2 H, page 10
- B. Correct: per SAP 200, Paragraph 6.5.2 H, page 10
- C. Incorrect: per SAP 200, Paragraph 6.5.2 H, page 10
- D. Incorrect: per SAP 200, Paragraph 6.5.2 H, page 10

REFERENCE:

SAP 200, Conduct of Operations, Paragraph 6.5.2 H, page 10

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of facility requirements for controlling vital / controlled access.

Answer: B

## 90. G2.1.34 2 - SRO ONLY

The unit is undergoing a normal heatup. Plant conditions are as follows:

- Hydrazine was added when RCS temperature was 185°F.
- RCS temperature is 200°F.
- A reactor coolant sample shows dissolved oxygen concentrations of 1.1 ppm.

Given the above conditions and in accordance with GOP-2, "Plant Startup and Heatup," and Tech Spec 3.4.7, "Chemistry," which ONE of the following is correct?

- A. Secure the Heatup, plant chemistry is **NOT** in compliance with GOP-2; an LCO **HAS** been entered.
- B. Secure the Heatup to prevent plant chemistry from **NOT** being in compliance with GOP-2; an LCO has **NOT** been entered.
- C. The heatup can continue, plant chemistry **IS** in compliance with GOP-2; an LCO **HAS** been entered.
- D. The heatup can continue, plant chemistry **IS** in compliance with GOP-2; an LCO has **NOT** been entered.

DISTRACTORS:

A INCORRECT Per GOP-2, RCS temperature should not be permitted to exceed 200°F until oxygen scavenging of the primary is complete and chemistry is within specification.

B CORRECT Per GOP-2, RCS temperature should not be permitted to exceed 200°F until oxygen scavenging of the primary is complete and chemistry is within specification. Although the Steady State Limit for Oxygen is 0.1ppm in Modes 1 - 4, it is not applicable with Tavg ≤ 250°F (per \* note below Table 3.4-2).

C INCORRECT Plant temperature has exceeded the GOP-2 limit of 200°F but not the TS limit of 250°F.

D INCORRECT Plant temperature has exceeded the GOP-2 limit of 200°F.

REFERENCES:

1. Tech Spec Table 1.1, "Operational Modes."
2. Tech Spec 3.4.7, "Chemistry," and Table 3.4-2, "Chemistry Limits."
2. GOP-2, "Plant Startup and Heatup (Mode 5 to Mode 3)," Step 2.1a page 2, Step 3.1 page 5, & the Reference Page.

K/A CATALOGUE QUESTION DESCRIPTION:

- Ability to maintain primary and secondary plant chemistry within allowable limits.

Answer: B

91. G2.2.20 1 - SRO ONLY

Which ONE of the following is a VIOLATION of administrative procedures when troubleshooting an INOPERABLE system or component, the condition of which is specified by a Technical Specification Action Statement.

- A. A Temporary Restoration to Service is used even though an alternative method of completing the work that will meet the action statement requirement was identified.
- B. The troubleshooting requires posting a plant operator to immediately restore an affected component.
- C. The Temporary Inoperable Status Change required to perform the troubleshooting was approved by the Duty Shift Supervisor.
- D. The Work Document also includes an approved Bypass Authorization Request to install electrical jumpers.

DISTRACTORS:

A Correct per SAP-205, 6.7.2.B

B Incorrect. Acceptable per 6.7.3.A.1. and 6.7.3.A.2. Plausible if applicant believes that the need to "immediately restore" would prevent a troubleshooting activity.

C Incorrect. SAP-205, Attachment V, Temporary Inoperable Status Change, requires approval by the Duty Shift Supervisor. Plausible because the Manager, Operations, approves some plant activities (e.g. extending the time an invalid nuisance annunciator may be removed from service).

D Incorrect. Allowed per SAP-0148 section 2.2. Plausible if applicant believes a Bypass Authorization Request is not used to authorize installation of electrical jumpers or that administrative procedures prohibit the use of electrical jumpers during troubleshooting.

