1. 001 1
Answer: D
Unit 2 has been at 60% power for 3 days.
The following conditions exist:
□□Control Bank D is at 174 steps withdrawn.
□□Rod Control is in automatic.
□□RCS Auctioneered High Tave is 564 deg F and steady.

Control Bank D rods start withdrawing at 8 steps per minute. With Control Bank D at 177 steps, Rod Control is placed in Manual, and all rod motion stops.

Which ONE of the following describes why control rods will be inserted in manual to 174 steps withdrawn in accordance with 02-OHP-4022-012-003, Continuous Control Bank Movement?
A. To prevent reduced charging flow.

B. To prevent exceeding QPTR Limits.

C. To restore RCS pressure to normal.

D. To restore Tave to programmed band.

ANSWER: %Answer% - 60% power, programmed Tave is~ 563.2 degrees. Act. Tave is ~0.8 deg above program. When rods withdraw, power will rise, then the reactivity from the rise in temperature will cause power to return to ~ it's pre-withdraw power, with Tave higher. Auct. high Tave feeds other systems that rely on Tave to remain on program. Rods are reinserted to restore equilibrium.

A - Incorrect - Charging flow will rise to raise PZR level to higher setpoint established from higher Tave.
B - Incorrect - QPTR will not be significantly affected by withdrawing the rods in a group as designed.
C - Incorrect - Automatic pressure control system will raise spray flow temporarily to restore the higher pressure to 2235 psig.
Lesson Plan/Objective:RO-C-AOP-7/AOP7.6

Reference:02-OHP-4022-012-003, Continuous Control Bank Movement step 3, pg. 4
RO-C-AOP-7, Abnormal Operating Procedures-Day 7 pg. 21

Continuous Rod Withdrawal
Knowledge of the reasons for the following responses as they apply to the Continuous Rod Withdrawal:
Manually driving rods into position that existed before start of casualty
RO-3.2 SRO-3.6

2. 002 3
Answer: C
Unit 1 is in the process of starting up following an outage. Reactor trip breaker testing was taking place with power at 2%. A loss of offsite power results in the trip of all RCPs. Additionally, CRID 2 is lost when the CD EDG energizes T11D.

The following conditions exist:
□□Reactor trip breaker A - OPEN
□□Reactor trip bypass breaker A - OPEN
□□Reactor trip breaker B - OPEN
□□Reactor trip bypass breaker B - CLOSED
□□WR startup rate is -0.3 dpm
□□RCS T_{avg} is 547°F and lowering

Which ONE of the following is the NEXT action required of the operators and why?
A. Send an operator to locally verify reactor trip breakers are open because control room indications are NOT accurate with a loss of CRID 2.

B. Transition to 01-OHP-4023-FR-S.1, Response to Nuclear Power Generation/ATWS, because the reactor failed to trip.

C. Transition to 01-OHP-4023-E-0, Reactor Trip or Safety Injection, because the reactor has tripped.

D. Manually close the steam dump valves because they incorrectly opened due to the reactor trip breaker status.

ANSWER: %Answer% - The Plant has tripped. Only 1 trip breaker/bypass set is required to open to trip the plant. With the plant in Mode 2, 01-OHP-4023-E-0 is applicable.

A - Incorrect - Trip and Bypass indications are not affected by CRID 2.
B - Incorrect - The reactor has tripped. 01-OHP-4023-S.1 is not required.
D - Incorrect - The Steam dumps will close on the loss of power.(Loss of CW and loss of CRID 2)
Lesson Plan/Objective:RO-C-01200/11

Reference:RO-C-01200 Rod Control and Rod Position Indicating System pg. 14-15
OHI-4023 Abnormal/Emergency Procedure User's Guide Attachment 2 pg. 28

Reactor Trip
Knowledge of the interrelations between a reactor trip and the following:
Reactor trip status panel
RO-3.5 SRO-3.6

3. 003 4
Answer: A
Which ONE of the following describes the procedural actions in response to addressing a leaking Pressurizer (PRZ) PORV?

A. 1. All PORV block valves are initially closed to lower tailpipe temperature.
   2. One PORV block valve is opened at a time.
   3. Leakage is determined by a rise in tailpipe temperature after each PORV block valve is re-opened.

B. 1. PORV block valves are closed one at a time.
   2. Temperature on the tailpipe is monitored by the operator.
   3. Leakage is determined by a lowering of tailpipe temperature after each PORV block valve is closed.

C. 1. PORV block valves are closed one at a time.
   2. Temperature on the Pressurizer Relief Tank (PRT) is monitored by the operator.
   3. Leakage is determined by a lowering PRT temperature after each PORV block valve is closed.

D. 1. All PORV block valves are initially closed to stabilize Pressurizer Relief Tank (PRT) temperature.
   2. One PORV block valve is opened at a time.
   3. Leakage is determined by a rise in PRT temperature after each PORV block valve is re-opened.

ANSWER: %Answer% - The procedure requires that all PORV Block Valves be initially closed. Once tailpipe temperature is lowering, the block valves are opened 1 at a time to check for a rise in tailpipe temperature.

B - Incorrect - All Block Valves are initially closed.
C - Incorrect - All Block Valves are initially closed. PRT conditions are checked but not used to determine leaky valves.
D - Incorrect - PRT conditions are checked but not used to determine leaky valves.
Lesson Plan/Obj: RO-C-AOP-1/AOP1.17

Reference: OHP-4022-002-009, Leaking Pressurizer Power Operated Relief Valve

Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
Ability to operate and/or monitor the following as they apply to the Pressurizer Vapor Space Accident:
PZR spray block valve and PORV block valve

4. 004 3
Answer: B
The plant has experienced a large break LOCA. The reactor has tripped and an SI signal is present. Charging Pumps Suction from RWST IMO-910 opened BUT IMO-911 failed to open.

Which ONE of the following is the impact of this action on the Charging Pump suction flow?
A. Both operating charging pumps will receive suction flow from the VCT.

B. Both operating charging pumps will receive suction flow from the RWST.

C. One charging pump will continue to take suction from the VCT and one charging pump will take suction from the RWST.

D. One charging pump will take suction from the RWST. The other charging pump will have no suction until operator action is taken.

ANSWER: %Answer% - CVCS suction from the RWST is provided through the IMO-910 and IMO-911 valves which are in a parallel arrangement allowing either valve to provide suction to both pumps.

A - Incorrect - The VCT suction valves will isolate on a SI signal.
C - Incorrect - The VCT suction valves will isolate on a SI signal.
D - Incorrect - IMO-910 and IMO-911 valves which are in a parallel arrangement allowing either valve to provide suction to both pumps.

Lesson Plan/Objective:RO-C-00300/13

Reference: RO-C-00300, Chemical Volume Control System pg. 62 & 64
SOD-00300-01 Charging and Letdown System drawing

Large Break LOCA
Ability to operate and/or monitor the following as they apply to a Large Break LOCA:
Manual and/or automatic transfer of suction of charging pumps to borated source
RO-4.3 SRO-3.9

5. 005 1
Answer: A
Unit 2 Reactor Startup is in progress with Reactor Power at 2E-8 amps and rising.

The following conditions exist:
□□Annunciator Panel 207 Drop 62, RCP 3 Bearing Temp High, is alarming
□□Annunciator Panel 207 Drop 63, RCP 3 BRG Seal Water Temp High, is alarming
□□RCP No. 3 Lower Bearing water temperature is 228°F and rising.
□□RCP No. 3 Motor Bearing temperature is 174°F and stable.
□□RCP No. 3 Seal Leakoff temperature is 179°F and rising.
□□RCP No. 3 Seal Injection Flow is 10 gpm.

Which ONE of the following operator actions MUST be taken based upon these conditions?

A. Manually trip the reactor, Enter 02-OHP 4023.E-0, Reactor Trip or Safety Injection, perform immediate actions, then trip the No. 3 RCP.

B. Initiate reactor shutdown per 02-OHP 4021.001.003, Power Reduction and trip the No. 3 RCP after the reactor is shutdown.

C. Do NOT trip the reactor. Trip the No. 3 RCP and be in Hot Shutdown in 1 hour.

D. Do NOT trip the reactor. Trip the No. 3 RCP and close the No. 1 seal leakoff valve.

ANSWER: %Answer% - The Plant is not analyzed/licensed to operate with less than 4 RCPs. Lower bearing water temperature is > 225°F which requires a trip. The reactor must first be tripped and verified and then the RCP is tripped.

B - Incorrect - RCP Lower bearing temperature has exceeded the trip setpoint.
C - Incorrect - The Plant is not analyzed/licensed to operate with less than 4 RCPs. Tech Specs require Hot Standby in 1 hour.
D - Incorrect - The Plant is not analyzed/licensed to operate with less than 4 RCPs.

Lesson Plan/Objective:RO-C-AOP-4/AOP4.20

Reference:RO-C-AOP-4, Abnormal Operating Procedures – Day 4 pg. 58-59
02-OHP-4022-002-00, Malfunction of a Reactor Coolant Pump pg. 4 & 16 (Steps 1 and 14)

Reactor Coolant Pump (RCP) Malfunctions
Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions:
Consequences of an RCPS failure
RO-3.7 SRO-4.1

6. 006 2
Answer: D
Unit 1 Reactor power is at 50%.

The following conditions exist:
□□PRZ level is stable at program level
□□QRV-251 Charging Flow Controller is in MANUAL
□□Charging and letdown are balanced.

Which ONE of the following describes the effect on the plant if QRV-251 Charging Flow Controller remains in MANUAL and power is increased to 100%?
A. Charging flow will RISE.

B. Charging flow will LOWER.

C. PRZ level will LOWER.

D. PRZ level will RISE.

ANSWER: %Answer% - With QRV-251 Charging Flow Controller in Manual Charging flow will remain constant since RCS pressure is constant. As the RCS heats up the Pressurizer Level will rise as the water expands.

A - Incorrect - With QRV-251 Charging Flow Controller in Manual Charging flow will remain constant.
B - Incorrect - With QRV-251 Charging Flow Controller in Manual Charging flow will remain constant.
C - Incorrect - With QRV-251 Charging Flow Controller in Manual Charging flow will remain constant. As the RCS heats up the Pressurizer Level will rise as the water expands.

Lesson Plan/Objective:Lesson Plan/Objective: RO-C-00202 / #8

Reference : SOD-0202-003, Pressurizer Level Control

Loss of Reactor Coolant Makeup
Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup:
Reason for changing from manual to automatic control of charging flow valve controller
RO-2.9 SRO-3.0

7. 007 2
Answer: B
Per Technical Specifications, which ONE of the following conditions MEETS the associated MINIMUM requirement for the Borated Water Sources to be considered OPERABLE in Mode 3? (2-Figure 19.17 Boric Acid Storage Tank Volume is attached)

A. A flowpath to the Centrifugal Charging Pump (CCP) via Boric Acid Flow Control Valve, 2-QRV-421.

B. A Boric Acid Storage Tank solution temperature of 64°F.

C. A Boric Acid Storage Tank level of 70%.

D. A Boric Acid Storage Tank boron concentration of 6540 ppm.

ANSWER: %Answer% - Per TS 3.1.2.8 a Minimum solution temperature of 63°F is required for Operability.

A - Incorrect - The flowpath to the charging pump can take credit for 2-QMO-420 Emergency Boration Valve
C - Incorrect - a water volume of 8500 gallons is required which corresponds to ~72%
D - Incorrect - A concentration of 6550-6990 ppm is required.

Lesson Plan/Objective:RO-C-00300/16

Reference:SD-00300, Chemical and Volume Control System Description
Technical Specification 3.1.2.8 Borated Water Sources - Operating pg. 3/4 1-16
Technical Specification Bases 3/4.1.2 Boration Systems pg. 3/4 1-2, 1-3, & 1-4

Emergency Boration
Knowledge of the operational implications of the following concepts as they apply to Emergency Boration:
Low temperature limits for boron concentration
RO-2.8 SRO-3.6

Reference Provided 2-Figure 19.17 Boric Acid Storage Tank Volume

8. 008 1
Answer: A
During an ATWS event, the fuel cladding fission product barrier is severely challenged. Which ONE of the following conditions is the mechanism which causes the fuel/cladding challenge?
A. Fuel overheating from DNBR limits being exceeded.

B. High RCS pressure caused by high temperature.

C. Overpower of the fuel/fuel rod.

D. Excessive radial flux distribution.

ANSWER: %Answer% - If the DNBR decreases too far, the possibility exists that fuel damage will occur since the heat energy from the fuel is not efficiently removed.
B - Incorrect - RCS Pressure is a concern for vessel integrity but it will not lead to fuel damage.
C - Incorrect - Power of the fuel should not exceed normal power levels and will likely be less.
D - Incorrect - Radial flux distribution should not be affected.

Lesson Plan/Objective:RO-C-EOP04/6

Reference:RO-C-EOP04, Subcriticality CSFST, FR-S Series EOPs, and Background Information pg. 20

Anticipated Transient Without Scram (ATWS)
Knowledge of the operational implications of the following concepts as they apply to the ATWS:
Reactor nucleonics and thermo-hydraulics behavior
RO-2.8 SRO-3.1

9. 009 1
Answer: A
Core Alterations are in progress on Unit 2. RCS boron concentration has been verified to be 2360 ppm (two samples analyzed).

The crew is required to ...
A. suspend core alterations and positive reactivity changes, and initiate boration.

B. suspend core alterations and positive reactivity changes, and establish containment integrity.

C. suspend core alterations and remove all personnel from the containment building.

D. remove all personnel from the containment building, establish containment integrity, and initiate boration.

ANSWER: %Answer% - Technical Specification 3.9.1 requires either Keff <.95% or 2400ppm concentration. 02-OHP-4030-227-037 requires the most conservative of the Keff or 2400 ppm.

B - Incorrect - Containment Integrity is not required.
C - Incorrect - Containment evacuation is not required.
D - Incorrect - Containment evacuation and Containment Integrity are not required.

Lesson Plan/Objective:RO-C-ADM13/ADM13.3.0

Reference: 02-OHP-4030-227-037 Refueling Surveillance pg. 4 & 34 (Steps 3.2 and DS-3 Step 1)
Technical Specification 3.9.1 Refueling Boron Concentration pg. 3/4 9-1

Fuel Handling Incidents
Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents:
SDM
RO-3.4 SRO-3.8

10. 010 1
Answer: B
During power operation, SG tube leakage was detected and estimated at 50 gpm when RCS pressure was 2200 psig and SG pressure was 800 psig. The plant was shutdown and a cooldown initiated.

Which ONE of the following is the approximate current leak rate if RCS pressure is 1700 psig and SG pressure is 1000 psig? Assume the break size has not changed.

A. Approximately 50% of the initial leak rate (~25 gpm)

B. Approximately 70% of the initial leak rate (~35 gpm)

C. Approximately 140% of the initial leak rate (~70 gpm)

D. equal to the initial leak rate (~50 gpm)

ANSWER: %Answer% - Break flow is Proportional to the Square Root of the Pressure Differential. $Flow_{\text{int}} \propto \sqrt{(2200-800}$

$Flow_{final} \propto \sqrt{(1700-1000)}$

$Flow = \sqrt{(1700-1000)/(2200-800)}\ \text{x}\ 50 = .707\ \text{x}\ 50 \cong 35.5$

Flow is ~70% of initial or 35 gpm

A - Incorrect - Differential pressure is 1/2 of original but break flow should be proportional to the square root of DP.
C - Incorrect - This swaps the order of the pressures 1400/700 = 2 and the square root of 2 is 1.41.
D - Incorrect - This is original value. The DP changed and so does break flow.

Lesson Plan/Objective: RO-C-GF27 / #10

Reference: RO-C-EOP05, SI Termination, ECCS Flow Reduction, and SI Reinitiation and Actuation; RO-C-GF27, Sensors and Detectors

Steam Generator (S/G) Tube Leak
Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Leak:
Leak rate vs. pressure drop
RO-3.5 SRO-3.9

11. 011 1
Answer: A
The control room operators are responding to a SGTR. They have identified and isolated the ruptured S/G.

During the briefing for the initial RCS cooldown, the SRO states that the RCPs should be stopped and natural circulation should be established prior to the cooldown.
The RO states that the RCPs should remain running and forced reactor coolant circulation should be used during the cooldown.

Which ONE of the following identifies which crew member is correct and why?

A. The RO -- because forced circulation will reduce susceptibility to pressurized thermal shock and minimize boron dilution concerns.

B. The RO -- because with a SG tube rupture, natural circulation conditions will be difficult to establish.

C. The SRO -- because once natural circulation is established the ruptured SG will not cooldown and depressurize thereby limiting the total amount of leakage.

D. The SRO -- because natural circulation will preclude any damage to the RCP's and minimize RCS pressure perturbations.

ANSWER: %Answer% - Forced circulation will provide better mixing and a uniform RCS cooldown rate. If the RCPs are stopped the loop flows on natural circulation will be greatly reduced and cold SI water being injected near the isolated SG may collect near the vessel downcomber and lead to a pressurized thermal shock condition.

A - Incorrect - Natural circulation can be established during a SGTR and is the case used for most design analysis (loss of offsite power).
C - Incorrect - The cooldown and depressurization of the ruptured SG will be slightly less with natural circulation but it will take longer so the total leakage will be greater.
D - Incorrect - Damage to the RCPs is not a concern until depressurization and then only if the RCS is severely depressurized. The RCPs operating will provide a more balanced cooldown and pressure control.

Lesson Plan/Objective: RO-C-EOP08 / #10

Reference: RO-C-EOP08, SGTRs, E-3 Series EOPs, and Background Information

Steam Generator Tube Rupture (SGTR)
Knowledge of the operational implications of the following concepts as they apply to the SGTR:
Natural circulation
RO-3.9 SRO-4.2

12. 012 4
Answer: A
During performance of 02-OHP-4023-ES-3.1, Post SGTR Cooldown Using Backfill the ruptured steam generator narrow range level was found to be less than 26%. The operators were instructed to refill the steam generator to 62%.

What is the concern with ruptured steam generator level less than required?

A. Uncovering the U-tube could result in an uncontrolled depressurization of the ruptured steam generator causing a reinitiation of the primary to secondary leak.

B. The broken tube could be uncovered allowing steam to flow into the RCS resulting in steam binding of the RCPs.

C. The feed ring could uncover, resulting in a water hammer and aggravating the tube damage whenever AFW is initiated subsequently.

D. SG level must remain in the narrow range, or AFW must be > 25,000 lb/hr to prevent SG dry out.

ANSWER: %Answer%: When SG level is in the narrow range, the steam region in the ruptured SG is insulated from the colder water in the U-Tubes region by a layer of warm water. This maintains SG pressure. If level drops the Steam can condense on the cooler surface of the U-Tubes.

B - Incorrect - The steam would condense in the cooler water and the volume of steam would not be great enough to impede the RCPs.
C - Incorrect - Water from AFW or FW Systems enters SG feed ring and then flows down between SG shell & tube wrapper in the SG downcomber
D - Incorrect - The intact SGs provide adequate Heat Sink. SG dryout is a concern if cold water is later introduced. With a ruptured SG, the RCS would reenter the SG.
Lesson Plan/Objective:RO-C-EOP08/#18

Reference:PSBD (Rev. 1), 12-OHP-4023-ES3.1, Background Volume ES-3.1, Page 16, "EOP Step 6 Basis"

Steam Generator Tube Rupture (SGTR)
Knowledge of the reasons for the following responses as they apply to the SGTR:
Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures
RO-4.2 SRO-4.5

13. 013 4
Answer: C
Unit 2 has experienced a steamline break. None of the main steam isolation valves can be closed. 02-OHP-4023-ECA-2.1, "Uncontrolled Depressurization of all Steam Generators," has been implemented.

Which ONE of the following statements is correct regarding Attachment A, Local SG Isolation?
A. Isolation of both steam supply lines to the TDAFP is allowed, regardless of the status of the other sources of feed flow to the SGs, since no secondary heat sink is intact.

B. Integrity must be restored to all SGs, before the operator can transition to E-2, Faulted Steam Generator Isolation, via the foldout page.

C. Valves are closed one loop at a time in order to restore integrity to at least one SG as early as possible.

D. The Operator is allowed to place the Stop Valve Dump Valve control switches to LOCKOUT only if the selected valve is NOT accessible for local isolation.

ANSWER: %Answer%
Valves are closed one loop at a time in order to ensure a complete, local check of the valves for each SG to restore integrity to at least one SG as early as possible.

A - Incorrect - Isolation of both TDAFP steam lines is NOT allowed if it is the only source of FW.
B - Incorrect - If integrity is restored to any SG the transition is made.
D - Incorrect - This action may be required if the Dump valves require manual Closure to override standing Automatic closure signal.
Lesson Plan/Objective:RO-C-EOP07/#16

Reference:PSBD Rev. 3 12-OHP-4023-ECA-2.1 Background Document Step 1 Basis pg. 6 and Attachment A Basis pg. 81

Steam Line Rupture
Knowledge of the interrelations between the Steam Line Rupture and the following:
Valves
RO-2.6 SRO-2.5

14. 014 1
Answer: B
The control room operators are responding to a RED condition on the heat sink status tree. While they attempt to restore feed flow to a S/G, conditions degrade to the point that RCS bleed-and-feed must be established.

The reason RCS bleed and feed must be established QUICKLY is to prevent:

A. A rapid RCS overpressurization, followed by a rapid RCS depressurization due to RCP seal failures.

B. The inability to provide sufficient injection flow for core cooling due to high RCS pressure.

C. An overpressurization challenge to the reactor vessel.

D. High temperature and pressure failure of Steam Generator tubes.

ANSWER: %Answer%
ECCS flow will be limited by RCS pressure. Performing the steps quickly limits the RCS pressure rise due to loss of heat Sink.

A - Incorrect - A rapid Pressure increase is NOT expected. Seal failure is not expected due to a pressure rise.
C - Incorrect - RCS Overpressurization is protected against by the Pressurizer PORVs and Safeties.
D - Incorrect - SG to RCS Differential pressure is normally limited to 1600 psid. This is not expected to be exceeded (SG at ~ 1000 psig).

Lesson Plan/Objective:RO-C-EOP11/11

Reference:PSBD Rev. 2 12-OHP-4023-FR-H.1 Background Document Step 18 Caution 1 Basis pg. 39
RO-C-EOP11 Heat Sink CSFST, FR-H Series EOPs, and Background Information pg. 26, 27, 32, & 38

Loss of Main Feedwater (MFW)
Ability to operate and/or monitor the following as they apply to the Loss of Main Feedwater (MFW):
HPI, under total feedwater loss conditions
RO-4.4 SRO-4.5

15. 015 2
Answer: C
Unit 1 has just entered mode 3 following a maintenance outage to replace a leaky fuel assembly. During work on the East RHR pump, an accidental spill causes radiation levels to increase.

The following radiation channels have alarmed:
□□ERA-7305 U1 East RHR Pump Room - RED
□□VRS-1505 Unit Vent Effluent Low Range Noble Gas - RED

Which ONE of the following is true regarding system operations based on these conditions?
A. The Auxiliary Building Supply fans have automatically tripped.

B. The AES Fan Charcoal Filter has automatically aligned.

C. The AES Fan Charcoal Filter must be manually placed in service.

D. The Auxiliary Building Supply fans must be manually tripped.

ANSWER: %Answer%
If the alarm actuates on the ERA-7300 pump rooms the Operator is required to place the AES Fan Charcoal Filter test Selector Switch to the CHAR FILT position.

A - Incorrect - Auxiliary Building Supply fans are not automatically tripped. (Fuel Pool area fans are tripped on local radiation)
B - Incorrect - The dampers realign for flow through the charcoal filter bed when actuation by the manual selector switch or a Phase B actuation signal occurs.
D -Incorrect - Auxiliary Building Supply are not stopped.
Lesson Plan/Objective: RO-C-02801B/9

Reference: 12-OHP-4024-139, Annunciator Response: Radiation Drop 11 ERS-7300, Data Aquisition Module
Accidental Liquid Radwaste Release
Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following:
Radioactive-gas monitors
RO-2.7 SRO-2.7

16. 016 2
Answer: C
During a Large Break LOCA, an evaluation of plant status is made during Step 11 of 01-OHP-4023-E-1, Loss of Reactor or Secondary Coolant. Part of this evaluation includes a check of ECCS pump compartment sump alarms and auxiliary building vent stack and area radiation monitors.

Which ONE of the following reasons describes the BASIS for checking these radiation monitors?
A. Determine if local actions can be performed without excessive personnel exposure.

B. Determine if ECCS leakage exceeds that assumed in the control room dose analysis.

C. Determine if a transition should be made to address a LOCA outside of Containment.

D. Collect current radiation values to assist in Emergency Event classification.

ANSWER: %Answer%
Plant sump alarms and radiation monitors are both checked to identify leakage in the auxiliary building. this check is made to determine if the operator should make a transition to 01-OHP-4023-ECA-1.2, LOCA Outside Containment.

A - Incorrect - In-Plant operators are dispatched with radiation protection techs that assess the plant conditions with hand held instruments.
B - Incorrect - Ongoing plant leakage from ECCS equipment is tracked to ensure that assumptions are met.
D - Incorrect - This assessment is done outside of the emergency operating procedure set (EOPs).
Lesson Plan/Objective:Ro-C-EOP09/36

Reference: PSBD Rev. 2, 12-OHP-4023-E-1 Background Document, EOP Step 11 Basis pg. 27

Accidental Liquid Radwaste Release
Knowledge of the reasons for the following responses as they apply to the Accidental Liquid Radwaste Release:
Actions contained in EOP for accidental liquid radioactive-waste release
RO-3.8 SRO-4.3

17. 017 4
Answer: D
Unit 1 and Unit 2 were operating at 100% power with the Unit 1 and Unit 2 East Essential Service Water (ESW) pumps running with the Unit Crossties open.

Given the following sequence of events:
- Unit 2 tripped due to a turbine Electro-Hydraulic Control oil leak.
- Unit 1 remained on line.
- The Unit 2 Reserve Transformers are unavailable.
- Both Unit 2 Emergency Diesel Generators (EDGs) started.
- Buses T21A, T21B, and T21C were energized from the EDGs.
- Bus T21D failed to energize.

Assuming NO operator actions, which ONE of the following describes the ESW cooling water status for the Unit 2 EDGs?

A. 2CD EDG must be tripped immediately as ESW cooling has been lost.

B. 2CD EDG has ESW cooling supplied by the Unit 2 West ESW Pump.

C. 2AB EDG must be tripped immediately as ESW cooling has been lost.

D. 2CD EDG has ESW cooling supplied by the Unit 1 West ESW Pump.

ANSWER: %Answer% - When bus T21D is lost the Unit 2 East ESW Pump Trips, this will cause a low header pressure condition and automatically start the Unit 1 West ESW pump to Supply 2CD EDG with ESW cooling.

A - Incorrect - The Unit 1 West ESW pump will supply ESW Cooling water.
B - Incorrect - The 2CD Diesel Generator could be supplied if the alternate ESW supply was manually opened (recent change).
C - Incorrect - Diesel Generator 2AB has cooling from the auto start of the Unit 2 West ESW Pump (Would also have cooling from the Unit 1 East ESW).

Lesson Plan/Objective: RO-C-01900 / #11

Reference:RO-C-01900 TP-11, Unit 1 Essential Service Water
RO-C-01900 TP-12, Essential Service Water System Overview

Loss of Nuclear Service Water
Ability to operate and/or monitor the following as they apply to the Loss of Nuclear Service Water (SWS):
Loads on the SWS in the control room
RO-3.2 SRO-3.3

18. 018 3
Answer: B
Unit 1 has experienced a Reactor Trip. A Safety Injection was actuated when Pressurizer PORV, NRV-151, opened and did not reclose. Subsequently, the PORV Isolation NMO-151 was closed. The Crew has reset SI and Phase A Containment Isolation and attempted to restore Control Air to Containment by placing control switches for XCR-100, 101, 102, and 103 to the open position.

The following conditions exist:

	Indicating Light	
	Green	Red
□□XCR-100 Control Air Supply Header No. 2	NOT LIT	NOT LIT
□□XCR-101 Control Air Supply Header No. 2	NOT LIT	LIT
□□XCR-102 Control Air Supply Header No. 1	NOT LIT	NOT LIT
□□XCR-103 Control Air Supply Header No. 1	NOT LIT	LIT

□□All Containment Air Pressure Low Alarms - LIT

Which ONE of the following describes the cause of these conditions and the current status of the plant?

A. Phase A has failed to RESET causing a loss of RCS pressure control (PORVs and Sprays won't open).

B. Power has been lost to Train A Air Supply Valves causing a loss of Letdown.

C. Power has been lost to Train B Air Supply Valves causing a loss of Seal Injection.

D. An air leak inside containment has caused isolation of Air Supply valves causing a loss of CCW to the RCPs.

ANSWER: %Answer% - The Letdown line is isolated by air inside containment operated valves QRV-111, 112, 160, 161, and 162.

A - Incorrect - The Pressurizer PORVs, NRV-152 and NRV-153, have backup Air Supplies.
C - Incorrect - RCP Seal Injection is not isolated and Seal Return QCM-250 and QCM-350 are motor operated valves. RCP Seal Leakoff valves QRV-10, 20, 30, and 40 are fail open.
D - An Air would not automatically isolate the air supply. CCW valves to RCPs CCM-458 and CCM-459 would not have isolated and these are motor operated valves. CCW from RCPs CCM-451, 452, 453, and 454 are motor operated valves closed by Phase B.

Lesson Plan/Objective: RO-C-AOP-8 / #17

Reference: 01-OHP-4022-064-002, Loss Of Control Air Recovery, Attachments B-1, 2, and 6
Loss of Instrument Air
Ability to determine and interpret the following as they apply to the Loss of Instrument air: Cause and effect of low-pressure instrument air alarm
RO-2.9 SRO-3.2

19. 019 3
Answer: C
Which ONE of the following states the reason for depressurizing all intact steam generators as directed by OHP 4023-FR-C.1, Response to Inadequate Core Cooling?

A. Allow more feedwater into the steam generators to enhance Natural Circulation.

B. Inject a sufficient quantity of borated water to provide adequate shutdown margin.

C. Allow the SI Accumulators and the RHR system to inject water into the core.

D. Establish sufficient subcooling to maximize Natural Circulation flow.

ANSWER: %Answer%
The rapid depressurization of the secondary is the most efficient way to reduce primary pressure. Since the High head ECCS pumps are not injecting the attempt is made to lower pressure and inject the Accumulators and allow RHR pumps to inject.

A - Incorrect - In an Inadequate Core Cooling event, RCS inventory is lost to the point that Natural Circulation can no longer remove the heat load and the cooling mechanism shifts to Reflux Cooling.
B - Incorrect - Shutdown Margin is not a concern with Inadequate Core Cooling. If Shutdown margin was lost it would trigger the higher priority Subcriticality FRP.
D - Incorrect - In an Inadequate Core Cooling event, RCS inventory is lost to the point that Natural Circulation can no longer remove the heat load and the cooling mechanism shifts to Reflux Cooling.
Lesson Plan/Objective: RO-C-EOP10/#13

Reference: PSBD rev. 4 12-OHP-4023-FR-C.1 Background Document EOP Step #15 Basis

Inadequate Core Cooling
Knowledge of the interrelations between the Inadequate Core Cooling and the following:
LPI pumps
RO-3.9 SRO-4.1

20. 020 2
Answer: D
Unit 2 was operating at 100% power when a RCS leak developed. The Operators have entered 02-OHP 4022-002-020, Excessive RCS Leakage.

The following conditions exist:
- Letdown flow is isolated.
- East and West Charging pumps are operating.
- Charging flow is 180 gpm.
- Pressurizer level is 51% and constant.
- VCT makeup is in service at the maximum rate.
- VCT level is 22% and lowering.
- Containment pressure is 0.5 psig and constant.

Which ONE of the following describes the required operator action and why?

A. Align CCP suction to the RWST and perform a controlled rapid shutdown per 02-OHP-4022-001-006 Rapid Power Reduction Response, to maintain RCS Tavg-Tref.

B. Restore 75 gpm letdown to ensure proper regen heat exchanger warming of the charging flow.

C. Perform a controlled rapid shutdown per 02-OHP-4022-001-006 Rapid Power Reduction Response since RCS leakage is greater than the Technical Specification Limit.

D. Trip the reactor and transition to 02-OHP-4023-E-0, Reactor Trip or Safety Injection since VCT level can NOT be maintained.

ANSWER: %Answer%
Leakage in excess of VCT makeup will lead to eventual loss of CCP suction. This would be mitigated by the refueling water sequence swapover to the RWST suction source but this would result in excessive boration of the RCS.

A - Incorrect - The procedure directs a Reactor Trip. Temperature control would be extremely difficult.
B - Incorrect - Letdown was isolated to allow Pressurizer level to be stabilized.
C - Incorrect - The procedure directs a Reactor Trip. The VCT would be drained at this rate.
Lesson Plan/Objective: RO-C-AOP-2/AOP2.19

Reference:RO-C-AOP-2, Abnormal Operating Procedures - Day 2 pg. 41
02-OHP-4022-002-020, Excessive Reactor Coolant Leakage pg. 2 and 3

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 coolant inventory
RO-4.3 SRO-4.4

21. 021 1
Answer: C
During startup, the following plant conditions exist:
□□RCS pressure is 2200 psig.
□□RCP seal injection flow to each pump is 8 gpm.
□□RCP #1 seal leakoff valves are open.
□□RCP #1 seal leakoff flow rate is 1.75 gpm.
□□RCP #1 pump motor bearing water temperature is approaching the high alarm.

How would the RCP be affected if QRV-150, RCP #1 seal bypass valve, was opened under these conditions?
A. Pressure to the seal return line to the VCT is lowered causing flow across #2 seal to drop.

B. Full RCS pressure is applied to the #3 Seal causing it to become the primary seal.

C. Temperature extremes on the shaft could result in damage to the RCP.

D. Increased flow around the #1 seal will aid in motor bearing cooling.

ANSWER: %Answer%
Opening the valve at NOP would result in a higher flowrate that would be detrimental to the shaft. This would cause temperature extremes over a small area that could lead to bending the shaft. Additionally, this could cause thermal shocking of the seals and shaft on a loss of seal injection.

A - Incorrect - Bypassing the #1 seal should raise the pressure in the VCT return line.
B - Incorrect - #3 seal will NOT see full pressure.
D - Incorrect - Motor bearing temperatures will not be affected.
Lesson Plan/Objective:RO-C-00201/#4

Reference:RO-C-00201 Reactor Coolant Pump System pg. 11, 28, and 29
RO-C-00201 Reactor Coolant Pump System transparencies TP-9 and TP-10

Reactor Coolant Pump System (RCPS)
Ability to manually operate and/or monitor in the control room:
RCP seal bypass
RO-2.6 SRO-2.6

22. 022 2
Answer: C
Unit 1 was operating at 100% power. The West CCP had been tagged out due to a bearing failure.

The following sequence of events occurs:
- A reactor trip and safety injection occurs in response to a Steam Generator Tube Rupture.
- SI is reset.
- The T11D, 4kV AC ESF Bus subsequently loses normal power but is re-energized by the 1CD Emergency Diesel Generator.
- T11D Automatic load sequencing is complete.

Which ONE of the following statements correctly describes the status the East CCP?

The East CCP ...
A. has tripped and automatically restarted.

B. was NOT affected by the loss of Bus T11D.

C. has tripped and may be manually started immediately.

D. has tripped and may NOT be manually started until the load conservation signal resets.

ANSWER: %Answer%
The ECCS timer and SI signals are the only auto starts for the CCPs. The pumps will NOT automatically start following a load shed. The East CCP is powered from T11D while the West CCP is powered from T11A.

A - Incorrect - The pumps will NOT automatically start following a load shed.
B - Incorrect - The East CCP is powered from T11D.
D - Incorrect - The CCP is not prevented from starting due to a load shed.

Lesson Plan/Objective:RO-C-00300/#14 (#9)

Reference: RO-C-00300 Chemical Volume Control System pg. 32
SD-00300 Chemical Volume Control System Description pg. 37

Chemical and Volume Control System (CVCS)
Knowledge of bus power supplies to the following:
Charging pumps
RO-3.3 SRO-3.5

23. 023 1
Answer: D
Hydrogen is supplied to the Volume Control Tank (VCT).

This design feature of the CVCS system is provided to...
A. lower iodine levels in the RCS.

B. control the pH in the RCS.

C. increase demineralizer efficiency for corrosion products.

D. minimize oxygen in the RCS.

ANSWER: %Answer%
Hydrogen is used to scavenge dissolved oxygen from the RCS.

A - Incorrect - Hydrogen does not impact iodine levels.
B - Incorrect - Lithium is used for pH control
C - Incorrect - Hydrogen does not impact demineralizer efficiency
Lesson Plan/Objective: RO-C-00300/#8

Reference:RO-C-00300 Chemical Volume Control System pg. 43 and 44
SD-00300 Chemical Volume Control System Description pg. 29, 67, and 104

Chemical and Volume Control System (CVCS)
Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following:
Oxygen control in RCS
RO-2.8 SRO-3.3

24. 024 6
Answer: B
During implementation of 02-OHP-4023-FR-Z.1, Response to High Containment Pressure, the operators are directed to check for 02-OHP-4023-ECA-1.1, Loss of Emergency Coolant Recirculation, actions NOT in effect.

The reason for this verification is that in procedure 02-OHP-4023-ECA-1.1:

A. the initiation of RHR spray is performed prior to 50 minutes following the event to aid in reducing containment pressure.

B. containment pressure is allowed to rise slightly to account for reduced operation of containment spray pumps.

C. containment pressure is allowed to rise to 12 psig with NO containment spray pumps operating.

D. the steam generators are NOT isolated even if faulted to allow for additional RCS cooldown.

ANSWER: %Answer%
Procedure 02-OHP-4023-ECA-1.1 uses less restrictive criteria, which permits reduced spray pump operation depending on RWST level and containment pressure. This is done to conserve RWST inventory.

A - Incorrect - RHR Spray is Never aligned any earlier than 50 minutes.
C - Incorrect - Containment pressure is only allowed to increase to 8 psig with NO Containment Spray Pumps.
D - Incorrect - Faulted SGs would still be isolated.
Lesson Plan/Objective:RO-C-EOP13/#7

Reference:PSBD Rev 2, 12-OHP-4023-FR-Z.1, Background Document pg. 5 Step 2 Basis
02-OHP-4023-ECA-1.1 Loss of Emergency Coolant Recirculation Step 4 pg. 3
RO-C-EOP13, Containment CSFST, FR-Z Series EOPS, and Background Information pg. 26 and 27

Emergency Core Cooling System (ECCS)
Knowledge of the effect that a loss or malfunction of the ECCS will have on the following:
Containment
RO-4.2 SRO-4.4

25. 025 4
Answer: C
Unit 2 was operating at 100% power

The following alarms are received:
- Panel 204
  - Drop 88 - West CCW Surge Tank LVL HI OR LOW
  - Drop 98 - East CCW Surge Tank LVL HI OR LOW
- Panel 207
  - Drop 7, RCP #1 Thermal Barrier Clg Wtr D/P High
  - Drop 8, RCP #1 Thermal Barrier Clg Wtr Temp High
  - Drop 9, RCP #1 Thermal Barrier DP Low
- Panel 238
  - Drop 10, R-17A East CCW Header High Radiation

Which ONE of the following statements is the required action and why? The required actions are to verify CCW vent (2-CRV-412) shut, notify Chem. Lab and RP of high activity, and...
A. trip the reactor and #21 RCP then enter E-0 since the #1 RCP seal has failed.
B. monitor RCP Bearing temperatures since CCW lines in containment have ruptured.
C. close RCP thermal barrier valves (2-CCM-453 and 454) since the #21 RCP thermal barrier has failed.
D. remove letdown from service and place excess letdown in service since the letdown heat exchanger has failed.

ANSWER: %Answer%
Panel 207 Drops 7, 8, & 9 indicate a failure of the RCP Thermal Barrier. These alarms along with the others (Surge tank level and radiation) indicate the need to close the CCW from RCP Thermal Barrier Valves as per 02-OHP-4022-016-003 steps 1 & 2.

A - Incorrect - RCP Seal failure should not impact Surge tank level and temperature.
B - Incorrect - CCW line rupture in Containment would NOT result in High CCW radiation.
D - Incorrect - Letdown would NOT cause Thermal barrier alarms.
Lesson Plan/Objective:RO-C-AOP-4/AOP 4.16 (AOP 4.17)

Reference:02-OHP 4022.016.003, CCW In-Leakage Procedure (Steps 1 -2) pg. 3 and 4
RO-C-AOP-4, Abnormal Operating Procedures - Day 4 pg 47

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 malfunctions or operations:
Consequences of high or low CCW flow rate and temperature; the flow rate at which the CCW standby pump will start RO-2.5 SRO-2.8 Similar to Master Bank question 12AOPS0417-1

REFERENCES: 01-OHP 4022.016.003, CCW In-Leakage Procedure, Rev. 4

26. 026 5
Answer: A
A steamline break has occurred on Unit 1 SG #11. The break was isolated and Safety Injection (SI) has just been terminated.