REFERENCES:

1. SAP-0205, Status Control and Removal and Restoration
2. SAP-0148, Temporary Bypass, Jumper, and Lifted Lead Control

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the process for managing troubleshooting activities (2.2/3.3)

Answer: A

92. G2.2.7 1 - SRO ONLY

A bypass authorization request, prepared per SAP-148, "Temporary Bypass, Jumper, and Lifted Lead Control," requires prior PSRC and NSRC review for which ONE of the following conditions?

- A. A review indicates that system operability will be affected.
- B. A review indicates that 10 CFR 50 Appendix R fire protection criteria are impacted.
- C. A review indicates that Seismic or blowout provisions are being diminished.
- D. A review indicates that a full safety evaluation is required per 10 CFR 50.59.

DISTRACTORS:

A INCORRECT

B INCORRECT

C INCORRECT

D CORRECT

REFERENCES:

1. SAP-148, "Temporary Bypass, Jumper, and Lifted Lead Control." [Attachment 1, page 14 of 20.](#)

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the process for conducting tests or experiments not described in the safety analysis report.

Answer: D

## 93. G2.3.2 2 - SRO ONLY

Which ONE of the following is correct per HPP- 709, Sampling and Release of Radioactive Gaseous Effluents:

- A. Discharges from the Waste Gas Decay Tank or other high activity gaseous releases should be avoided when the wind is from the East-Southeast. This will prevent the released activity from being drawn into the Auxiliary Building ventilation.
- B. Discharges from the Waste Gas Decay Tank or other high activity gaseous releases should be avoided when the wind is from the West-Southwest. This will prevent the released activity from being drawn into the Auxiliary Building ventilation.
- C. Discharges from the Waste Gas Decay Tank or other high activity gaseous releases should be avoided when the wind is from the East-Southeast. This will prevent the released activity from being drawn into the Control Building ventilation.
- D. Discharges from the Waste Gas Decay Tank or other high activity gaseous releases should be avoided when the wind is from the West-Southwest. This will prevent the released activity from being drawn into the Control Building ventilation.

DISTRACTOR:

A: Correct: Discharges from the Waste Gas Decay Tank or other high activity gaseous releases should be avoided when the wind is from the **East-Southeast**. This will prevent the released activity from being drawn into the **Auxiliary** Building ventilation. Per HPP-709 NOTE 5.1.H

B, C, D Incorrect

REFERENCE:

HPP- 709, Sampling and Release of Radioactive Gaseous Effluents, page 10

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of facility ALARA program.

Answer: A

94. G2.4.33 2 - SRO ONLY

Which ONE of the following individual's approval is required to extend the time that an invalid nuisance annunciator is removed from service past 96 hours?

- A. Duty Shift Engineer
- B. Duty Shift Supervisor
- C. Manager, Operations
- D. General Manager, Nuclear Plant Operations

DISTRACTORS:

A

B

C Correct per OAP-100.5, Section 14.0

D

REFERENCES:

1.

K/A CATALOGUE QUESTION DESCRIPTION:

- Knowledge of the process used to track inoperable alarms.

Answer: C

## 95. G2.4.38 2 - SRO ONLY

Plant conditions are as follows:

- An event has occurred resulting in substantial core degradation with potential loss of containment integrity.
- A General Emergency has been declared.
- The prevailing wind is blowing from the south.

Which ONE of the following must assume the duties of Interim Emergency Director, and to which area should he direct non-essential personnel be evacuated?

- A. Shift Supervisor; Evacuate to their personal residence.
- B. Shift Supervisor; Evacuate to the Southern Offsite Holding Area.
- C. Manager, Operations; Evacuate to their personal residence.
- D. Manager, Operations: Evacuate to the Southern Offsite Holding Area.

DISTRACTORS:

A INCORRECT      Correct individual; however, if there is a potential for personnel or vehicle contamination, the evacuation would NOT be to personal residence.