The following plant conditions exist:
- East CCP aligned to VCT with normal charging and letdown in service
- SI and RHR pumps shutdown
- RCPs are stopped
- Pressurizer pressure = 1800 psig and rising
- Pressurizer level = 64% and rising
- RCS Core Exit temperature = 503°F and rising
- Containment pressure = 0.1 psi

SG	11	12	13	14
Levels (NR)	0%	13%	20%	20%
Pressures (psig)	0	825	830	830

Which ONE of the following actions are required for plant recovery and why?
A. Open SG PORVs to stabilize the heatup to prevent pressurizer overfill.
B. Raise Charging flow to raise the Pressurizer level to 82% to enable RCP start.
C. Reinitiate High Head SI flow to stop the heatup.
D. Close SG PORVs to allow plant to return to normal temperature and pressure.

ANSWER: %Answer% - Opening the SG PORVs will stabilize the plant heatup and limit the rise in PRZ level (due to RCS expansion).

B - Incorrect - Pressurizer Level is only increased to 82% for an RCP start in the case of RCS voiding. The RCS is adequately subcooled in this situation.
C - Incorrect - High head SI flow is not required to stabilize heatup. High Head SI flow will increase RCS Volume and contribute to the likelihood of an overpressurization of the RCS.
D - Incorrect - Allowing Temperature and pressure to return to normal is undesirable given these conditions.

Lesson Plan/Objective: RO-C-EOP07 / #9

Reference : PSBD Rev. 2 12-OHP-4023-ES-1-1, SI Termination Background Document Step 13 Basis pg. 23
RO-C-EOP07 secondary Side Breaks, E-2 Series EOPs, and Background Information pg. 58, 59, and 61

SI Termination
Knowledge of the reasons for the following responses as they apply to the SI Termination:
Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics
RO-3.3 SRO-3.6

27. 027 1
Answer: C
The crew has entered OHP-4023-FR-C-2, Response to Degraded Core Cooling.

The following conditions exist:
□□RCS Hot Leg Temperatures are 300°F.
□□RVLIS NR indications are 37%.

Which ONE of the following would be most effective in restoring core cooling?
A. Depressurizing SGs to Atmospheric Pressure.

B. Aligning BIT flow from the Opposite Unit.

C. Starting a Residual Heat Removal Pump.

D. Starting a Reactor Coolant Pump.

ANSWER: %Answer% - An RHR pump will provide the greatest injection flow to restore inventory and thus will restore core cooling. At this temperature with the RCS Saturated, pressure will be less than 60 psig resulting in ~3000 gpm from the RHR pump.

A - Incorrect - Further depressurization of the SGs will not significantly add to RCS cooling. With RCS hot leg temperatures at 300°F SG pressures would be ~52 psig. The RCS needs inventory makeup to restore cooling.
B - Incorrect - BIT flow from the opposite unit will be limited to ~ 50 gpm.
D - Incorrect - Without makeup to the RCS starting the RCPs will not significantly add to core cooling.

Lesson Plan/Objective: RO-C-EOP10 / #5

Reference: RO-C-EOP10, Core Cooling and Inventory Critical Safety Functions, FR-C and FR-I Series Procedures, and Background Information pg. 67, 68, and 78
PSBD Rev. 2 12-OHP-4023-FR-C-2, Response to Degraded Core Cooling Background Document Step 19 and 20 Basis pg. 37 and 40

Degraded Core Cooling
Knowledge of the operational implications of the following concepts as they apply to the Degraded Core Cooling:
Components, capacity, and function of emergency systems
RO-3.6 SRO-4.0

28. 028 2
Answer: C
Unit 2 is responding to a Saturated Core Cooling condition IAW 02-OHP-4023-FR-C-3, due to a loss of subcooling following a Reactor Trip and Safety Injection.

The following conditions exist:
□□RCS Subcooling - 0°F
□□RCS Temperature - 620°F
□□RCPs - STOPPED
□□RVLIS Narrow Range - 80%

Which ONE of the following choices provides the expected indication of ECCS flow to the RCS, under these conditions?
A. RHR pump discharge flow reads 500 gpm on 2-IFI-310 flow meter.

B. SI pump discharge flow reads 60 gpm on 2-IFI-266 flow meter.

C. Charging pump flow reads 95 gpm on each BIT flow meter.

D. All SI Accumulator pressures dropping slowly.

ANSWER: %Answer%
At 620°F, the RCS pressure is 1772 psig (1787 psia). The charging pumps are the only pumps capable of injecting at this pressure.

A - Incorrect - RHR pumps shutoff head of 200 psid would not allow injection until RCS pressure was much lower.
B - Incorrect - SI pumps shutoff head of 1566 psig would not allow injection until RCS pressure was lower.
D - Incorrect - Accumulator normal pressure band is 620-650 psig, so they would not be able to inject until RCS pressure was below that of the accumulators.

Lesson Plan/Objective:RO-C-00800/#6

Reference:SD-00800 Emergency Core Cooling System Description pg. 27, 38, and 41
RO-C-EOP10, Core Cooling and Inventory Critical Safety Functions, FR-C and FR-I Series Procedures, and Background Information pg.31

Saturated Core Cooling
Ability to operate and/or monitor the following as they apply to the Saturated Core Cooling:
Operating behavior characteristics of the facility
RO-3.2 SRO-3.7

29. 029 1
Answer: A
The following conditions exist:
□□Reactor has tripped from 100% power due to a loss of off-site power.
□□Natural circulation has been verified.

Which ONE of the following describes the response of core Delta-T if the plant remains in hot standby?
A. Delta T will lower due to the smaller heat generation over time.

B. Delta T will rise as the water in the SGs heats up.

C. Delta T will rise due to lack of cooling to the upper vessel head.

D. Delta T will lower due to the addition of cold AFW to the SGs.

ANSWER: %Answer% - Decay heat production lowers over time. Delta T across the core is determined by the temperature cold leg temperature and the temperature of the fluid exiting the core. Since the fluid exiting the core is subjected to less heating the DT will lower.

B - Incorrect - To maintain natural circulation heat is removed from the SGs so they would not be expected to heat up. Even if they did this would effect the temperature differential between the SG and RCS but not the Delta T across the core.
C - Incorrect - The Reactor vessel head will cool slower than the rest of the vessel due to lower flow. This will not affect the temperature of the water exiting the core (Core Exit Temps).
D - Incorrect - Delta T across the core is determined by the cold leg temperature and the temperature of the fluid exiting the core. The cold AFW may cause cooler water to enter the core but the Delta T is determined by the amount of heat the core adds.

Lesson Plan/Objective:RO-C-EOP03 / #7

Reference: RO-C-EOP03, Plant Trips, Diagnosing Accidents, Natural Circulation Cooldown, E-0 Series EOPs, and Background Information pg. 12 and 71
Natural Circulation Operations
Ability to operate and/or monitor the following as they apply to the Natural Circulation Operations:
Desired operating results during abnormal and emergency situations
RO-3.5 SRO-3.8

30. 030 1
Answer: A
A Loss of Off-Site Power has occurred on Unit 2. The crew is performing the actions of 02-OHP-4023-ES-0.2, Natural Circulation Cooldown.

The following conditions exist:
- RCS temperature is 527°F and trending down at approximately 20°F per hour
- RCS pressure is 1850 psig and trending down slowly
- 2-QRV-251, Charging Flow Control Valve, is fully open
- Pressurizer level is 4% and trending down slowly
- High Steam Flow and Low Pressurizer Pressure SI signals are BLOCKED

Which ONE of the following describes the correct action(s) for these conditions?

A. Actuate Safety Injection and return to 02-OHP-4023-E-0, Reactor Trip or Safety Injection.

B. Transition to 02-OHP-4023-ES-0.3, Natural Circulation Cooldown with a Steam Void in the Vessel.

C. Throttle closed the steam dumps to allow RCS temperature to stabilize IAW 02-OHP-4023-ES-0.2, Natural Circulation Cooldown.

D. Operate SI pumps as necessary to maintain RCS inventory and avoid overfilling the pressurizer IAW 02-OHP-4023-ES-0.2, Natural Circulation Cooldown.

ANSWER: %Answer%
02-OHP-4023-ES-0.2 Foldout page directs this action when pressurizer level cannot be maintained at >5%

B - Incorrect - pressurizer level is already below the SI actuation setpoint and 02-OHP-4023-ES-0.3 is only made after step 13 if a rapid depressurization is required.
C - Incorrect - With a cooldown rate of 20°F, the Charging pump should be sufficient to make up to the pressurizer due to volume changes from the cooldown.
D - Incorrect - the action described would be for post-SI termination in the event of a LOCA
Lesson Plan/Objective:RO-C-EOP03/#23

Reference: RO-C-EOP03, Plant Trips, Diagnosing Accidents, Natural Circulation Cooldown, E-0 Series EOPs, and Background Information pg. 89
02-OHP-4023-ES-0.2 Natural Circulation Cooldown Foldout Page

Natural Circulation Operations
Knowledge of the reasons for the following responses as they apply to the Natural Circulation Operations:
RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated
RO-3.4 SRO-3.6

31. 031 2
Answer: D
A LOCA is in progress and both recirculation sump suction valves (ICM 305 and ICM 306) failed to open while transferring to cold leg recirculation. The crew is currently at step 12.b. RNO of OHP-4023-ECA-1-1, Loss of Emergency Coolant Recirculation.

This step directs the crew to establish minimum ECCS flow to remove decay heat per Figure 1. This is to be accomplished by manually aligning ECCS pumps and throttling BIT discharge to cold leg valves as necessary.

The following conditions exist:
- RWST level is 18% and lowering.
- East CCP, South SI & West RHR pumps are running.
- RCS Pressure is 340 psig.
- Minimum ECCS Flow Required per Figure 1 is 280 gpm.

Which ONE of the following describes how this flow will be established?
A. Shutdown RHR Pump and throttle BIT to 280 gpm of combined CCP and SI pump flow.

B. Shutdown CCP and SI Pumps. RHR pump flow should be about 280 gpm at this pressure.

C. Shutdown SI and RHR Pumps. CCP flow should be about 280 gpm at this pressure without throttling the BIT.

D. Shutdown SI and RHR Pumps and throttle BIT to 280 gpm of CCP flow.

ANSWER: %Answer% - The RHR is shutdown because it is not expected to be delivering flow at this pressure. The SI pump is shutdown because its flow at this pressure would be about 700 gpm. CCP flow at this pressure would be about 550 gpm and so the BIT Valves must be throttled.

A - Incorrect - SI pumps do not flow through the BIT lines so they would be injecting ~ 700 gpm.
B - Incorrect - RHR Pumps are not expected to inject at this pressure. CCP would be required.
C - Incorrect - CCP flow is expected to be ~ 550 gpm at this pressure.

Lesson Plan/Objective: RO-C-EOP09 / #26

Reference: OHP-4023-ECA-1-1, Loss of Emergency Coolant Recirculation pg. 17
UFSAR Table 6.2-5 Design Parameters - ECCS pumps

Loss of Emergency Coolant Recirculation
Ability to operate and/or monitor the following as they apply to the Loss of Emergency Coolant Recirculation:
Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features
RO-3.9 SRO-4.0

32. 032 1
Answer: D
While responding to a LOCA, a transition to OHP-4023-ECA-1.1, Loss of Emergency Coolant Recirculation, was performed due to a loss of emergency coolant recirculation.

The following conditions exist:
- RWST level is 18% and lowering.
- Containment Pressure is 2.5 psig
- All ECCS pumps are running.
- Both CTS pumps were stopped.
- RCS Pressure is 940 psig.

Make up is being added to the RWST and ECCS is reduced to one train of SI flow.

What are these actions designed to do?
A. Restore RWST level so Containment Spray can be started.

B. Prevent damage to vital equipment by saving one ECCS train.

C. Establish conditions to allow restart of RCPs.

D. Delay the time to RWST depletion.

ANSWER: %Answer%
Makeup is added to the RWST to extend time the ECCS pumps can take suction from the RWST and supply core cooling. Reducing to one train of ECCS flow (1 CCP, SI, & RHR) delays the time to RWST depletion.

A - Incorrect - CTS is operated based on Containment Pressure. CTS is not required below 3 psig.
B - Incorrect - The reason for the ECCS reduction is to delay RWST depletion. The procedure provides direction to stop ALL ECCS pumps prior to damage from low RWST level.
C - Incorrect - These actions are NOT performed to allow the restart of RCPs. The RCPs will be started in step 11 (immediately after reducing ECCS to 1 train in Step 10) if subcooling is sufficient.
Lesson Plan/Objective: RO-C-EOP09/#36

Reference: PSBD Rev. 1 12-OHP-4023-ECA-1.1 Loss of Emergency Recirculation Background Document Step 6 and 10 Basis pg. 18 and 29
RO-C-EOP09, LOCAs, E-1 Series EOPs, and Background Information pg. 93

Loss of Emergency Coolant Recirculation
Knowledge of the interrelations between the Loss of Emergency Coolant Recirculation 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
RO-3.9 SRO-4.3

33. 033 2
Answer: C
Operators are performing 02-OHP-4023-ECA -2.1, Uncontrolled Depressurization of All Steam Generators due to a steam leak inside containment along with failure of all SG stop valves to close.

The following plant conditions exist:

- Cooldown rate is 155^{o} F per hour.
- RCS cold leg temperatures are 340^{o} F
- Containment pressure is 8 psig.
- Narrow range Steam Generator levels indicate offscale low.
- Steam Generator AFW flow indicates 170x10^{3} pph each SG.

Which ONE of the following choices is correct for these plant conditions ?

A. Adjust AFW flow to 60x10^{3} pph on each Steam Generator.

B. Adjust AFW flow to 25x10^{3} pph on each Steam Generator, after at least one SG narrow range level is greater than 13%.

C. Adjust AFW flow to 25x10^{3} pph on each Steam Generator.

D. Isolate AFW flow to three of the Steam Generators.

ANSWER: %Answer%
AFW flow should be reduced to 25x10^{3} pph on each Steam Generator if the cooldown rate is > 100^{o}F per hour.

A - Incorrect - The 240x10^{3} pph (60/SG) is the normal minimum required for heatsink. With the reduced RCS temperature and cooldown rate this is not required at this time.
B - Incorrect - Flow is throttled irregardless of level. The minimum is 25x10^{3} pph when < 13% (Note the number is 24% for Adverse Containment which applies in this case.).
D - Incorrect - A minimum is 25x10^{3} pph is required to each SG when < 13% to minimize thermal shock.
Lesson Plan/Objective:RO-C-EOP07/#8

Reference:02-OHP-4023-ECA-2.1, Uncontrolled Depressurization of All Steam Generators Step 2 pg. 4
RO-C-EOP07, Secondary Side Breaks, E-2 Series EOPs, and Background Information pg. 97 and 98

Uncontrolled Depressurization of all Steam Generators
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
RO-3.6 SRO-3.9

34. 034 2
Answer: D
Unit 2 was operating at 95% power when a load rejection occurred.

Shortly after the load rejection the following plant conditions exist:

- RCS Tavg is 572^{O} F
- Pressurizer Level is 54%
- Pressurizer vapor temperature is 650^{O} F
- Pressurizer liquid temperature is 649^{O} F

Which ONE of the following is the current status of the pressurizer based on these conditions? (Reference the steam tables)

A. Pressurizer PORVs and Spray valves are full OPEN.

B. Pressurizer Spray valves are modulated OPEN.

C. Pressurizer proportional heaters are modulated ON.

D. Pressurizer Backup and proportional heaters are fully ON.

ANSWER: %Answer%

Pressurizer vapor space of 650^{O}F equates to 2193 psig (2208 psia). This is below the 2210 psig setpoint to fully energize the backup heaters.

A - Incorrect - Pressure would need to be > 2335 psig (659^{O}F)

B - Incorrect - Pressure would need to be 2260-2310 psig (654-657^{O}F)

C - Incorrect - Pressure would need to be > 2220 psig (652^{O}F)
Lesson Plan/Objective:RO-C-00202/#6

Reference: Steam Tables
SD-00202 Pressurizer and Pressure Relief System Description Figure 15

Pressurizer Pressure Control System (PZR PCS)
Knowledge of the operational implications of the following concepts as they apply to the PZR PCS:
Determination of the condition of fluid in PZR, using steam tables.
RO-3.5 SRO-4.0

Reference Provided - Steam Tables

35. 035 1
Answer: A
During the performance of an NIS power range heat balance at 100% power, an operator uses a feedwater temperature 30^{O}F lower than actual.

Would the calculated value of power be HIGHER or LOWER than actual power, and would an adjustment of the NIS power range channels, based on this value, be CONSERVATIVE or NON-CONSERVATIVE with respect to High Power Reactor Trip protection setpoints?

	Calculated Power	Setpoints
A.	Higher	Conservative
B.	Higher	Non-Conservative
C.	Lower	Conservative
D.	Lower	Non-Conservative

ANSWER : %Answer% - A Lower FW temperature means more energy must be added to the FW to produce Steam. This will make it look like a higher reactor power and setting NI's at a higher value would be conservative (Lead to an earlier trip and/or require the plant to operate at a lower thermal power).

B - Incorrect - Calculated power would be higher but setting the NI's to a higher value is conservative with respect to protection setpoints.
C - Incorrect - Calculated power would be higher.
D - Incorrect - Calculated power would be higher.

Lesson Plan/Objective: RO-C-GF19 / #14

Reference: RO-C-GF19, Heat Transfer

Reactor Protection System
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPS controls including:
Trip setpoint adjustment
RO-2.9 SRO-3.4

36. 036 2
Answer: C
Unit 1 was operating at 100% power. A small break LOCA occurs resulting in automatic reactor trip and safety injection.

The following conditions exist:
□□RCS pressure has just stabilized at 1200 psig.
□□Core Exit Thermocouples indicate 565^{O}F
□□SI pump flows are 0 gpm
□□BIT injection flows are 0 gpm

Which ONE of the following describes the effect this will have on core cooling?
A. Adequate core cooling will be maintained if the RHR pumps function as designed.

B. Inadequate core cooling and core damage will result even if BIT and SI flow is subsequently restored.

C. Inadequate core cooling and core damage will result unless BIT or SI flow is subsequently restored.

D. Adequate core cooling will be maintained as long as steam generator levels are maintained in the narrow range.

ANSWER: %Answer%
With RCS pressure stabilized at 1200 psig and no High Head Injection flow, mass loss continues. Eventually enough mass will be lost that significant voiding occurs and no core cooling takes place leading to fuel damage.

A - Incorrect - The RHR pumps will not inject at this pressure. Voiding will occur.
B - Incorrect - The RCS has just reached saturated conditions as indicated by CETCs and stabilized pressure. Restoration of High head SI will restore inventory and preclude damage.
D - Incorrect - High Head SI is required to restore inventory to allow cooling in conjunction with a secondary heat sink.
Lesson Plan/Objective:RO-C-EOP09/#8

Reference: RO-C-EOP09, LOCAs, E-1 Series EOPs, and Background Information pg.147 and 148

Engineered Safety Features Actuation System (ESFAS)
Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following:
Fuel
RO-4.4 SRO-4.7

37. 037 3
Answer: C
The following conditions exist:
- Containment pressure instrument Channel #3, 2-PPP-301 (PT-935) declared inoperable.
- Required actions per 02-OHP-4022-013-011 Containment Instrumentation Malfunction have been completed.
- Required Technical Specification Actions have been taken for Channel #3, 2-PPP-301 (PT-935)

Which ONE of the following describes the REMAINING coincidence for the SAFETY INJECTION ACTUATION and CTS ACTUATION?

Remaining Channels to cause actuation
Remaining Channels with INPUT to this function

	SAFETY INJECTION ACTUATION	CTS ACTUATION
A.	2/3	2/3
B.	1/3	1/3
C.	1/2	2/3
D.	1/2	1/3

ANSWER: %Answer%
The CTS Actuation Bistable is placed in the BYPASSED condition to prevent inadvertent actuation. This changes the remaining channel coincidence to 2/3 instead of the previous 2/4. Only 3 channels (Channels 2, 3, & 4) feed the SI Actuation (including this channel). The bistable for the SI actuation is placed in the TRIP condition.

A - Incorrect - This channel feeds the SI Actuation. (True if candidate assumes this channel does not feed SI or that both bistables are bypassed.)
B - Incorrect - Only 3 total including this channel feed SI. CTS is bypassed. (True if candidate assumes 4 channels feed SI and that CTS is bypassed)
D - Incorrect - The CTS is placed in BYPASS. (True if candidate assumes that CTS is tripped)

Lesson Plan/Objective:RO-C-01100/#6

Reference: RO-C-AOP-2, Abnormal Operating Procedures - Day 2 pg. 16 and 17
02-OHP-4022-013-011 Containment Instrumentation Malfunction pg. 2 and 5

Engineered Safety Features Actuation System (ESFAS)
Knowledge of the effect of a loss or malfunction of the following will have on the ESFAS:
Sensors and detectors
RO-2.7 SRO-3.1

38. 038 1
Answer: B
A reactor Startup is in progress on Unit 1. The crew has just completed recording critical data. When the RO begins to withdraw control rods to raise reactor power, the IR NIS indication suddenly drops by 1/3 decade and continues to decrease at a negative (-).3 DPM.

The following conditions exist:
□□There is no significant change in RCS Tave.
□□The Control Bank D step counters now read 131 steps for both D1 and D2 groups.
□□IRPI indicators for Control Bank D1 Rods D-4, D-12, M-4, and M-12 indicate 0 steps.

Which ONE of the following has occurred based on these indications?
A. Either the control bank D group step counter or IRPI indicators have failed, but not enough information is provided to determine whether any rods have dropped.

B. The control bank step counters and associated IRPI indicators, along with the NIS indications are consistent with multiple dropped rods.

C. An ATWS condition has occured since more than a single dropped rod would have resulted in a reactor trip.

D. The control bank D group step counter has failed, it should also read 0 steps if the rods in this group are fully inserted.

ANSWER: %Answer%
The IPRI indications and the lowering NIS indicates that multiple rods have dropped. The reactor did not trip automatically (<5% PR change). The operator will need to trip manually.

A - Incorrect - The IPRI indications and the lowering NIS indicates that multiple rods have dropped.
C - Incorrect - The reactor did not trip automatically because power is too low to receive a negative rate trip. (<5% PR change). The operator will need to trip manually.
D - Incorrect - The Group step counter indicates demand position.
Lesson Plan/Objective:RO-C-01200/#23

Reference:RO-C-AOP-6, Abnormal Operating Procedures – Day 6 pg. 59 and 60

Rod Position Indication System (RPIS)
Knowledge of the physical connections and/or cause-effect relationships between the RPIS and the following systems:
NIS
RO-3.0 SRO-3.3

39. 039 2
Answer: A
Unit 1 is conducting a reactor startup following a refueling outage.

The following conditions exist:

- Source Range Instrument N-31 indicates 2.1×10^{4} cps.
- Source Range Instrument N-32 indicates 2.0×10^{4} cps.
- Intermediate Range Instrument N-35 indicates 2.5×10^{-11} amps.
- Intermediate Range Instrument N-36 indicates 1.0×10^{-9} amps.
- Rods are in manual with no rod motion.
- Source Range and Intermediate Range Nuclear Instruments are slowly rising.

Which ONE of the following best explains the indications?

A. N-35 compensating voltage is set too high

B. N-35 compensating voltage is set too low

C. N-36 compensating voltage is set too high

D. N-36 compensating voltage is set too low

ANSWER: %Answer% - N-35 reads too low for the conditions given, compensating voltage is too high.

B - Incorrect - N-35 reads too low.
C - Incorrect - Overlap is proper for N-36.
D - Incorrect - Overlap is proper for N-36.

Lesson Plan/Objective:RO-C-01300/#9

Reference:SD-01300 Excore Nuclear Instrumentation System Description Figure 5
RO-C-01300, Excore Nuclear Instrumentation System Handout #3 pg.3

Nuclear Instrumentation System
Knowledge of the effect of a loss or malfunction of the following will have on the NIS:
Discriminator/compensation circuits
RO-2.6 SRO-2.9

40. 040 3
Answer: B
Unit 2 is operating at 100% power. The 43-TSAT-2 Thermocouple Selector Switch is selected to use a single thermocouple (Auctioneering function is NOT Working).

The following conditions exist:
- Subcooling Meter is in the T-SAT-T/C position
- Subcooling Meter indicates " 425"
- RCS T_{hot} indicates 608^{O}F
- RCS pressure indicates 2200 psig

Which ONE of the following statements describes these indications and the required actions?

A. A T/C wiring SHORT is causing the thermocouple to read HIGH. The operator should select another T/C, the T-SAT-RTD position or use PPC values.

B. A T/C wiring OPEN is causing the thermocouple to read LOW. The operator should select another T/C, the T-SAT-RTD position or use PPC values.

C. A T/C wiring SHORT is causing the thermocouple to read HIGH. The operator should defeat the failed thermocouple at the Incore TC Recorder.

D. An T/C wiring OPEN is causing the thermocouple to read LOW. The operator should defeat the failed thermocouple at the Incore TC Recorder.

ANSWER: %Answer%

A failed OPEN TC will indicate LOW (200^{O}F) causing the meter to read "425" or excessive subcooling. Selecting another T/C will restore the expected reading. Selecting the T-SAT-RTD position allows the use of the RTDs for calculation. The PPC also provides indications of individual TCs and calculations that use the Average TC margin to saturation.

A - Incorrect - A short will cause the TC to indicate low (200^{O}F). A high reading would indicate an "OL" or a negative number indicating saturation.

C - Incorrect - A short will cause the TC to indicate low (200^{O}F). A high reading would indicate an "OL" or a negative number indicating saturation. TCs are not defeated from the recorder.
D - Incorrect - TCs are not defeated from the recorder.
Lesson Plan/Objective:RO-C-01301/#12

Reference: RO-C-01301, Incore Nuclear Instrumentation System pg. 33 and 34
RO-C-GF27, Sensors and Detectors pg. 24 and 25

In-Core Temperature Monitor (ITM) System
Ability to (a) predict the impacts of the following malfunctions or operations on the ITM System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Thermocouple open and short circuits
RO-3.1 SRO-3.5

41. 041 2
Answer: D
Unit 2 has just tripped due to a Loss of Offsite power. Both EDGs started and energized the required loads. All equipment responded as designed.

The following conditions exist:
□□Containment parameters are normal
□□Average core exit thermocouple (CET) temperature is stable.

Which ONE of the following combination of RCS pressure and average CET temperature verifies the MINIMUM required subcooling to AVOID Safety Injection per 02-OHP-4023-ES-0.2, Natural Circulation Cooldown?

A. 600 psig, 590^{O}F

B. 500 psig, 460^{O}F

C. 450 psig, 430^{O}F

D. 375 psig, 400^{O}F

ANSWER: %Answer%

02-OHP-4023-ES-0.2 requires >36^{O}F of subcooling or requires that a SI be actuated.

02-OHP-4023-SUP-001 adds 10^{O}F to the T/C average for instrument uncertainties. This requires the T/C to be 46^{O}F below Tsat for the given pressure.

A - Incorrect - RCS is saturated - Tsat is 489^{O}F

B - Incorrect - RCS is 10^{O}F subcooled - Tsat is 470^{O}F

C - Incorrect - RCS is 30^{O}F subcooled - Tsat is 460^{O}F
Lesson Plan/Objective:RO-C-EOP03/#18

Reference:02-OHP-4023-ES-0.2, Natural Circulation Cooldown Foldout Page
02-OHP-4023-SUP-001, Subcooling Margin determination pg. 3 and 4
RO-C-EOP03, Plant Trips, Diagnosing Accidents, Natural Circulation Cooldown, E-0 Series EOPs, and Background Information pg.. 8 and 89

In-Core Temperature Monitor (ITM) System
Knowledge of the operational implications of the following concepts as they apply to the ITM System:
Saturation and subcooling of water
RO-3.7 SRO-4.0

Provide Steam Tables

42. 042 2
Answer: C
Given the following conditions concerning the Ice Condenser Cooling System:

Aligned to Unit 1 - Glycol Pumps 1 and 2 running with #3 in Auto.
Refrigeration Chiller Unit 1 in SEQUENCE MODE
Refrigeration Chiller Units 7 and 8 in BASE LOAD

Aligned to Unit 2 - Glycol Pumps 5 and 6 running with #4 in Auto.
Refrigeration Chiller Unit 3 in SEQUENCE MODE
Refrigeration Chiller Units 4, 5, and 6 in BASE LOAD

The NESW piping to the #5 and #6 Chillers starts leaking which causes a loss of NESW flow to both chillers.(NESW flow to the all other chillers is not significantly impacted) This also causes a trip of Glycol Pump #2 due to water spraying on the motor.

Which ONE of the following describes the resulting status of the Ice Condenser Cooling System? Assume NO operator action.

A. U1 - Chiller Units 7 and 8 operating, Glycol pump #3 starts.
U2 - Chiller Units 3, 4, 5, and 6 tripped, U2 Containment Isolation Glycol valves closed.
B. U1 - Chiller Units 7 and 8 operating, U2 Crossties open, Glycol pump #3 starts.
U2 - Chiller Units 5 and 6 tripped, Chiller Units 1 and 3 pick up cooling load for U2, Glycol pump #4 starts.
C. U1 - Chiller Units 7 and 8 operating, Glycol pump #3 starts.
U2 - Chiller Units 5 and 6 tripped, Chiller Unit 3 picks up cooling load for U2.
D. U1 - Chiller Units 7 and 8 tripped, Chiller Unit 1 picks up cooling load for U1, Glycol pump #1 alone supplies required flow.
U2 - Chiller Units 5 and 6 tripped, Chiller Unit 3 picks up cooling load for U2.

ANSWER: %Answer% - Loss of NESW flow will cause the associated Chiller to trip. The Standby pump will auto start if the operating pump trips. In Sequence Mode the chillers will increase load based on cooling requirements.

A - Incorrect - Chiller Units 7 and 8 won't trip on the loss of a single pump, standby pump #3 will start.
B - Incorrect - Chiller units 3 and 4 won't trip. Containment Isolation valves close on Lo-2 glycol tank level and Containment Isolation Signals but not on chiller or pump trips.
C - Incorrect - Unit crossties do not automatically open. Glycol Pump 4 would not auto start.

Lesson Plan/Objective:RO-C-01000 / #8

Reference: SD-01000, Ice Condenser System Description pg. 46-48
RO-C-01000, Ice Condenser System pg. 22,23, and 28
OHP 4021.010.001, Operation of the Ice Condenser Refrigeration System

Ice Condenser System
Ability to monitor automatic operation of the Ice Condenser System, including:
Refrigerant system
RO-3.0 SRO-3.0

43. 043 2
Answer: D
A Unit 2 LOCA event is in progress.

The following conditions exist:
- Containment Pressure is 4.5 psig and rising
- East CCP Leakoff 2-QMO-225 White Light - LIT
- West CCP Leakoff 2-QMO-226 White Light - LIT
- NESW and CCW to/from RCPs Green lights - LIT
- ALL CTS monitor lights on 2-SML-9A - LIT
- ALL CTS monitor lights on 2-SML-9B - NOT LIT

Based on these indications, which ONE of the following statements describes the failure and required operator actions?

A. Only train B of Containment Spray has failed to Actuate.
Manually align Train B Containment Spray Pump and Valves as required.

B. Containment Isolation Phase B has failed to Actuate.
Perform OHP 4023.SUP.004, Phase B Isolation Checklist.

C. Safety Injection has failed to Actuate.
Manually align Safety Injection Pumps and Valves as required.

D. Both Trains of Containment Spray have failed to Actuate.
Turn Both Containment Spray Actuation switches to Actuate.

ANSWER: %Answer%
Normal Indication of proper CTS operation would be CTS monitor Lights 2-SML-9A and 9B - LIT. With NO CTS operating when required (>3 psig in Containment), the Operator is required to Actuate both CTS Actuation switches.

A - Incorrect - 2-SML-9A is normally lit while 2-SML-9B is lit during CTS alignment. The lights are NOT train specific but condition specific.
B - Incorrect - The NESW and CCW green lights indicate Phase B Isolation. (Manual isolation is attempted prior to SUP-004)
C - Incorrect - QMO-225 and 226 White lights indicate SI actuated.

Lesson Plan/Objective:RO-C-00900/#12

Reference:RO-C-00900 Containment Spray and Hydrogen Recombiner pg. 13 and 14
02-OHP-4023-E-0, Reactor Trip or Safety Injection Step 5 pg. 7

Containment Spray System (CSS)
Ability to (a) predict the impacts of the following malfunctions or operations on the CSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Failure of ESF
RO-4.1 SRO-4.4

44. 044 1
Answer: A
Unit 1 has experienced a LOCA and Loss of Offsite power.

The following conditions exist:
□□Emergency Diesel Generator 1AB failed to start.
□□Emergency Diesel Generator 1CD has started and loaded as designed.
□□The division has restored power to the Reserve Aux Transformers.
□□No buses have been energized from the RATs.

The Unit Supervisor directs you to verify or restore power so a hydrogen recombiner may be run.

Which ONE of the following actions is required to enable the associated Hydrogen Recombiner to be operated?

A. Verify that bus T11C has energized 600V Bus 11C and MCC-1-EZC-C for (Train A) Hydrogen Recombiner Number 2.

B. Verify that bus T11C has energized 600V Bus 11C and Close the 11AC crosstie to supply power to Bus 11A and MCC-1-EZC-A for (Train B) Hydrogen Recombiner Number 1.

C. Energize RCP Bus 1B from the RAT to supply power to 600V Bus 11BMC for (Train B) Hydrogen Recombiner Number 1.

D. Energize RCP Bus 1C from the RAT to supply power to 600V Bus 11CMC for (Train A) Hydrogen Recombiner Number 2.

ANSWER: %Answer%
Hydrogen Recombiner #1 is powered form MCC-1-EZC-B and Hydrogen Recombiner #2 is powered form MCC-1-EZC-C.

B - Incorrect - Hydrogen Recombiner #1 is powered form MCC-1-EZC-B
C - Incorrect - Hydrogen Recombiner #1 is powered form MCC-1-EZC-B
D - Incorrect - Hydrogen Recombiner #2 is powered form MCC-1-EZC-C
Lesson Plan/Objective:RO-C-00900/#9

Reference:SD-00900 Containment Spray and Hydrogen Recombiner System Description pg. 40

Hydrogen Recombiner and Purge Control System (HRPS)
Knowledge of bus power supplies to the following:
Hydrogen recombiners
RO-2.5 SRO-2.8

45. 045 2
Answer: B
Unit 2 is in Mode 6 - Refueling with Fuel Movement in progress.

The following conditions exist at 0100:
□□Source range channels N31 and N32 are operable.
□□Source range channel N31 is selected for audible function.
□□Gamma-Metrics channels N21 and N23 are operable.

Given the following events and times:
□□At 0200, Source range channel N32 fails.
□□At 0300, Source range channel N31 fails.
□□At 0400, Gamma-Metrics channel N21 fails.
□□At 0500, Gamma-Metrics channel N23 fails.

Which ONE of the following is the earliest time that core alterations must be suspended?
A. 0200

B. 0300

C. 0400

D. 0500

ANSWER: %Answer% - Tech Spec 3.9.2 requires 2 operable source range channels. Wide range flux monitors (gamma metrics) are allowed to substitute for NIS source flux monitors. BUT the gamma metrics do NOT provide an audible function.

A - Incorrect - Wide range flux monitors (gamma metrics) are allowed to substitute for NIS source flux monitors. 2 WR and 1 SR with Audible are operable.
C - Incorrect - Gamma metrics do NOT provide an audible function.
D - Incorrect - 2 Channels and an Audible are required.

Lesson Plan/Objective: RO-C-ADM13/ADM13.3.0

Reference: Tech. Spec. 3.9.2; 02-OHP-4030-STP-037, Refueling Surveillance, Data Sheet 3, Item 2

Fuel Handling Equipment System (FHES)
Ability to manually operate and/or monitor in the control room:
Neutron levels
RO-3.5 SRO-3.9

46. 046 3
Answer: D
Given the following plant conditions:

- Unit 1 is at 100% power and stable.
- Steam Generator Level Controls are in AUTOMATIC.
- Steam Generator #12 Steam Flow Channel 1, 1-MFC-121, is selected to the Steam Generator Level Control System.

An unidentified calibration error results in Steam Generator #12 Steam Flow Channel 2, 1-MFC-120, indicating 10% low (indicates 90% vs 100% Steam Flow). When requested by MTI, operators switch the controlling Steam Flow channel to 1-MFC-120.

Which ONE of the following conditions will occur when the operator switches the controlling channel? (Assume all controllers remain in Automatic)

The Steam Generator Level Control system will:

A. initially lower feed flow, then control #12 SG level approximately 10% below program level.

B. not change feed flow to the #12 SG, but Feedwater delta-P program will be lowered to the 90% power value.

C. initially raise feed flow to #12 SG, then return level to program. The Feedwater delta-P program will be lowered to the 90% power value.

D. initially lower feed flow, then control #12 SG level at approximately program level.

ANSWER: %Answer% - SG FW flow will initially lower to match the lower Steam Flow, As a level deviation error builds in it will raise FW flow to restore level to the desired SG Level Setpoint. (Level Error is added to Steam Flow)

A - Incorrect - SG level setpoint is fixed and is not impacted by the SF channel.
B - Incorrect - SG FW flow will be affected & FW DP program will only be affected ~2.5% power since all 4 channels are summed.
C - Incorrect - FW flow will not raise and FW DP program will only be affected ~2.5% power since all 4 channels are summed.

Lesson Plan/Obj: RO-C-05100 / #9

Reference: SD-05100, Steam Generator System Description pg. 20-21 & 57-59

Steam Generator System (S/GS)
Ability to monitor automatic operation of the S/G, including:
S/G water level control
RO-4.0 SRO-3.9

47. 047 1
Answer: D
The plant is in a normal cooldown and preparing for a refueling outage. A misoperation of the Steam Generator Power Operated Relief Valves causes the cooldown rate to exceed Technical Specification limits.

Which of the following actions is required and why?
A. Restore cooldown rate to Tech. Spec. limits within 1 hour to provide adequate margin from ductile failure of the Reactor vessel.

B. Stop any further cooldown for 6 hours to allow temperature stabilization throughout the vessel wall.

C. Stop any further cooldown for 12 hours to allow temperature stabilization throughout the vessel wall.

D. Restore cooldown rate to Tech. Spec. limits within 30 minutes to provide adequate margin from brittle failure of the Reactor vessel.

ANSWER: %Answer%
Technical Specification 3/4.4.9.1 requires the RCS temperature to be restored to within Limits in 30 minutes. The concern of excessive cooldown rates to brittle failure caused by the tensile stresses on the inner wall.

A - Incorrect - Time to restore is 30 minutes. Concern is brittle failure.
B - Incorrect - Time to restore is 30 minutes. While soak time would aid the situation, this is NOT a required action and the time is excessive.
C - Incorrect - Time to restore is 30 minutes. While soak time would aid the situation, this is NOT a required action and the time is excessive.
Lesson Plan/Objective:RO-C-GF23/#14

Reference: Technical Specification 3/4.4.9.1 Pressure/Temperature Limits pg. 3/4 4-24
RO-C-GF23 Brittle Fracture and Vessel Thermal Stress pg. 53

Main and Reheat Steam System (MRSS)
Knowledge of the operational implications of the following concepts as they apply to the MRSS:
Bases for RCS cooldown limits
RO-2.7 SRO-3.1

48. 048 1
Answer: B
During the final stages of an RCS heatup, the Steam Dump System is set to automatically control RCS temperature at 541^{O}F.

Which ONE of the following is the correct Steam Dump Pressure Controller setpoint required to maintain RCS temperature at approximately 541^{O}F Tavg?
A. 940 psig

B. 955 psig

C. 970 psig

D. 985 psig

ANSWER: %Answer%
955 psig is Psat for 541°F.

A - Incorrect - 940 psig is Psat for 539°F.
C - Incorrect - 970 psig is Psat for 543°F.
D - Incorrect - 985 psig is Psat for 545°F.

Lesson Plan/Objective: RO-C-05200 / #9

Reference: Steam Tables; 02-OHP-4021-001-001, Plant Heatup From Cold Shutdown To Hot Standby pg. 29, 38, 45, and 46

Steam Dump System (SDS) and Turbine Bypass Control
Knowledge of the operational implications of the following concepts as they apply to the SDS:
Use of steam tables for saturation temperature and pressure.
RO-2.5 SRO-2.8

49. 049 1
Answer: D
Unit 2 is at 56% power with all control systems in AUTOMATIC.