B CORRECT

C INCORRECT      If there is a potential for personnel or vehicle contamination, the evacuation would NOT be to personal residence.

D INCORRECT

REFERENCES:

1. SAP-109, "Management Duty Supervisor."
2. EPP-012, "Onsite Personnel Accountability and Evacuation," pages 5 and 9.

K/A CATALOGUE QUESTION DESCRIPTION:

- Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.

Answer: B



## 96. W/E02EG2.4.6 1 - SRO ONLY

Plant conditions are as follows:

- A reactor trip and SI have occurred due to a steam break.
- ALL Main Steam Isolation Valves initially failed to close.
- EOP-3.1, Uncontrolled Depressurization of All Steam Generators, is in progress at Step 17, Establish Normal Charging.
- PZR level is 58%.
- EFW flowrate is 50 gpm to each Steam Generator due to required operator action.
- All Steam Generator Narrow Range levels are 4%.
- Reactor Building pressure has remained below 1 psig.
- RCS pressure is 1750 psig and going UP.
- Core Exit TCs are 435 oF and going DOWN.

The "C" Main Steam Isolation Valve closed 30 seconds ago and "C" Steam Generator pressure has changed from 80 to 130 psig.

Which ONE of the following correctly describes the actions the crew should take?

- A. Must remain in EOP-3.1 until the Critical Safety Function Status Trees direct entering an orange or red path Emergency Operating Procedure.
- B. IMMEDIATELY transition to EOP-3.0, Faulted Steam Generator Isolation, Step 1.
- C. Complete EOP-3.1 through Step 20, verify SI Flow is NOT required, and then transition to EOP-3.0, Faulted Steam Generator Isolation, Step 1.
- D. Complete ALL steps of EOP-3.1 and then transition to EOP-1.2, Safety Injection Termination, Step 1.

DISTRACTORS:

A Incorrect. The C SG pressure has increased. Per EOP-3.1 Reference Page item 2, Secondary Integrity Transition Criteria, the crew should go to EOP-3.0, Faulted Steam Generator Isolation, Step 1, after completing EOP-3.0 SI Termination steps 15 through 20. Plausible if applicant does not recognize secondary integrity transition criteria.

B Incorrect. Per EOP-3.1, Reference Page item 2, the crew should go to EOP-3.0 if any SG pressure increases at any time EXCEPT while performing SI Termination in steps 5 through 20. Plausible if applicant does not recognize step number or step description as an SI Termination step or does not remember an exception to Secondary Integrity Transition Criterion.

C Correct per EOP-3.1, Reference Page, item 2, Secondary Integrity Transition Criterion.

D Incorrect. Per EOP-3.1 Reference Page, item 2, the crew should transition to EOP-3.0 after completing SI Termination in Steps 15 through 20. Plausible because the last step of

EOP-3.0, Faulted Steam Generator Isolation, directs a transition to EOP-1.2.

REFERENCES:

1. EOP-3.1, Uncontrolled Depressurization of All Steam Generators
2. EOP-3.1LP, Uncontrolled Depressurization of All Steam Generators Lesson Plan

K/A CATALOGUE QUESTION DESCRIPTION:

- W/E02 SI Termination
- Knowledge symptom based EOP mitigation strategies (3.1/4.0).

Answer: C

## 97. W/E05EA2.1 1 - SRO ONLY

The Crew has entered EOP-16.0 "Response to Pressurized Thermal Shock" due to an Orange path on the integrity CSF status tree. The Crew is at the step for Checking RCS Tcold Stable or Increasing.

While checking EFW flow it is determined that a Red path condition exists on the Heat Sink CSF status tree.

Which ONE of the following correctly describes the action that should be taken by the crew?