Which ONE of the following describes the plant response to a trip of the East Main Feed Pump? Assume NO operator action and NO plant trip occurs.
As SG water levels start lowering, ...

A. the feedwater header pressure lowers, causing the West MFP speed to rise until it trips on overspeed. Both the Steam-driven and Motor-driven Auxiliary Feedwater Pumps start when SG levels reach the Low-Low level setpoint.

B. the Feedwater Regulating Valves open further, the West MFP speed rises, the Low Pressure Heater Bypass CRV-224 opens and the Middle Heater Drain Pump starts due to low Main FW Pump Suction Pressure.

C. the West MFP speed rises but will not maintain SG level. Both the Steam-driven and Motor-driven Auxiliary Feedwater Pumps start when SG levels reach the Low-Low level setpoint.

D. the Feedwater Regulating Valves open further and the feedwater header pressure lowers causing the West MFP speed to rise. NO automatic pump starts occur.

ANSWER: %Answer%
On the loss of the East Main FW Pump, reduced flow will cause the FW regulating valves will open further as the SGs try to maintain normal level & FW flow matched to steam flow. FW Pump Discharge pressure will decrease and the FW pp vs. Steam pressure Delta P will cause the West FW pump speed to increase to restore programmed Delta Pressure.

A - Incorrect - The Main FW pumps can supply 60% flow and so the West FW pump would not trip on overspeed.
B - Incorrect - The Heater Drain pump will not auto start nor will the LP Heater Bypass Open since pressure will not significantly decrease because the total amount of FW flow required does not change.
C - Incorrect - The Main FW pumps can supply 60% flow and so a Low-Low level would not be reached and AFW will not start.
Lesson Plan/Objective:RO-C-AOP-3 / #AOP3.15

Reference: RO-C-05500 Main Feedwater System pg. 10, 18, and 19
02-OHP-4022-055-001, Loss Of One Main Feed Pump pg. 2

Main Feedwater (MFW) System
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW System controls including:
Power level restrictions for operation of MFW pumps and valves
RO-2.7 SRO-2.9

50. 050 7
Answer: B
The control room operators are responding to a red path on the Heat Sink CSF caused by a loss of all Auxiliary Feed Pumps.

The following plant conditions exist:
- All RCPs have been tripped.
- East CCP is tripped
- West CCP is operating
- Containment Pressure is 0.8 psig
- Control Air to Containment remains isolated due to an air leak.

SG #	11	12	13	14
Wide Range Level %	32	21	25	28

The AEO reports that the Turbine Driven Auxiliary Feed Pump should be restored within 10 minutes. Which ONE of the following describes the correct operator response? (01-OHP-4023-FR-H.1, Response To Loss of Secondary Heat Sink attached)

A. Immediately initiate bleed and feed. Terminate bleed and feed as soon as AFW flow is restored.
B. Immediately initiate bleed and feed. Continue bleed and feed until AFW flow has restored at least one SG NR Level.
C. Continue efforts to restore AFW flow. Do NOT initiate bleed and feed until 3 SG levels are less than 15%.
D. Continue efforts to restore AFW flow. Do NOT initiate bleed and feed until 2 SG levels are less than 15%.

ANSWER: %Answer%
Bleed and feed must be initiated immediately upon reaching the criteria. The effectiveness depends on the timeliness of initiation. Only 2 PRZ PORVs are available since air is lost to Containment. This requires bleed and feed to be initiated when 2 SG levels are <30% (Step 3). Bleed and feed is continued until at least 1 SG is >8% (step 30).

A - Incorrect - RCS feed and Bleed is NOT stopped until at least 1 SG is >8%.
C - Incorrect - Bleed and feed must be initiated immediately upon reaching the criteria. The effectiveness depends on the timeliness of initiation. (Plausible if candidate assumes 3 PORVs and Normal Containment)
D - Incorrect - Bleed and feed must be initiated immediately upon reaching the criteria. The effectiveness depends on the timeliness of initiation.(Plausible if candidate assumes 3 PORVs and keys on the step that says at least 2 levels > 15%)
Lesson Plan/Objective: RO-C-EOP11/#7

Reference: 01-OHP-4023-FR-H.1, Response To Loss of Secondary Heat Sink pg. 3 & 32; RO-C-EOP11, Heat Sink CSFST, FR-H Series EOPs, and Background Information pg. 27, 28, 34, and 35

Auxiliary / Emergency Feedwater (AFW) System
Knowledge of the effect that a loss or malfunction of the AFW System will have on the following: RCS RO-4.4 SRO-4.6
Reference Provided - 01-OHP-4023-FR-H.1, Response To Loss of Secondary Heat Sink

51. 051 3
Answer: C
Unit 1 is in Mode 3. The 4160 VAC distribution system is being supplied by the Reserve Auxiliary Transformers (RATs). Due to a system disturbance, indicated voltage on the safeguards buses drops.

The following conditions exist:
□□T11A Voltage Indication is 112 Volts
□□T11B Voltage Indication is 114 Volts
□□T11C Voltage Indication is 113 Volts
□□T11D Voltage Indication is 114 Volts

Which ONE of the following describes the FINAL plant response if voltage remains at these values for an extended period?
A. All safeguards busses will be energized by their respective EDG.

B. T11A and T11C busses will be energized by their respective EDG.

C. T11A and T11B busses will be energized by its respective EDG.

D. Only T11A bus will be energized by its respective EDG.

ANSWER: %Answer%
An Undervoltage condition of 113 V will energize 62-1 T11A. After a 111 Second delay it will open T11A9 and T11B1 causing T11 A and T11B to lose power. This will cause the EDG to start and energize T11A and T11B.

A - Incorrect - T11 C and T11D will NOT deenergize since T11D is > 113V
B - Incorrect - T11C will NOT deenergize since T11D is > 113V
D - Incorrect - T11B will also recieve a trip signal and be energized by the EDG.
Lesson Plan/Objective:RO-C-08201/#6

Reference:RO-C-08201, Engineered Safety Systems Electrical pg. 29, 30, and Att.3
Annunciator #121 Response, Drop 78 Train B Aux Buses Undervoltage pg. 156-163

A.C. Electrical Distribution System
Knowledge of the physical connections and/or cause-effect relationships between the A.C. Distribution System and the following systems:
ED/G
RO-4.1 SRO-4.4

52. 052 4
Answer: D
The following conditions exist on Unit 1:
□□The reactor was operating at 92% power.
□□All controls are in automatic normal lineup.
□□An automatic reactor trip occurred fifteen (15) minutes ago.

After the trip, operators note RCP bus 1B is NOT energized and the reserve feed breaker (1B5) over current trip annunciator is lit. The reactor operator has been directed to clear the seal in on the alarm and attempt to re-close the breaker (1B5).

Which ONE of the following describes the response of the breaker 1B5 once the alarm is cleared? (OP-1-980411-4, 4KV Aux Transformers 1AB & 101AB Sht. 2 Elementary Diagram attached)

A. Closes automatically.

B. Can be closed by the operator using only the breaker control switch.

C. Cannot be closed until an AEO clears the over current conditions locally.

D. Cannot be closed with the control switch until an operator clears the anti-pump circuit.

ANSWER: %Answer%
Clearing the Alarm will clear the trip signal but the anti-pump circuit will keep the breaker locked out until it is reset. The breaker cannot be closed until the auto close signal is removed. The device that caused the auto close signal must be reset. Turning the associated breaker DC control power off will also reset the circuit.

A - Incorrect - The anti-pump circuit will keep the breaker from closing.
B - Incorrect - The anti-pump circuit will keep the breaker from closing.
C - Incorrect - The Overcurrent will clear once the breaker trips open. Resetting the alarm would allow reclosure except the anti-pump circuit will keep the breaker from closing.

Lesson Plan/Objective:RO-C-08200/#6

Reference:OP-1-980411-4, 4KV Aux Transformers 1AB & 101AB Sht. 2 Elementary Diagram

SD-08200, Balance of Plant Electrical System Description pg.52, 53, and Figure 18

A.C. Electrical Distribution System
Knowledge of A.C. Distribution System design feature(s) and/or interlock(s) which provide for the following:
Interlocks between automatic bus transfer and breakers
RO-2.8 SRO-3.1

Provide Attachment - OP-1-980411-4, 4KV Aux Transformers 1AB & 101AB Sht. 2 Elementary Diagram

53. 053 5
Answer: D
The in-service "N" Train Battery Charger has been disconnected from the 600v AC power supply by a load shed.

Which ONE of the following describes the system or operator response necessary to restore the battery charger to service?
A. The standby charger will automatically pick up the load and battery.

B. The charger will come back on when sufficient draw down of the battery has occurred.

C. This charger is locked out and cannot be re-energized. Therefore, it is necessary to put the opposite train charger in service by placing its control box switch to Auto.

D. Turn the battery charger control box switch on the in-service battery charger to Off and then back to Auto.

ANSWER: %Answer%
After a Safety Injection or Load Shed, the In-Service battery charger must be manually reset by placing the chargers control switch to OFF and then returning it to AUTO.

A - Incorrect - The standby charger will NOT automatically pick up load.
B - Incorrect - The charger will NOT come back on until it is reset.
C - Incorrect - The charger may be reset. The opposite charger will NOT energize the battery by placing the switch to AUTO.
Lesson Plan/Objective: EOP Task 0820080504 - UO-C-AS11/#3.5

Reference:01-OHP-4024-115 Annunciator #115 Response Drop 57 Trains A & B N Battery Chg De-energized pg. 91and 92
01-OHP-4021-082-015 Operation of the N Train Battery System pg. 2-4 and 10
OP-1-98210-13

D.C. Electrical Distribution System
Knowledge of the physical connections and/or cause-effect relationships between the D.C. Electrical System and the following systems:
Battery charger and battery
RO-2.9 SRO-3.5

54. 054 3
Answer: C
The 2AB Emergency Diesel Generator (EDG) has been manually started and paralleled to the grid, in accordance with 02-OHP-4030-STP-027AB, AB Diesel Generator Operability Test (Train B). The operator loaded the EDG to 1000 KW with minimum amps indicated on all three phases.

Before the EDG has operated for 10 Minutes at 1000 KW the operator observes that the amp readings on all three phases have increased to 610 amps.

Which ONE of the following statements describes the action required to correct this condition and the basis for this action?

A. Trip the EDG to prevent exceeding the maximum voltage ratings of the supplied loads.

B. Remove loads from the associated bus by swapping required pumps to the other train to prevent exceeding the Generator current rating.

C. Manually adjust the voltage regulator to reduce current to prevent overheating of the Generator.

D. Raise EDG speed to reduce the reactive load and prevent motoring the Generator.

ANSWER: %Answer%
The rising current was a caused by a failure of the voltage regulator. Transferring the Voltage regulator to manual and reducing current will prevent excessive reactive loads and reduce heating.

A - Incorrect - Voltage is locked in by the Grid when the EDG is paralleled.
B - Incorrect - With the EDG paralleled to the grid stopping pumps on the bus will not reduce EDG current.
D - Incorrect - EDG speed is high enough to prevent motoring.
Lesson Plan/Objective:RO-C-03200/#12

Reference:SD-03200, Emergency Diesel Generators pg. 32, 55-59
02-OHP-4030-STP-027AB, AB Diesel Generator Operability Test (Train B) pg. 40 Step 3.17, and 51-52

Emergency Diesel Generator (ED/G) System
Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Consequences of high VARS on ED/G integrity
RO-2.5 SRO-2.7

55. 055 6
Answer: C
Which ONE of the following lists the two conditions that will independently cause automatic closure of Liquid Waste Disposal Effluent Discharge Header Shutoff Valve, 12-RRV-285?

A. Low circulating water flow
High radiation sensed in the release header

B. Low circulating water flow
High radiation sensed in the circulating water flow

C. Low release header radiation monitor sample flow
High radiation sensed in the release header

D. High release header radiation monitor sample flow
High radiation sensed in the circulating water flow

ANSWER: %Answer%
High radiation sensed on RRS-1000 or Low Sample flow on RFS-1010 will cause an isolation of 12-RRV-285.

A - Incorrect - Low circulating water flow will close 1-RRV-287 or 2-RRV-286 NOT 12-RRV-285.
B - Incorrect - Low circulating water flow will close 1-RRV-287 or 2-RRV-286 NOT 12-RRV-285. Also CW radiation will not close 12-RRV-285.
D - Incorrect -CW radiation will not close 12-RRV-285.

Lesson Plan/Objective: RO-C-02200/#8

Reference: OP-12-98810-9 Liquid Waste Effluent Radiation Monitoring Sampler Sys (RRS-1000) Elementary Diagram.
OP-12-98313-14 Rad Waste Disposal Sys Liquid Waste Elementary Diagram.

56. 056 7
Answer: C
Which ONE of the following will cause the waste gas compressor discharge to be directed to the standby gas decay tank?
A. High hydrogen alarm on the Automatic Gas Analyzer for the gas decay tank being filled.

B. Low pressure in the standby gas decay tank.

C. Extreme high oxygen alarm on the Alternate Oxygen Monitor.

D. High pressure in the waste gas vent header.

ANSWER: %Answer%
Extreme high O2 as sensed on the Alternate Oxygen Monitor will cause the in-service tank to isolate and the standby tank to align.

A. Incorrect - There is NO high hydrogen automatic alignment from the automatic gas analyzer.
B - Incorrect - Pressure >100 psig in the in-service tank will cause the swap
D - Incorrect - This is high pressure prior to the waste gas compressor.
Lesson Plan/Objective: RO-C-02300/#8

Reference:01-OHP-4024-128 Annunciator #128 response Drop 15 Waste Gas Analyzer O2 Ext High pg. 30-31
01-OHP-4024-128 Annunciator #128 response Drop 20 Gas Decay Tanks Switching pg. 40-41

Waste Gas Disposal System (WGDS)
Knowledge of Waste Gas Disposal System design feature(s) and or interlock(s) which provide for the following:
Isolation of waste gas release tanks
RO-2.9 SRO-3.4

57. 057 3
Answer: A
Which ONE of the following will result in the generation of a Containment Ventilation Isolation (CVI) signal on a HIGH Alarm?
A. Upper containment area radiation monitors, VRS-1101/1201

B. Unit vent effluent high range noble gas radiation monitor, VRS-1509

C. Lower Containment high range area monitors, VRA-1310/1410

D. Unit vent effluent low range noble gas radiation monitor, VRS-1505

ANSWER: %Answer% - Upper containment area monitors, VRS1101/1201, cause a Containment Ventilation Isolation.

B - Incorrect - VRS-1509 is AB Vent monitor which opens 1-VRV-317 and closes 1-VRV-318.
C - Incorrect - VRA1310/1410 are indication/alarm only. Other channels of the 1300/1400 monitors actuate Containment Ventilation Isolation on Lower Containment Radiation.
D - Incorrect - VRS-1505 isolates 12-RRV-306 waste gas release.

Lesson Plan/Objective: RO-C-01350 / #3

Reference: 12-OHP-4021-013-006, Operation of the Eberline Radiation Monitoring System Control Terminal pg. 1-7
RO-C-01350, Radiation Monitor System pg. 48-49

Area Radiation Monitoring (ARM) System
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ARM system controls including:
Radiation levels
RO-3.4 SRO-3.6

58. 058 1
Answer: B
In preparation for a Unit 1 Containment Pressure Relief, the BOP operator is directed to initiate a Source Check for Channel ERS-1305.

Fifteen seconds later the Unit Supervisor notes that the indication for Monitor ERS-1300 on the Unit 1 Composite display has turned WHITE.

Which ONE of the following explains the reason for this indication (WHITE status)?
(Assume all other channels/monitors are functioning properly)
A. Source Check has been successfully completed.

B. Source check has been initiated and is still in progress.

C. The ALERT setpoint has been exceeded for the monitor during the source check.

D. The monitor Trip/Block switches are still in the BLOCK position.

ANSWER: %Answer%
Any CHANNEL in Check Source will cause the MONITOR to display as white on the composite screen. ERS-1305 is a CHANNEL of the ERS-1300 MONITOR.

A - Incorrect - The channel will return to Green when the Check Source has successfully completed.
C - Incorrect - Channel will alarm in Yellow if the alert setpoint is reached.
D - Incorrect - The Trip/Block switches are external to the Radiation Monitor Display system and do NOT affect the monitor color.
Lesson Plan/Objective:RO-C-1350/#8

Reference:12-OHP-4021-013-006, Operation of the Eberline Radiation Monitoring System Control Terminal pg. 8-11
RO-C-01350, Radiation Monitor System pg. 28

Process Radiation Monitoring (PRM) System
Ability to manually operate and/or monitor in the control room:
Radiation monitoring system control panel
RO-3.7 SRO-3.7

59. 059 4
Answer: C
Unit 2 was operating at 100% power when the reactor was manually tripped due to lowering RCS Pressure and Pressurizer level. All systems responded as designed.

The following plant conditions exist:
□□SRA-2905, Steam Jet Air Ejector, has a HIGH alarm.

Which ONE of the following would be used to identify WHICH SG has a tube leak under these conditions?
A. SG feed flow to steam flow mismatch.

B. MRA-2601, 2602, 2701, and 2702, SG PORV Radiation Monitors.

C. R-19, Blowdown Sampling Radiation Monitor during Chemistry sampling.

D. R-24, SG Blowdown Treatment Radiation Monitor during Chemistry sampling.

ANSWER: %Answer%
Typically, blowdown sample monitor monitors all SGs combined. Individual SGs will be selected by Chemistry following the trip to aid in identifying the ruptured SG.

A - Incorrect - NOT a sensitive method of comparison as it requires large gpm leak rates before this is Noticeable. Following the trip this would be an ineffective method.
B - Incorrect - Since Offsite power is NOT lost the SG PORVs will remain closed. (Monitors do NOT reflect SG activity if PORVs are closed)
D - Incorrect - Treatment monitor will NOT respond to individual SGs during sampling activity. (Isolated upon trip)
Lesson Plan/Objective:RO-C-EOP-08/#5

Reference: RO-C-EOP08, SGTRs, E-3 Series EOPs, and Background Information pg. 16 & 21

Process Radiation Monitoring (PRM) System
Knowledge of the physical connections and/or cause-effect relationships between the PRM System and the following systems:
Those systems served by PRMs
RO-3.6 SRO-3.9

60. 060 2
Answer: B
Unit 1 was operating at 100% power when an Inadvertent Phase A Containment Isolation occurred. The Crew has reset Phase A Containment Isolation and attempted to restore Control Air to Containment. The Control Air Containment Isolation Valves failed to open.

Which ONE of the following describes short-term impact of the loss of air on the restoration efforts of the crew?
A. RCP NESW Motor Air cooling water can NOT be restored.

B. Glycol Cooling to the ICE condenser can NOT be restored.

C. RCS overpressure protection has been lost (PORVs won't open).

D. RCP Seal Injection is available but Seal Return can NOT be restored.

ANSWER: %Answer%
Glycol Cooling inside Containment Isolation valves VCR-11 and VCR-21 will NOT open.

A - Incorrect - NESW to RCP Motor Cooling valves are located outside containment and close on a Phase B Isolation.
C - Incorrect - PORVs NRV-152 and NRV-153 have local reservoirs.
D - Incorrect - RCP Seal Injection is not isolated and Seal Return QCM-250 and QCM-350 are motor operated valves. RCP Seal Leakoff valves QRV-10, 20, 30, and 40 are fail open.

Lesson Plan/Objective:RO-C-AOP-8/AOP8.13

Reference:RO-C-01000 Ice Condenser system pg. 32 and TP-13

Instrument Air System (IAS)
Knowledge of the effect that a loss or malfunction of the IAS will have on the following:
Containment air system
RO-3.1 SRO-3.4

61. 061 3
Answer: B
Due to a failure of the fire protection system, a fire in the Unit #1 Control Room Cable Vault has resulted in loss of equipment control and normal habitability.

The following plant conditions exist:
- As you are leaving the Control Room, you notice indications of load shed occurring and both EDGs start and load.
- Control is established for all systems except the centrifugal charging pumps (CCPs)

Which ONE of the following procedural actions is required to initially establish CVCS flow to the RCS?

A. Restore the 1E CCP using the restoration series procedures.

B. Cross-tie from the U-2 CVCS system to allow RCP seal injection to maintain level.

C. Cross-tie from the U-2 CVCS system to allow BIT flow to maintain level.

D. Align the 1E CCP using the Unit 1 LS-5 (Local Shutdown) series procedures.

ANSWER: %Answer%
The operators are directed to establish seal injection within 30 minutes using the crosstie to Unit 2 as per 01-OHP-4025-LS-6-1, Seal Injection from CVCS Crosstie.

A - Incorrect - The restoration series procedures are used after the Unit has been stabilized. The 01-OHP-4045-R.6 procedures assume that seal injection is already being supplied from the opposite unit or from the other charging pump.
C - Incorrect - Seal injection flow is first established to the RCPs. The procedures direct ~8gpm flow to prevent overfilling the Pressurizer. This equates to the minimum 2 gpm required per seal.
D - Incorrect - The LS-5 series procedures assumes that a Unit 1 charging pump is operating. It aligns various flowpaths from the Unit 1 charging pump to the RCS but does NOT Start a Unit 1 Charging pump.

Lesson Plan/Objective:

Reference:01-OHP-4025-001-001, Emergency Remote Shutdown pg.11
01-OHP-4025-LS-6, RCS Make-up, Seal Injection, and Boration with CVCS Crosstie pg. 1

Fire Protection System (FPS)
Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following:
Shutdown capability with redundant equipment
RO-2.7 SRO-3.2

62. 062 3
Answer: C
Unit 2 is operating at 100% power. A small instrument air leak inside Containment causes a slow rise in Containment pressure. Containment pressure is currently 0.29 psig.

In order to ensure that adequate margin to Containment Technical Specification pressure limits is maintained, which ONE of the following indicates the appropriate action to reduce Containment pressure ?

A. Maximize NESW cooling to the Containment Ventilation Units

B. The Containment should be vented using the Containment Purge System.

C. The Containment should be vented using the Containment Pressure Relief system.

D. All Upper/Lower Containment Ventilation Fans (CUV/CLV) should be started or verified running.

ANSWER: %Answer%
With the Containment Pressure rising due to air line leakage, the only way to reduce pressure is to purge air from Containment. This is accomplished with the Containment Pressure Relief System. The Containment Purge system requires multiple reviews and sampling prior to use and is used only for shutdown conditions.

A - Incorrect - Increasing cooling (lowering temperature) may cause a slight pressure reduction but with continued in-leakage pressure a release will have to be performed.
B - Incorrect - The Containment Purge system requires multiple reviews and sampling prior to use and is used only for shutdown conditions.
D - Incorrect - Increasing cooling (lowering temperature) may cause a slight pressure reduction but with continued in-leakage pressure a release will have to be performed.
Lesson Plan/Objective:RO-C-02800/#2

Reference:RO-C-02800, Containment Ventilation System pg. 7

Containment System
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment System controls including: Containment pressure, temperature, and humidity
RO-3.7 SRO-4.1

63. 063 1
Answer: B
While performing actions in 02-OHP-4023-E-3, 'Steam Generator Tube Rupture' the Control Room Supervisor has reached Step 8 which reads:

8.# Check Intact SG Levels:
a. Narrow Range level - Greater than 13%

Which ONE of the following BOP responses would satisfy Cook Plant Management expectations for Verbal Communications?
A. Yes, intact Sierra Golf narrow range levels are 40% and rising.

B. Yes, intact Steam Generator narrow range levels are 50% and stable.

C. Yes, intact Steam Generator narrow range levels are greater than 13%.

D. Yes, intact Steam Generator narrow range levels are 15% and increasing.

ANSWER: %Answer%
Correct response is to provide the component name (Steam Generator), a current value (50%) and trend (stable)

A - Incorrect - The phonetic "Sierra Golf" is not appropriate for Steam Generator.
C - Incorrect - A value/trend should be provided.
D - Incorrect - "increasing" is a sound alike word to decreasing and is Not allowed.
Lesson Plan/Objective:RO-C-ADM14/ADM 14-6

Reference:PMP-4010-COM-001 Verbal Communications pg. 3-4
OHI-4023 Abnormal/Emergency Procedure User's Guide pg. 24
Generic
Conduct of Operations
Ability to make accurate, clear and concise verbal reports.
RO-3.5 SRO-3.6

64. 064 5
Answer: A
A maintenance visual inspection requires momentarily placing the 'B' train pump control switch in PULL-TO-LOCKOUT. The Unit condition is such that BOTH trains are required to auto start.

Which ONE of the following describes the status of the affected ESF system?

The 'B' train pump is INOPERABLE until...
A. the control switch is independently verified in its normal position.

B. the pump's monthly surveillance has been performed.

C. the pump's auto start function is tested.

D. the pump is manually started.

ANSWER: %Answer%
The B train pump may be considered Operable after being returned to the correct position and being independently verified.

B - Incorrect - Surveillance does NOT need to be performed to declare B train equipment operable.
C - Incorrect - Once returned to the correct position and being independently verified train B is considered operable - a test of the pump's auto start function is NOT required.
D - Incorrect - Once returned to the correct position and being independently verified train B is considered operable - a functional test (manual start) is NOT required.
Lesson Plan/Objective:RO-C-ADM1/#4

Reference:OHI-4043 Technical specification Open Items Log pg. 5

Generic
Equipment Control
Ability to analyze the affect of maintenance activities on LCO status.
RO-2.6 SRO-3.8

65. 065 5
Answer: A
Which ONE of the following evolutions would meet the 02-OHP-4030-227-037, Refueling Surveillance definition of "entering MODE 6"?

A. Movement of the first assembly into containment during core reload.

B. Movement of the first assembly out of containment during core offload.

C. Latching of the first fuel assembly in the Spent Fuel Pit during core reload.

D. As soon as RCS temperature is lowered to less than 140^{o}F with a boron concentration of at least 2450 ppm.

ANSWER: %Answer%
Movement of the first assembly into containment following a complete offload(defueled) condition is considered "entry into Mode 6".

B - Incorrect - Mode 6 is entered upon detensioning the reactor vessel head.
C - Incorrect - Mode 6 is entered when the assembly enters containment.
D - Incorrect - Mode 6 is entered when the assembly enters containment.
Lesson Plan/Objective:RO-C-ADM13/ADM13.1.0

Reference:02-OHP-4030-227-037, Refueling Surveillance pg. 5

Generic
Equipment Control
Knowledge of the refueling process.
RO-2.6 SRO-3.5

66. 066 5
Answer: C
Unit 1 has experienced a Large Break LOCA. All safeguards equipment functioned properly following the event initiation. You are the BOP assigned to perform 01-OHP-4023-E-0, Reactor Trip or Safety Injection Attachment A.

Which ONE of the following describes the action required for the Control Room Pressurization fans and why?

A. Manually start both pressurization fans to ensure that enough pressure exists to ensure adequate filter flow.

B. Verify that both pressurization fans automatically start to ensure that enough pressure exists to ensure adequate filter flow.

C. Manually stop one pressurization fan to ensure that control room dose remains within analyzed limits.

D. Notify Unit 2 control room to start both pressurization fans if one Unit 1 fan is NOT running to ensure that control room dose remains within analyzed limits.

ANSWER: %Answer%
Attachment A Step 4 provides direction to stop 1 pressurization fan to limit the filter flow rates to ensure the dose remains within limits.

A - Incorrect - Both fans are expected to auto start and one fan must be stopped.
B - Incorrect - One fan must be stopped to limit the filter flow rate.
D - Incorrect - One pressurization fan for each Unit through its respective (independent) filter train is required.
Lesson Plan/Objective:RO-C-EOP03/#22

Reference:01-OHP-4023-E-0, Reactor Trip or Safety Injection Attachment A pg. 35
PSBD 12-OHP-4023-E-0 background document pg. 75

Generic
Radiological Controls
Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.
RO-2.9 SRO-3.3

67. 067 1
Answer: C
If the Reactor Coolant Subcooling Margin Monitor is not working properly, which ONE of the following describes the instrumentation used to calculate subcooling per 02-OHP-4023-SUP.001, Subcooling Margin Determination?
A. Use 8 highest CETC average and lowest RCS wide range pressure

B. Use 8 highest CETC average and lowest RVLIS pressure.

C. Use 5 highest CETC average and lowest RVLIS pressure.

D. Use 5 highest CETC average and lowest RCS wide range pressure.

ANSWER: %Answer%
02-OHP-4023-SUP.001, Subcooling Margin Determination requires the use of the lowest RVLIS pressure instrument and the 5 highest CETCs.

A - Incorrect - Meter uses average of 8 CETCs, but procedure uses 5. Also RCS wide range is NOT used.
B - Incorrect - Meter uses average of 8 CETCs, but procedure uses 5.
D - Incorrect - RCS wide range is NOT used.

Lesson Plan/Objective:RO-C-00200/#9

Reference:02-OHP-4023-SUP.001, Subcooling Margin Determination pg. 2-3

Generic
Emergency Procedures/Plan
Ability to identify post-accident instrumentation.
RO-3.5 SRO-3.8

68. 068 3
Answer: B
Unit 2 has experienced a large break LOCA with complications. The crew is performing the steps of 02-OHP-4023-ECA-1.1, Loss of Emergency Coolant Recirculation, when the STA announces that two of the critical safety functions are indicating an ORANGE path.

The ORANGE path identified procedures are:
□□02-OHP-4023-FR-C.2, Response to Degraded Core Cooling
□□02-OHP-4023-FR-Z.1, Response to High Containment Pressure

Which ONE of the following describes the required action and reason based on these conditions?

A. Immediately implement 02-OHP-4023-FR-Z.1 since the containment is the last remaining fission product barrier.

B. Immediately implement 02-OHP-4023-FR-C.2 since protection of the cladding is the highest priority.

C. Continue with 02-OHP-4023-ECA-1.1 since the Loss of Recirculation capability must be resolved before Function Restoration Procedures are implemented.

D. Continue with 02-OHP-4023-ECA-1.1 while also performing the steps of 02-OHP-4023-FR-Z.1 since protection of containment is critical.

ANSWER: %Answer%
Procedural usage requires performance of the highest priority RED or ORANGE path procedure. This would require implementing 02-OHP-4023-FR-C-2 since restoration of heat removal is vital to prevent failure of the fuel matrix/cladding.

A - Incorrect - Containment is the 3rd barrier. On a LOCA the RCS pressure boundary is lost but the cladding remains. Protection of cladding is a higher priority.
C - Incorrect - ORANGE path represent a severe challenge and must be implemented immediately even during ECA-1.1.
D - Incorrect - A transition must be made to the FR and the required FR is 02--OHP-4023-FR-C-2
Lesson Plan/Objective:RO-C-EOP01/#22

Reference:RO-C-EOP01, Introduction to EOPs and Rules of Usage pg. 20-24

Generic
Emergency Procedures/Plan
Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.
RO-2.8 SRO-3.8

69. 069 5
Answer: D
Unit 2 has experienced a loss of both CCW pumps in MODE 3.

The following plant conditions exist:
- NEITHER Unit 2 CCW pump can be restarted.
- CVCS crosstie from Unit 1 is NOT available.
- BOTH Unit 2 CCPs are running because a CCP swap was in progress.
- 02-OHP-4022-016-004, Loss of Component Cooling Water, is in progress.

Which ONE of the following describes the procedural requirements for CCP operation based on these conditions?

A. Immediately stop both CCPs.

B. Immediately stop one CCP; stop the second CCP within 1-1/2 minutes of the event.

C. Stop BOTH CCPs within 1-1/2 minutes of the event.

D. Immediately stop one CCP; run the second CCP as long as it continues to operate.

ANSWER: %Answer%
02-OHP-4022-016-004 has a note prior to step 4 that describes the possible damage that may occur to a CCP on the loss of CCW. The note and procedure directs that one CCP be saved until CCW is restored. The other pump should be run as long as possible to allow time to align Seal injection crosstie.

A - Incorrect - One pump should be run as long as possible to allow time to align Seal injection crosstie.
B - Incorrect - One pump should be run as long as possible to allow time to align Seal injection crosstie. (The pump may trip after 1.5 minutes)
C - Incorrect - One pump should be run as long as possible to allow time to align Seal injection crosstie. (The pump may trip after 1.5 minutes)
Lesson Plan/Objective:RO-C-AOP-5/AOP5.13

Reference:02-OHP-4022-016-004, Loss of Component Cooling Water pg. 4-5

Generic
Emergency Procedures/Plan
Knowledge of loss of cooling water procedures.
RO-3.3 SRO-3.7

70. 070 3
Answer: C
When Rod Control was placed in AUTO during a Unit 2 power escalation the following conditions were noted:

- Nuclear Instrumentation Power Range Channels 15% and rising
- Power Range Low Power Trip NOT Blocked
- Intermediate Range Trip NOT Blocked
- Control rods withdrawing at 64 steps per minute

Which ONE of the following actions are required in accordance with 02-OHP-4022-012-003, Continuous Control Bank Movement?

A. Trip the reactor if rods do not automatically stop at the 16% Low Power Rod Stop.

B. Trip the turbine, verify automatic reactor trip, and initiate emergency boration.

C. Place Rod Control in MANUAL. Manually trip the reactor if rod motion continues.

D. Place Rod Control in MANUAL. Verify automatic reactor trip at 20% if rod motion continues.

ANSWER: %Answer% - Per 02-OHP-4022-012-003, Continuous Control Bank Movement, the reactor should be tripped if movement continues after rods are placed in Manual.

A - Incorrect - Rod stop is at 16% power. The procedure directs a manual trip after placing rods in manual.
B - Incorrect - The turbine is not tripped before a reactor trip is attempted.
D - Incorrect - The procedure directs a manual trip after placing rods in manual.

Lesson Plan/Obj: RO-C-AOP-7 / #5

Reference: 02-OHP-4022-012-003, Continuous Control Bank Movement

Continuous Rod Withdrawal
- Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Proper actions to be taken if automatic safety functions have not taken place

71. 071 3
Answer: C
Unit 2 is operating at 100% power, with Pressurizer Pressure Control selected to Channel 1-2.

Annunciator Panel 208 Drop 7, Pressurizer Pressure High Deviation alarms.

The following conditions exist:
- Pressurizer Spray Valve 2-NRV-163 is full OPEN
- Pressurizer Spray Valve 2-NRV-164 is full OPEN
- Pressurizer Pressure Channels all indicate 2200 psig and lowering.
- 2-RU-27, PRZ Pressure Controller indicates 90%

The RO attempts to take manual control of 2-RU-27, PRZ Press Control, but determines it will not transfer to manual.

Based on these conditions, which ONE of the following actions must be performed according to 2-OHP 4022.013.009, Pressurizer Pressure Instrument Malfunction?

A. Trip the reactor and turbine. Perform the immediate actions of E-0, REACTOR TRIP OR SAFETY INJECTION.

B. Defeat pressure channel NPP-151 and declare E CCP INOPERABLE.

C. Manually close both pressurizer spray valves.

D. Manually close the Pressurizer PORV, 2-NRV-152.

ANSWER: %Answer%
The indications given represent a failure high of 2-RU-27,PRZ Press Control. This will cause the spray valves to open, the high pressure alarm, and actual pressure to lower. Closing the Spray valves will stop the pressure lowering. The heaters will need to be energized to restore pressure to the Normal Operating band.

A - Incorrect - A reactor Trip is NOT required and is not directed by the procedure.
B - Incorrect - All pressurizer channels are indicating normally (lowering). This would be required if NPP-151 had failed.
D - Incorrect - The PORV would NOT be open with the PRZ Press Controller failed. while this would provide one signal to open the PORV, the bistable channel would also have to rise.

Lesson Plan/Objective:RO-C-AOP01/AOP1.5

Reference:02-OHP 4022.013.009, Pressurizer Pressure Instrument Malfunction pg. 3-4

Pressurizer Pressure Control (PRZ PCS) Malfunction
Emergency Procedures/Plan
Knowledge of abnormal condition procedures.
RO-3.4 SRO-3.6

72. 072 1
Answer: D
The following U2 plant conditions exist:
- All RCPs Running
- PRZ level 58% rising
- RCS pressure 2080 psig lowering

Which ONE of the following failures would have caused these plant conditions?
A. Pressurizer Master Level Controller Output failed HIGH

B. Pressurizer Master Pressure Controller Output failed LOW

C. CCP Discharge Flow Control 2-QRV-251 Failed OPEN

D. Pressurizer PORV 2-NRV-153 failed OPEN

ANSWER: %Answer%
PORV 2-NRV-153 failing open will cause Pressurizer Level to Rise as pressure continues to fall.

A - Incorrect - The level Controller failing low would cause charging to raise but pressure would not lower.
B - Incorrect - The pressure controller failing low would cause pressure to raise.
C - Incorrect - The CCP flow control valve failing Open would cause charging to raise but pressure would not lower.

Lesson Plan/Objective:RO-C-EOP09/#22

Reference:RO-C-EOP09, LOCAs, E-1 Series EOPs, and Background Information pg. 186

Pressurizer Pressure Control (PRZ PCS) Malfunction
Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions:
PZR level
RO-3.7 SRO-3.8

73. 073 1
Answer: A
Unit 2 was operating at 80% power when the following alarms were received:

Annunciator Panel 213 Drop 11 Steam Gen 1 Steam Line Flow High
Annunciator Panel 213 Drop 31 Steam Gen 2 Steam Line Flow High
Annunciator Panel 214 Drop 11 Steam Gen 3 Steam Line Flow High
Annunciator Panel 214 Drop 31 Steam Gen 4 Steam Line Flow High

The following conditions exist:

- RCS Tavg - 565^{o}F, lowering
- Turbine load is stable
- Rods are stepping out
- SG flows are - 3.4 x 10^{6} lbm/hr

Which one of the following correctly describes the cause and required action to be taken for the above conditions?

A. A steam line break requires a Reactor Trip and Main Steamline Isolation.

B. A failed open SG PORV requires isolation.

C. MPC-253 has failed HIGH, perform actions for failed First Stage Turbine Impulse Pressure Transmitter.

D. MPC-253 has failed LOW, perform actions for failed First Stage Turbine Impulse Pressure Transmitter.

ANSWER: %Answer%
Based on the conditions presented a steam line break has occurred. Steam flow is indicating at the 92 to 93% power range. Tavg is 3.5^{o}F Low. A reactor trip and Steam Line isolation is warranted.

B - Incorrect - SG PORVs are rated at about 10% flow for all 4 PORVs. A single SG PORV would not cause a steam flow change of 12%.
C - Incorrect - If MPC 253 failed high rods would step in but Tavg would not be low and steam flows would not be this high.
D - Incorrect - If MPC-253 failed low the alarms would come in (Steam flow higher than calculated power) but rods would step out and actual steam flows would not be this high.
Lesson Plan/Objective:RO-C-05103/#9

Reference:RO-C-05103 Main Steam Systems pg. 9
SD-01100 RPS/ESFAS Signals System Description pg. 56

Steam Line Rupture
Ability to determine and interpret the following as they apply to the Steam Line Rupture:
Conditions requiring a reactor trip
RO-4.6 SRO-4.7

74. 074 5
Answer: C
Chemistry had confirmed two leaking fuel rods on Unit 1 when a Small Break LOCA occurred 12 hours ago.

The following conditions exist on Unit 1:
- All Red and Orange Paths have been addressed.
- Containment pressure is 1.0 psig.
- Containment air temperature is 215ºF.
- Lower Containment high range area monitors, (VRA-1310/1410) are reading 10 R/HR
- 01-OHP-4023-FR-Z.3, Response to High Containment Radiation Level, is entered.

In accordance with 01-OHP-4023-FR-Z.3, which ONE of the following must be verified?
A. Both Containment Recirculation Fans (CEQ) are running.

B. Upper and Lower Containment Ventilation Fans (CUV/CLV) are running.

C. Containment Ventilation Isolation has occurred.

D. Control Room Ventilation System is in ISOLATE.

ANSWER: %Answer% -
01-OHP-4023-FR-Z.3 requires the crew to verify Containment Ventilation Isolation.

A - Incorrect - Containment Recirculation Fans are run to help reduce Hydrogen Buildup. They are NOT run in 01-OHP-4023-FR-Z.3.
B - Incorrect - Containment Ventilation fans are tripped on a Containment Isolation signal.
D - Incorrect - Control Room Ventilation is aligned during a SI but is not addressed in 01-OHP-4023-FR-Z.3.

Lesson Plan/Objective:RO-C-EOP13/#6

Reference:01-OHP-4023-FR-Z.3, Response to High Containment Radiation Level pg. 2

Area Radiation Monitoring (ARM) System Alarms
Emergency Procedures/Plan
Knowledge symptom based EOP mitigation strategies.
RO-3.1 SRO-4.0

75. 075 1
Answer: D
Unit 1 is operating at 90% power with all systems in automatic. The control rods begin to step.