- A. Remain in EOP-16.0 until it is completed, then transition to EOP-15.0, Response to Loss of Secondary Heat Sink.
- B. Remain in EOP-16.0 until the Orange path is cleared, then transition to EOP-15.0.
- C. IMMEDIATELY transition to EOP-15.0.
- D. The transition to EOP-15.0 is NOT required since EOP 16.0 provides actions for adjusting EFW.

DISTRACTORS:

A Incorrect, a red path exists for heat sink and it has priority over integrity, the operator should transition immediately.

B Incorrect, a red path exists for heat sink and it has priority over integrity, the operator should transition immediately.

C Correct, the operator should transition to EOP-15.0 immediately.

D Incorrect, a red path exists for heat sink and it has priority over integrity, the operator should transition immediately. EOP-15.0 has a caution that states:

If total EFW flow is LESS THAN 450 gpm due to operator action, this procedure should NOT be performed, since these actions are NOT appropriate if 450 gpm EFW flow is available.

The stem does not support this and EOP-15.0 must be transitioned to for this CAUTION to apply.

REFERENCES:

1. EOP- 15.0, 16.0, 12.0. Summer Exam bank question EOPS 385.

K/A CATALOGUE QUESTION DESCRIPTION:

WE05EA2.1 Ability to operate and / or monitor the following as they apply to the (Loss of Secondary Heat Sink) Facility conditions and selection of appropriate procedures during abnormal and emergency operations. (3.4/4.4)

Answer: C

98. W/E09EA2.2 1 - SRO ONLY

A Reactor Trip with a loss of Off-site power has occurred. Power will not be restored for at least eight hours, and a cooldown is desired.

- RCS temperature is currently 557 oF
- Only one CRDM fan is operable.

Which ONE of the following correctly describes the actions to be taken in accordance with EOP-1.3 "Natural Circulation Cooldown"?

- A. Reduce RCS pressure to below 1925 psig, maintain RCS subcooling greater than 80 oF, cooldown shall not exceed 50 oF/hr.
- B. Maintain RCS pressure above 1925 psig, maintain RCS subcooling greater than 130 oF and cooldown shall not exceed 50 oF/hr.
- C. Reduce RCS pressure to below 1925 psig, maintain RCS subcooling greater than 130 oF, cooldown shall not exceed 25 oF/hr.
- D. Maintain RCS pressure above 1925 psig, maintain RCS subcooling greater than 80 oF and cooldown shall not exceed 25 oF/hr.

DISTRACTORS:

A Incorrect, RCS pressure should not be reduced, subcooling must be greater than 130oF.

B Correct, RCS pressure should be maintained above 1925, subcooling must be greater than 130oF, and cooldown is limited to 50oF/hr.

C Incorrect, RCS pressure should not be reduced, subcooling must be greater than 130 oF, and the cooldown is limited to 50 oF/hr.

D Incorrect, the cooldown is limited to 50 oF/hr.

REFERENCES:

1. EOP-1.3 Natural Circulation Cooldown.

K/A CATALOGUE QUESTION DESCRIPTION:

**WE09EA2.2** Ability to operate and / or monitor the following as they apply to the (Natural Circulation Operations) Adherence to appropriate procedures and operation within the limits in the facility's license and amendments. (3.4/3.8)

Answer: B

## 99. W/E12EG2.4.4 2 - SRO ONLY

Plant conditions are as follows:

- The Unit experienced a Steam Generator Tube Rupture (SGTR) on the "B" Steam Generator (SG).
- The crew is currently performing EOP-4.0, Steam Generator Tube Rupture, Step 3, Isolate flow from each RUPTURED SG.

When the crew transitioned from EOP-1.0 to EOP-4.0, FOUR (4) minutes ago, plant parameters were as listed below:

	<u>Loop A</u>	<u>Loop B</u>	<u>Loop C</u>
SG Pressure	800 psig	1200 psig	800 psig
SG NR Level	40%	80%	45%
SG PORV	SHUT	OPEN	SHUT
RCS Temperature	557 oF	556 oF	557 oF

RCS Pressure: 1350 psig

NOTE: ALL plant parameters were stable, with the exception of B SG NR Level, which was going UP.