The following conditions exist:
- Tave - RISING
- Tref - CONSTANT
- Pressurizer pressure - RISING
- Pressurizer level - RISING

These symptoms are consistent with which ONE of the following events?
A. One control rod has ejected from the core

B. A SG PORV has failed open

C. A pressurizer steam space leak has developed

D. A continuous rod withdrawal is occurring

ANSWER: %Answer%
With a continuous rod withdrawal RCS tavg will rise along with Pressurizer pressure and level.

A - Incorrect - Pressurizer Pressure and level would be lowering.
B - Incorrect - RCS Tavg would start to cool down and Pressurizer pressure and level would be lowering.
C - Incorrect - Pressure would be lowering.
Lesson Plan/Objective:RO-C-AOP-7/AOP7.1

Reference:RO-C-AOP-7, Abnormal Operating Procedures – Day 7 pg. 16

Control Rod Drive System
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including:
Location and interpretation of RCS temperature and pressure indications
RO-4.2 SRO-4.4

76. 076 1
Answer: B
Which ONE of the following completes the following statements?

The RCP Bearing Lift Pump WHITE light will illuminate __(1)__ after sufficient oil pressure is developed. The RCP Bearing Lift pump__(2)__ required to be started on a RCP Shutdown.

	(1)	(2)
A.	immediately	is
B.	immediately	is NOT
C.	2 minutes	is
D.	2 minutes	is NOT

ANSWER: %Answer%
The White Light is the RCP L.O. Start Permissive which will illuminate as soon as pressure is developed with the Lift Pump running. The Lift pump is NOT started for a pump shutdown.

A - Incorrect - The Lift pump is NOT started for a pump shutdown.
C - Incorrect - The pump must be run for two minutes prior to starting the RCP but the light is not delayed. The Lift pump is NOT started for a pump shutdown.
D - Incorrect - The pump must be run for two minutes prior to starting the RCP but the light is not Delayed.

Lesson Plan/Objective:RO-C-00201/#9

Reference:02-OHP-4021-002-003, Reactor Coolant Pump Operation pg. 13
OP-1-98201-12 Reactor Coolant System Sheet No. 1 Elementary Diagram

Reactor Coolant Pump System (RCPS)
Ability to manually operate and/or monitor in the control room:
RCP lube oil and lift pump motor controls
RO-2.8 SRO-2.5

77. 077 2
Answer: B
Unit 2 is performing actions of 02-OHP-4023-E-1, Loss of Reactor or Secondary Coolant, in response to a Large Break LOCA. On the Reactor Trip power was lost to 600 volt C bus, EZC-C.

The Crew has met the criteria to isolate the SI Accumulators.

Which ONE of the following describes the method required to complete this isolation based on these conditions?

Dispatch operators to energize the Accumulator outlet valves on...
A. 2-EZC-A and 2-EZC-D and then manually close all 4 accumulator outlet valves.

B. 2-EZC-A, 2-EZC-B, and 2-EZC-D and then manually close 3 accumulator outlet valves. Depressurize the remaining accumulator.

C. 2-ABV-A and 2-ABV-D and then manually close all 4 accumulator outlet valves.

D. 2-EZC-B and then manually close 2 accumulator outlet valves. Depressurize the remaining 2 accumulators.

ANSWER: %Answer%
The Accumulator Outlet valves are powered from 2-EZC-A, 2-EZC-B, 2-EZC-C, and 2-EZC-D. With power lost to 600 volt C bus, EZC-C, 2-IMO-110 will NOT close. The Crew will need to depressurize Accumulator #1.

A - Incorrect - Accumulators are powered from All 4 EZC Buses.
C - Incorrect - Accumulators are powered from All 4 EZC Buses.
D - Incorrect - Accumulators are powered from All 4 EZC Buses.
Lesson Plan/Objective:RO-C-00800/#5

Reference:02-OHP-4023-E-1, Loss of Reactor or Secondary Coolant pg. 16-18
RO-C-00800, Emergency Core Cooling System Handout 2 pg. 1-2

Emergency Core Cooling System (ECCS)
Knowledge of bus power supplies to the following:
Valve operators for accumulators
RO-2.5 SRO-2.9

78. 078 1
Answer: C
The RO has noted a rising level in the Pressurizer Relief Tank (PRT).

Which ONE of the following RELIEF VALVES might be discharging to the PRT?
A. 1-SV-62-1, RCP Thermal Barrier Relief Valve

B. 1-SV-64, Excess Letdown Heat Exchanger CCW Relief Valve

C. 1-SV-98S, SI Pump Discharge Relief Valve

D. 1-SV-52, Letdown Heat Exchanger Outlet Relief Valve

ANSWER: %Answer%
1-SV-98S, SI pump discharge pipe relieves to the PRT.

A - Incorrect - Relieves to the Containment Floor
B - Incorrect - Relieves to the Containment Floor (Excess Letdown/seal return line relieves to PRT)
D - Incorrect - Relieves to VCT (Letdown Orifice outlet relief goes to PRT)
Lesson Plan/Objective:RO-C-00202/#11

Reference:RO-C-00800, Emergency Core Cooling System pg. 37

Pressurizer Relief Tank/Quench Tank System (PRTS)
Ability to monitor automatic operation of the PRTS, including:
Components which discharge to the PRT
RO-2.7 SRO-2.9

79. 079 2
Answer: A
Following a LOCA with subsequent ECCS failures, the crew is performing the actions in 01-OHP-4023-FR-C.2, Response To Degraded Core Cooling.

The following conditions exist:
- RCS Pressure - RISING.
- Annunciator #108 Drop 6 Pressurizer Pressure High - High - LIT
- Pressurizer PORVs are open
- Core Cooling has NOT been restored

Which ONE of the following describes the required operation of the Pressurizer PORVs in this event?

A. Allow the PORVs to operate for RCS overpressure control as necessary.

B. Place the PORVs in OPEN to depressurize the RCS until the SI accumulators inject.

C. Isolate the PORVs to prevent further loss of RCS inventory.

D. Place the PORVs in CLOSE until required for inadequate core cooling conditions.

ANSWER: %Answer%
Per Step 6 of 01-OHP-4023-FR-C.2, the PORVs are verified closed with block valves open. This is to ensure that a PORV remains available to preclude use of the safety valves. Given the High pressure alarm (2385 psig) the PORVs should be allowed opened to reduce pressure and then verified reclosed.

B - Incorrect - The RCS is Not depressurized with the PORV in FR-C.2 (although this may be performed in FR-C.1)
C - Incorrect - The PORV should not be isolated since its operation is required to prevent lifting the safety valves.
D - Incorrect - The PORV should not be placed in close since its operation is required to prevent lifting the safety valves.

Lesson Plan/Objective:RO-C-EOP10/#13

Reference:01-OHP-4023-FR-C.2, Response To Degraded Core Cooling pg. 7
PSBD 12-OHP-4023-FR-C.2 Background Document Step 6 Basis pg. 12

Degraded Core Cooling
Conduct of Operations
Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
RO-3.7 SRO-4.4

80. 080 5
Answer: B
A LOCA is in progress, and the control room operators are attempting to stabilize plant conditions.

The following plant conditions exist:

- Core Exit TC's are 450^{O}F.
- RCS Pressure is 400 psig.
- RVLIS Narrow Range is 76%.
- RVLIS Wide Range is 27%.
- ALL RCPs are OFF.

Which ONE of the following describes current core conditions and operational requirements?(02-OHP-4023-F-0.2, Core Cooling status tree attached)

A. Subcooled. Operator action is not required because core cooling is satisfactory.

B. Saturated. At their discretion, the operators may perform 02-OHP-4023-FR-C.3, Response to Saturated Core Cooling to restore subcooled core cooling.

C. Degraded. Prompt action must be taken as per 02-OHP-4023-FR-C.2, Response to Degraded Core Cooling or conditions could degrade to an inadequate core cooling condition.

D. Inadequate. Immediate action must be taken as per 02-OHP-4023-FR-C.1, Response to Inadequate Core Cooling or core uncovery and fuel damage could occur.

ANSWER: %Answer%

400 psig = 414.7 psia = 448^{O}F indicating that Subcooling is <36^{O}F. With NO RCPs running and NR RVLIS > 46% the correct procedure would be 02-OHP-4023-FR-C.3, Response to Saturated Core Cooling. This is a yellow path procedure so discretion is allowed.

A - Incorrect - The plant is saturated.
C - Incorrect - Temperature is low enough and there is enough inventory that a degraded condition does not exist.
D - Incorrect - Temperature is low enough and there is enough inventory that an inadequate condition does not exist.

Lesson Plan/Objective:RO-C-EOP10/#21

Reference:02-OHP-4023-F-0.2, Critical Safety Functions Status Trees, Core Cooling

Saturated Core Cooling
Ability to determine and interpret the following as they apply to the Saturated Core Cooling:
Facility conditions and selection of appropriate procedures during abnormal and emergency operations
RO-3.2 SRO-4.0
Provide ATTACHMENT - 02-OHP-4023-F-0.2, Core Cooling status tree

81. 081 1
Answer: C
Which of the following describes the proper operator actions following a steam line break which results in an entry to 02-OHP-4023-FR-P.1, Response to Imminent Pressurized Thermal Shock Condition?

A. Hold RCS temperature stable, AND
   Maintain RCS pressure stable to allow soak

B. Allow RCS to heat up, AND
   Decrease RCS pressure to minimize subcooling

C. Hold RCS temperature stable, AND
   Decrease RCS pressure to minimize subcooling

D. Allow RCS to heat up, AND
   Maintain RCS pressure stable to allow soak

ANSWER: %Answer%
02-OHP-4023-FR-P.1, Response to Imminent Pressurized Thermal Shock Condition directs the operator to Stop the Cooldown, Terminate SI, Depressurize the RCS, and Stabilize/Soak the RCS.

A - Incorrect - The RCS is depressurized.
B - Incorrect - The RCS is NOT allowed to heat back up.
D - Incorrect - The RCS is NOT allowed to heat back up and the RCS is depressurized.
Lesson Plan/Objective:RO-C-EOP12/#28

Reference:RO-C-EOP12, Integrity CSFST, FR-P Series EOPS, and Background Information pg. 24-27
02-OHP-4023-FR-P.1, Response to Imminent Pressurized Thermal Shock Condition pg. 12-17

Pressurized Thermal Shock
Knowledge of the reasons for the following responses as they apply to the Pressurized Thermal Shock:
Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations
RO-3.7 SRO-3.8

82. 082 2
Answer: B
Unit 1 reactor has been manually tripped due to a secondary system malfunction. 01-OHP-4023-E-0 has been performed and a transition made to 01-OHP-4023-ES-0.1, Reactor Trip Response. The STA has identified a YELLOW path on the Heat Sink Status Tree for steam generator pressure.

The crew has entered 01-OHP-4023-FR-H.2, Response to Steam Generator Overpressure.

The following conditions exist:
- Steam Generator #13 Pressure - 1100 psig
- Steam Generator #13 NR Level - 90%

The crew is preparing to dump steam from the affected steam generator. The US reads the next step which requires a transition to 01-OHP-4023-FR-H.3, Response to Steam Generator High Level. Which ONE of the following describes the reason the crew is required to make the transition to 01-OHP-4023-FR-H.3?

Dumping steam as directed in 01-OHP-4023-FR-H.2 ...
A. will be ineffective in lowering SG pressure since the SG water is likely subcooled.
B. may result in two phase flow and water hammer, potentially damaging pipes and valves.
C. will cause a rapid pressure drop in the RCS, potentially resulting in a safety injection.
D. may cause an uncontrolled radiation release since it is likely that the steam generator is ruptured.

ANSWER: %Answer%
Per 01-OHP-4023-FR-H.2 Step 3, if the SG level is >88% a transition is made to 01-OHP-4023-FR-H.3 to address the high level that may be causing the pressure concern. Also as discussed in 01-OHP-4023-FR-H.3 Step 1, with a high SG level steam should not be released until the steam lines can be evaluated.

A - Incorrect - Opening the SG would lower pressure and allow the water to flash to steam (reach the saturation Pressure)
C - Incorrect - The level in the SG should have little effect on the RCS pressure drop.
D - Incorrect - A SGTR would lead to a SI and the operators would not be performing these procedures.
Lesson Plan/Objective:RO-C-EOP11/#10

Reference:01-OHP-4023-FR-H.2, Response to Steam Generator Overpressure pg. 2
01-OHP-4023-FR-H.3, Response to Steam Generator High Level pg. 2
PSBD 12-OHP-4023-FR-H.2 Background Document pg. 7
PSBD 12-OHP-4023-FR-H.3 Background Document pg. 5-6

Steam Generator Overpressure
Knowledge of the reasons for the following responses as they apply to the Steam Generator Overpressure:
RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated
RO-3.1 SRO-3.3

83. 083 111
Answer: A
A Unit 1 startup is in progress.

The following conditions exist:
- The reactor is critical in the source range.
- A loss of power to the CRID 2 bus occurs.

Which ONE of the following actions will occur?
A. Reactor trips and N32 Source Range channel is de-energized.
N31 Source Range channel is still in operation.

B. Reactor trips and N31 Source Range channel is de-energized.
N32 Source Range channel is still in operation.

C. The reactor is critical and N32 Source Range channel is de-energized.
N31 Source Range channel is still in operation.

D. Reactor trips and BOTH source range channels are de-energized.

ANSWER: %Answer%
With a normal startup in progress the loss of CRID 2 causes a loss of N32, N36, and N42. A loss of N32 (SR) or N36 (IR) at low power will cause a reactor trip. (N36 trips the reactor even if SR is blocked by P-6)

B - Incorrect - Reactor trips but N31 is still energized
C - Incorrect - Reactor trips on a number of PR/SR trip setpoints.
D - Incorrect - Reactor trips but N31 is still energized. P- 10 will NOT turn off both SR's because only 1 PR channel is affected.
Lesson Plan/Objective:RO-C-01300/#12

Reference:01-OHP-4021-082-008 Operation of CRID Power Supplies Table 2 pg. 128
RO-C-01300 Excore Nuclear Instrumentation System Handout 3 pg. 1-2

Nuclear Instrumentation System
Knowledge of bus power supplies to the following:
NIS channels, components, and interconnections
RO-3.3 SRO-3.7

84. 084 3
Answer: C
Unit 2 has experienced a NESW rupture inside containment. The crew has entered 02-OHP-4022-020-001, NESW System Loss/Rupture.

Which ONE of the following describes the required actions and the reason for these actions?

The crew is directed to trip the Reactor and ...
A. stop all RCPs to minimize the risk of fire since RCP fire protection has been lost.

B. stop all RCPs to prevent pump damage since all RCP cooling has been lost.

C. stop three RCPs. A containment pressure relief is performed to minimize the risk of a safety injection actuation since containment cooling has been lost.

D. stop three RCPs. A containment pressure relief is performed to allow containment purge supply to be started since ice condenser cooling has been lost.

ANSWER: %Answer%
The reactor must be tripped if a loss of NESW to containment occurs. Three RCPs are removed from service to stop heat input to the containment atmosphere during a loss of containment cooling. The heat input would cause a rapid rise in containment pressure, resulting in an SI and CTS actuation based solely on a loss of containment cooling.

A - Incorrect - RCP fire protection is lost but this is not the reason for stopping RCPs. One RCP is maintained operating to aid in a cooldown.
B - Incorrect - RCP motor air coolers are lost, but all cooling is not lost. The primary function of the motor air coolers is to cool the hot exhaust air from the RCP to keep the environment cool and not the pump. One RCP is maintained operating to aid in a cooldown.
D - Incorrect - Ice condenser cooling is provided by the Glycol cooling system which uses NESW to Cool its chillers. A rupture inside containment should not impact this cooling. The containment purge system is not used.
Lesson Plan/Objective:RO-C-AOP-5/AOP5.20

Reference:RO-C-AOP-5, Abnormal Operating Procedures Day 5 pg. 99-100

Containment Cooling System (CCS)
Ability to (a) predict the impacts of the following malfunctions or operations on the CCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Loss of service water
RO-2.9 SRO-3.2

85. 085 3
Answer: D
With Unit 2 at 30% power, which ONE of the following would cause the Containment Ice Condenser to be considered inoperable? (consider each condition independently)
A. Fifteen (15) Ice Condenser Air Handling Units will not run.

B. One Glycol circulating pump will not operate.

C. Two (2) Ice Condenser Refrigeration Units have failed.

D. The Ice Condenser Bed indicates 28^{o}F.

ANSWER: %Answer%
Technical Specification 3.6.5.1 requires the Maximum Ice Bed Temperature to be </= 27^{o}F.

A - Incorrect - There are 60 total Air handling units. 21 are required operable IF the temperature monitoring system is Inoperable.
B - Incorrect - There are 6 Glycol Pumps and only 2 would be required operable IF the temperature monitoring system is Inoperable.
C - Incorrect - There are 5 Refrigeration Units (10 total with sharing capabilities) for unit 2. Only 3 are required operable IF the temperature monitoring system is Inoperable.

Lesson Plan/Objective:RO-C-01000/#12

Reference:Technical Specification 3.6.5.1.c Ice Condenser Ice Bed pg. 3/4 6-35

Ice Condenser System
Conduct of Operations
Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.
RO-3.4 SRO-4.0

86. 086 2
Answer: C
A LOCA has occurred on Unit 2.

The following conditions exist:
- Containment Spray has actuated
- RWST level currently reads 26%
- Spray Additive Tank Flow reads 0 gpm
- Spray Additive Tank Pressure reads 4.0 psig
- Annunciator #205 Drop 2 Spray Additive Tank At 4000 GAL - NOT LIT
- Annunciator #205 Drop 3 Spray Additive Tank Level Low-Low - NOT LIT

What would be the effect of these conditions?

A. Containment pressure peaks at higher value due to the reduced heat removal capacity of the spray.

B. Removal of hydrogen in the containment atmosphere is lower due to the higher iodine concentration.

C. Corrosion of components in containment rises due to lower pH value of the containment sump fluid.

D. Containment radiation levels are higher due to the higher radioactive noble gas production.

ANSWER: %Answer%
The readings presented indicate a failure of the Spray Additive Tank to inject. (0 gpm flow and normal tank pressure with RWST near swapover point). The absence of sodium Hydroxide in the inject will lead to a more acidic environment and higher corrosion rates.

A - Incorrect - Heat removal is Not reduced by the loss of the Spray Additive Tank.
B - Incorrect - Hydrogen removal rate is not affected by iodine concentration.
D - Incorrect - Noble gas production is not affected. Iodine removal rates may be impacted.
Lesson Plan/Objective:RO-C-00900/#13

Reference:Technical Specification Bases 3/4.6.2.2n Spray Additive System pg. B 3/4 6-3

Containment Spray System (CSS)
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including:
Chemical additive tank level and concentration
RO-3.1 SRO-3.4

87. 087 4
Answer: B
Unit 1 is in Mode 5 following a refueling outage. The Containment Purge System was operating in the VENTILATION MODE with the following lineup:

Purge Supply Fan HV-CPS-1 - RUNNING
Purge Exhaust Fan HV-CPX-2 - RUNNING
Purge Supply to Upper Containment VCR-105 and VCR-205 OPEN
Purge Exhaust from Upper Containment VCR-106 and VCR-206 OPEN

Following a HIGH alarm on ERS-1401, Lower Containment Radiation Monitor, the Containment Purge System is aligned as follows:

Purge Supply Fan HV-CPS-1 - RUNNING
Purge Exhaust Fan HV-CPX-2 - RUNNING
Purge Supply to Upper Containment VCR-105 and VCR-205 OPEN
Purge Exhaust from Upper Containment VCR-106 and VCR-206 OPEN

Which ONE of the following describes the required operator actions?
A. Stop the Containment Purge and declare Containment Ventilation Isolation inoperable.

B. Stop the Containment Purge and notify Radiation Protection.

C. Continue the Purge as long as VRS-1101, Containment Normal Range Area Radiation Monitor still indicating as expected.

D. Continue the Purge as long as VRS-1505, Auxiliary Building Ventilation Noble Gas Activity Monitor still indicating as expected.

ANSWER: %Answer%
When the Containment Purge system is operating in the Ventilation Mode, the automatic isolation signals are blocked. The procedure requires the Purge to be stopped and radiation protection notified.