CURRENT plant parameters are as follows:

	<u>Loop A</u>	<u>Loop B</u>	<u>Loop C</u>
SG Pressure	500 psig	1050 psig	750 psig
SG NR Level	20%	85%	45%
SG PORV	SHUT	SHUT	SHUT
RCS Temperature	520 oF	550 oF	550 oF

RCS Pressure: 1000 psig

ALL above parameters are all decreasing (going DOWN), with Loop A parameters decreasing faster than Loops B and C.

Which ONE of the following correctly describes the NEXT action the crew should take in accordance with Emergency Operating Procedures?

- A. IMMEDIATELY go to EOP-2.0, Loss of Reactor or Secondary Coolant.
- B. IMMEDIATELY go to EOP-3.0, Faulted Steam Generator Isolation.
- C. RETURN to EOP-4.0, Steam Generator Tube Rupture, Step 1.

D. COMPLETE EOP-4.0, Step 3 and THEN go to EOP-3.0, Faulted Steam Generator Isolation.

DISTRACTORS:

- A Incorrect. Plausible if applicant believes a LOCA is now in progress. A LOCA would be indicated by decreasing RCS pressure and Loop B SG pressure ONLY, NOT a large decrease in Loop A SG pressure, level, and RCS temperature.
- B Correct per EOP-4.0, Reference Page, Secondary Integrity Transition Criteria
- C Incorrect. Plausible because this is item 4 (Multiple Tube Rupture Criteria) on the EOP-4.0 reference page.
- D Incorrect. EOP rules of usage require immediate transition after performing applicable immediate actions. EOP-4.0 does not contain any immediate actions. Plausible if applicant believes that completely isolating the ruptured SG is a higher priority than isolating the faulted SG.

REFERENCES:

- 1. EOP-4.0, Steam Generator Tube Rupture, Reference Page, item 2, Secondary Integrity Transition Criteria.
- 2. EO-2, Usage of Emergency Operating Procedures.

K/A CATALOGUE QUESTION DESCRIPTION:

- W/E12 Steam Line Rupture - Excessive Heat Transfer
- G2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures (4.0/4.3).

Answer: B

100. W/E13EG2.2.25 1 - SRO ONLY

Which ONE of the following describes the basis for reducing the Power Range Neutron Flux High Trip Setpoint, in accordance with Summer Technical Specification Table 3.7-1, if one or more main steam line code safety valves are inoperable for more than 4 hours?

- A. To ensure that sufficient relieving capacity is available to limit secondary system pressure to within 110% of design pressure.
- B. To minimize the positive reactivity effects of the Reactor Coolant System cooldown associated with the blowdown of the INOPERABLE safety valve(s).
- C. To limit the pressure rise within the reactor building to within the values assumed in the accident analysis in the event of a steam line rupture within the reactor building.
- D. To ensure that pressure induced stresses in the steam generator with the INOPERABLE safety valve(s) do not exceed the maximum allowable fracture toughness stress limits.

DISTRACTORS:

A Correct per Summer Technical Specification Bases 3/4.7.1.1, page B 3/4 7-1, paragraph 2.

B Incorrect. Plausible because this is part of the basis for the operability of MSIVs and FWIVs.

C Incorrect. Plausible because this is part of the basis for the operability of the MSIVs and FWIVs.

D Incorrect. Plausible because this is the basis for the Steam Generator Pressure / Temperature limitation (3.7.2). Fracture toughness (brittle fracture) is not a concern at NOP/NOT.

REFERENCES:

1. Summer Technical Specification Bases 3/4.7.1.1, 3/4.7.1.5, 3/4.7.1.6, 3/4.7.2

K/A CATALOGUE QUESTION DESCRIPTION:

- W/E 13 Steam Generator Over-pressure.

G2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits (2.5/3.7).

Answer: A