A - Incorrect - When the Containment Purge system is operating in the Ventilation Mode, the automatic isolation signals are blocked.
C - Incorrect - The procedure requires the Purge to be stopped and radiation protection notified.
D - Incorrect - The procedure requires the Purge to be stopped and radiation protection notified. (This monitor is required per ODCM)
Lesson Plan/Objective: RO-C-02800 / #9

Reference: 01-OHP-4021-028-005, Operation of the Containment Purge System Attachment 2 (Ventilation Mode) pg. 23-27

Containment Purge System (CPS)
Conduct of Operations
Ability to perform specific system and integrated plant procedures during all modes of plant operation.
RO-3.9 SRO-4.0

88. 088 5
Answer: C
Unit 1 has experienced a Loss of All AC Power. The turbine-driven auxiliary feedwater pump has tripped.

The following conditions exist:
- Annunciator Panel 114 Drop 10, TDAFP Trip & Throt VLV Unlatched - LIT
- Annunciator Panel 113 Drop 50, TDAFP Overspeed Trip or ABN - LIT

Drop 50 clears when the Annunciator RESET is pressed.

Which ONE of the following statements describes the operator action required to restart the pump?

A. Dispatch an AEO to locally reset mechanical overspeed and latch the TDAFW (Turbine Driven Aux Feed Water) pump Trip and Throttle Valve.

B. Reset the Trip by re-opening the Main Steam to AFP Turbine MOVs (□□□□□□□□□□□□□□□□).

C. Reset the Trip from the Control Room by placing the Trip and Throttle Valve control switch (QT-506) to close and then to open.

D. Reset the Trip and Throttle Valve from the Control Room by closing and then re-opening the operator using the TDAFP Speed Control.

ANSWER: %Answer%
Since Drop 50 reset, the trip is an electrical overspeed trip. The Trip and Throttle valve control switch (QT-506) must be placed to close and then to open to reset the trip signal.

A - Incorrect - Drop 50 will NOT reset if a mechanical overspeed trip is present.
B - Incorrect - The trip and throttle valve must be relatched. The steam supply will not isolate.
D - Incorrect - The TDAFP Speed Control in the control room is no longer functional.
Lesson Plan/Objective:RO-C-05600/#10

Reference: 01-OHP-4024.114 Annunciator Panel 114 Drop 10, TDAFP Trip & Throt VLV Unlatched pg. 17
01-OHP-4024.114 Annunciator Panel 114 Drop 50, TDAFP Overspeed Trip or ABN pg. 74-75
RO-C-05600 Auxiliary Feedwater System pg. 35

Auxiliary / Emergency Feedwater (AFW) System
Emergency Procedures/Plan
Knowledge of annunciators alarms and indications, and use of the response instructions.
RO-3.3 SRO-3.4

89. 089 4
Answer: D
Unit 1 is at 100% power. A relief valve has failed open on 1AB Emergency Diesel Generator Starting Air Receiver #1. The associated starting air compressor has tripped off.

Which one of the following correctly describes the response of 1AB Emergency Diesel Generator if a start signal occurs before any operator action?

The EDG will ...
A. NOT start because the starting air system will be depressurizing or completely depressurized.

B. start from #2 Starting Air Receiver but only in the slow speed mode with NO jet assist.

C. start in the normal time from #2 Starting Air Receiver but only half of the cylinders will receive starting air pressure.

D. start in the normal time from #2 Starting Air Receiver but only one starting air valve will supply all of the cylinders with starting air pressure.

ANSWER: %Answer%
Only 1 Starting air valve will pass the required starting air pressure to the common header that supplies the starting air manifolds that distributes the air to the cylinders.

A - Incorrect - The engine will start since the air receivers are independent.
B - Incorrect - The engine will start normally (fast speed) with all of the required air supplied from the #2 receiver.
C - Incorrect - All cylinders will receive the normal starting air pressure since the air system is crosstied downstream of the starting air valves.
Lesson Plan/Objective:RO-C-03201/#6

Reference:RO-C-03201 Diesel Generator Auxiliaries System Description Fig. 5 TP-29

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:
Air receivers
RO-2.7 SRO-2.9

90. 090 1
Answer: B
Which ONE of the following describes three sources of liquid waste to the Reactor Coolant Drain Tank?

A. Excess Letdown Heat Exchanger , Lower Containment Sump, Charging Line Suction Relief

B. RCS Loop Drains, Reactor Vessel Flange Leak Off, SI Accumulator Tank Drains

C. RCS Loop Drains, Pressurizer Relief Tank, Reactor Cavity Sump

D. RCP Thermal Barrier Relief, Excess Letdown/Seal Return Relief, Reactor Vessel Flange Leak Off

ANSWER: %Answer%
RCS Loop Drains, Reactor Vessel Flange Leak Off, SI Accumulator Tank Drains all discharge to the RCDT

A - Incorrect - Discharges to RCDT, Dirty waste HUT, and PRT respectively
C - Incorrect - Discharges to RCDT, Clean waste HUT (uses RCDT pumps), and Dirty waste HUT respectively
D - Incorrect - Discharges to Containment Floor, PRT, and RCDT respectively
Lesson Plan/Objective:RO-C-02200/#3

Reference:SD-02200, Figure 2, RCDT and Miscellaneous Containment Inputs to Clean Waste Holdup Tank (TP-9)

Liquid Radwaste System (LRS)
Knowledge of the physical connections and/or cause-effect relationships between the Liquid Radwaste System and the following systems:
Sources of liquid wastes for LRS
RO-2.7 SRO-2.9

91. 091 1
Answer: B
The In-Service Waste Gas Decay Tank #2 has a Hydrogen concentration of 4.8%.
Per Technical Specification 3.11.2.1, Explosive Gas Mixture, which ONE of the following is the HIGHEST Oxygen concentration allowed?
A. 2.0 %

B. 3.0 %

C. 4.0 %

D. 5.0 %

ANSWER: %Answer%
Technical Specification 3.11.2.1, Explosive Gas Mixture requires Oxygen Concentration of less than or equal to 3% when Hydrogen concentration is > 4%

A - Incorrect - 3.0% is the Highest allowed.
C- Incorrect - Only if H2 <4%
D- Incorrect - Only if H2<4%

Lesson Plan/Objective:RO-C-02300/#11

Reference:Technical Specification 3.11.2.1, Explosive Gas Mixture pg. 3/4 11-2

Waste Gas Disposal System (WGDS)
Knowledge of the operational implications of the following concepts as they apply to the Waste Gas Disposal System:
Relationship of hydrogen/oxygen concentrations to flammability
RO-2.5 SRO-3.1

92. 092 3
Answer: B
Which ONE of the following describes the Unit 1 Control Room Ventilation System damper alignment following receipt of a ERS-7401 Control Room Radiation Monitor High alarm?

	1-HV-ACR-DA-1 Control Rm Vent Intake Damper	1-HV-ACR-DA-2 CR PRZN CLN-UP Intake Damper	1-HV-ACR-DA-3 CR PRZN CLN-UP Recirc Damper
A.	Closed	Open	Closed
B.	Closed	Partially Open	Open
C.	Open	Open	Open
D.	Closed	Partially Open	Closed

ANSWER: %Answer%
On receipt of a high radiation alarm the control room intake damper (1-HV-ACR-DA-1) closes and the Clean up damper (1-HV-ACR-DA-2) partially opens. The recirc damper (1-HV-ACR-DA-3) remains open.

A - Incorrect - DA-2 will not be full open and DA-3 will be open.
C - Incorrect - DA-1 will be closed and DA-2 will not be full open
D - Incorrect - DA-3 will be open

Lesson Plan/Objective:RO-C-02801A/#8

Reference:12-OHP-4024-139 Annunciator #139 Response: Radiation Drop #12 ERS-7400 pg. 44-45

Area Radiation Monitoring (ARM) System
Knowledge of the physical connections and/or cause-effect relationships between the ARM system and the following systems:
Control room ventilation
RO-3.3 SRO-3.5

93. 093 4
Answer: A
Which ONE of the following is the correct sequence of events that automatically occur in the Control and Plant Air Systems as air pressure lowers?

A.	95 psig at PPS-10 (20)	Standby PAC starts
	90 psig CAS wet receiver pressure	CAC starts
	85 psig at PPS-11 (21)	Plant air header isolates
B.	100 psig at PPS-10 (20)	Standby PAC starts
	95 psig CAS wet receiver pressure	CAC starts
	90 psig at PPS-11 (21)	Plant air header isolates
C.	100 psig CAS wet receiver pressure	CAC starts
	95 psig at PPS-10 (20)	Standby PAC starts
	90 psig at PPS-11 (21)	Plant air header isolates
D.	95 psig at PPS-10 (20)	CAC starts
	90 psig at PPS-11 (21)	Standby PAC starts
	85 psig CAS wet receiver pressure	Plant air header isolates

ANSWER: %Answer% - Per SD-06401-002, Compressed Air System description, the following are the Plant/Control Air Pressure Setpoints:

Air Header Pressure:
125 Safeties open
105 BAC unloads
104 PAC surge unloader opens
100 CAC unloads
98 PA header unisolates
97 PA alarm 'PAC fail/low press'
95 STANDBY PAC starts
95 CA low press alarm
90 CAC auto start
85 Plant air header isolates
80 Manual reactor trip

B - Incorrect Setpoints
C - Incorrect Setpoints and Order
D - Incorrect Setpoints and Order

Lesson Plan/Objective: RO-C-06401 / #4

Reference: SD-06401-002, Compressed Air System Description pg. 38

Instrument Air System (IAS)
Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following:
Cross-over to other air systems
RO-3.2 SRO-3.5

94. 094 3
Answer: C
Both Units are responding to a loss of Plant Air (PA) and Control Air (CA) event.

The following conditions exist:
- Both Unit's Plant Air Compressors (PAC's) have failed.
- Both Unit's Control Air Compressors (CAC's) have failed.
- Both Unit's PA Header pressures are 70 psig and lowering.
- Both Unit's CA Header pressures are 80 psig and lowering.
- An AEO has been dispatched to start the Back-up Plant Air Compressor (B/U PAC), per 01-OHP-4022-064-001, Control Air Malfunction.

Which ONE of the following statements describes the B/U PAC ability to repressurize both Unit's Control Air Systems under these conditions?

A. PRV-10 or PRV-11, Plant Air Header Crosstie Valves to Unit 2, must be jumpered and reopened.

B. PRV-20 or PRV-21, Plant Air Header Crosstie Valves to Unit 1, must be jumpered and reopened.

C. The B/U PAC will discharge to both Unit's Control Air Systems.

D. The B/U PAC to Plant Air Receiver crosstie must be manually opened.

ANSWER: %Answer%
The Backup Air compressor discharges into the section of piping between the Plant Air header crosstie valves. This is also where the Control Air headers are connected allowing the backup air compressor to supply control air.

A - Incorrect - This would supply backup air to Unit 1.
B - Incorrect - This would supply backup air to Unit 2.
D - Incorrect - There is no crosstie valve to the Plant Air Receivers and Plant Air is isolated from Control Air.

Lesson Plan/Objective:RO-C-06401/#3

Reference: SD-06401-002, Compressed Air System Description Fig. 1 TP-14

Station Air System (SAS)
Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following:
Cross-connect with IAS
RO-2.9 SRO-3.2

95. 095 1
Answer: B
Unit 1 is at 50% power. Annunciator 118, Drop 84 ESW Pipe Tunnel Sump Level Hi-Hi is received. In accordance with the annunciator response procedure, you dispatch an operator to investigate the alarm.

Which ONE of the following is the correct response based on this condition?

Your briefing to the operator should include direction to...
A. open 2-DR-271 ESW Pipe Tunnel emergency Flood Drainage Shutoff valve to drain the ESW Pipe Tunnel to the sub-basement.

B. hook up a tygon hose to the telltale drain before opening the door to the ESW Pipe Tunnel.

C. operate the Heater Drain Pump Area Flood Control Pump from the 591' elevation before entering the ESW Pipe Tunnel.

D. first enter the AB Diesel Generator Room to observe the water level in the Diesel Oil Pit Sump.

ANSWER: %Answer%
The annunciator response procedure directs the operator to hook up a tygon hose to the telltale drain (1-DR-272) to determine the water level in the ESW Pipe Tunnel before attempting to open the water tight door.

A - Incorrect - This valve is used as a point to connect a 4" hose to route water to the Heater Drain Area Sump if required.
C - Incorrect - This is used if the heater drain pump room sump level is high.
D - Incorrect - This does not open into the ESW pipe tunnel (and is not directed by ARP)

Lesson Plan/Objective:RO-C-ADM1/#20

Reference:01-OHP-4024-118 Annunciator #118 Response Drop 84 ESW Pipe Tunnel Sump Level Hi-Hi pg 146-147

Generic
Conduct of Operations
Ability to coordinate personnel activities outside the control room.
RO-3.8 SRO-3.6

96. 096 5
Answer: B
During a power escalation, the following conditions are noted:

- Annunciator 210, Drop 44, Reactor Delta Flux Deviation, has been LIT for more than 15 minutes and verified valid.
- Reactor power at 85%

Which ONE of the following actions must be taken?

A. Within 30 minutes restore Axial Flux Difference to within the limits or be in Hot Standby in the next 6 hours.

B. Within 30 minutes reduce power to less than or equal to 50% and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% within the next 4 hours.

C. Within 15 minutes verify Axial Flux Difference is within COLR limits (doghouse) and stop the power escalation until Axial Flux Difference is restored to within the target band.

D. Within 15 minutes reduce power by at least 3% from rated thermal power for every 1% that Axial Flux Difference exceeds the limit, and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours.

ANSWER: %Answer%
Annunciator 210 drop 44 will alarm when AFD is outside the target band and 45 penalty minutes have accumulated when power is between 50 and 90% power. With the alarm lit for more than 15 minutes over 1 hour of penalty time exists requiring TS 3.2.1 Action 2.a.2 (30 minutes to <50 % and reset trip setpoints to <55% in next 4 hours)

A - Incorrect - Hot standby is NOT required.
C - Incorrect - AFD has exceeded 1 hour of penalty time. A power reduction is required. (Can not exceed 90% unless in the target band)
D - Incorrect - Power reduction to < 50% is required (These are reduction amounts required for QPTR)
Lesson Plan/Objective: RO-C-ADM1/#14

Reference: Technical Specification 3.2.1 Axial Flux Difference pg 3/4 2-1
02-OHP-4024-210 Annunciator 210, Drop 44, Reactor Delta Flux Deviation pg. 75-78

Generic
Conduct of Operations
Knowledge of less than one hour technical specification action statements for systems.
RO-3.0 SRO-3.8

97. 097 22
Answer: C
Unit 2 is operating at 99.9% power.

The following conditions exist:
□□2AB Emergency Diesel Generator (EDG) is inoperable due to contaminated oil.
□□The 2 East Centrifugal Charging Pump (CCP) tripped due to a motor fault.

Based on these conditions, which ONE of the following LCO actions is the MOST limiting for continued operation? (Unit 2 Tech Spec 3.0, Tech Spec 3.5.2, and Tech Spec 3.8.1.1 are attached.)

A. If the 2 E CCP cannot be returned to operable status within 72 hours, then be in Mode 4 within the next 12 hours.

B. If the 2AB EDG cannot be returned to operable status within 72 hours, then be in Mode 3 within the next 6 hours and Mode 5 within the subsequent 30 hours.

C. Start a shutdown within two hours and be in Mode 3 within the next 6 hours.

D. Start a shutdown within one hour and be in Mode 3 within the next 6 hours.

ANSWER: %Answer%
The 2AB EDG is the train B emergency power source. The 2E CCP is the train A Charging pump. Since the Emergency power source is Inoperable for Train B, Tech Spec 3.0.5 states that the 2W CCP may be considered operable only if the 2E CCP is Operable. Since the 2E CCP has tripped due to a motor fault, actions must be taken within 2 hours to place the unit in a mode in which the LCO does not apply. Hot Standby in 6 hours, Hot Shutdown in the next 6 and Cold Shutdown in the subsequent 24 hours.

A - Incorrect - TS 3.0.5 is more limiting. This is the TS 3.5.2 ECCS requirement.
B - Incorrect - TS 3.0.5 is more limiting. This is the TS 3.8.1.1 AC Sources requirement.
D - Incorrect - TS 3.0.5 applies. This is for TS 3.0.3 (not required to cascade specs).

Lesson Plan/Objective: RO-C-TS01/#15

Reference: Technical Specification 3.0.5 LCO Applicability pg. 3/4 0-1

Generic
Conduct of Operations
Ability to apply technical specifications for a system.
RO-2.9 SRO-4.0

Provide ATTACHMENT - Unit 2 Tech Spec 3.0, Tech Spec 3.5.2, and Tech Spec 3.8.1.1

98. 131 2
Answer: D
During a secondary side fault, following completion of Steam Generator blow down, it is important to minimize and control the amount of RCS heatup in OHP-4023-ES-1-1, SI Termination, to prevent:

A. PRZ overfill and water relief through the PRZ PORVs and avoid exceeding tech spec heatup limits.

B. exceeding minimum DNBR limits and limit the □P across the faulted SG tubes.

C. exceeding tech spec heatup limits and limit the □P across the faulted SG tubes.

D. PRZ overfill and water relief through the PRZ PORVs and limit the □P across the tubes of the faulted SG.

ANSWER: %Answer% - In addition to the mass introduced from ECCS injection flow, a heatup of the RCS would cause an expansion of the primary inventory and subsequent refilling of the pressurizer. With NO operator action to control RCS temperature, Tavg will return to No Load conditions (547°F), the Pressurizer will go solid, and the following concerns arise:
- Pressurizer overfill and water relief through the PORVs.
- Excessive Delta P across the faulted SG tubes (limit 1600 psig)

A - Incorrect - Exceeding Tech Spec heatup limits are NOT of concern.
B - Incorrect - Exceeding minimum DNBR limits are NOT of concern.
C - Incorrect - Exceeding Tech Spec heatup limits are NOT of concern.

Lesson Plan/Objective: RO-C-EOP07 / #9

Reference: RO-C-EOP07, Secondary Side Breaks, E-2 Series EOPs, and Background Information

Generic
Knowledge of the specific bases for EOPs.
RO - 2.7 SRO - 3.6

99. 099 3
Answer: B
Units 1 and 2 are at 100% power.

The following conditions exist:
- Unit 2 has experienced several fuel pin failures.
- A leak must be repaired on a pipe at the end of the Aux. Bldg. 601 ft. elev. pipe tunnel.
- The general area dose rate in the location of the repair is 600 mrem/hr.
- In order to reach the location of the repair the worker must transit through a 6 Rem/hr high radiation area for 2 minutes and return via the same path.
- The worker currently has an accumulated annual dose of 400 mrem.

Which ONE of the following is the maximum allowable time that the worker can participate in the repairs and NOT exceed the TEDE Administrative Dose Limit?

A. 70 minutes

B. 120 minutes

C. 140 minutes

D. 160 minutes

ANSWER: %Answer% - The candidate should determine that the ADL is 2000 mrem.
Transient exposure is 400 mrem (6000mrem/hr x 4/60hr). (transit to and from the job).
(Current) 400 mrem + (transit) 400 mrem = 800 mrem
ADL of 2000 mrem - 800 mrem = 1200 mrem allowable before reaching ADL.
1200 mrem /600 mrem/hr = 2 hours

A - Incorrect - Based on using limit of 1500 versus correct ADL (2000).
C - Incorrect - Based on calculating using a one-way transit dose.
D - Incorrect - Based on using ADL (2000) and NO transit dose.

Lesson Plan/Objective: RO-C-RP02/#5

Reference: RO-C-RO02 10CFR20 and Radiation Protection Attachment pg. 1

Generic
Radiological Controls
Knowledge of 10 CFR: 20 and related facility radiation control requirements.
RO-2.6 SRO-3.0

100. 100 3
Answer: A
The following conditions exist:
- Unit 1 Containment Purge System is operating in the CLEAN-UP MODE
- An external failure alarm on VRS-1101, Upper Containment Normal Range Area Monitor, occurs.

Which ONE of the following describes the response of the Containment Ventilation System to the failure alarm?

A. Containment ventilation isolation valves 1-VCR-101 through 1-VCR-107 close
1-HV-CIPS-1, Containment Instrument Room Purge Supply Fan 1, trips

B. Containment ventilation isolation valves 1-VCR-101 through 1-VCR-107 close
1-HV-CPS-1/2, Containment Purge Supply Fans 1 and 2, trip
1-HV-CPX-1/2, Containment Purge Exhaust Fans 1 and 2, trip
1-HV-CPR-1, Containment Pressure Relief Fan, trips
1-HV-CIPS-1, Containment Instrument Room Purge Supply Fan, trips

C. Containment ventilation isolation valves 1-VCR-201 through 1-VCR-207 close
1-HV-CIPS-1, Containment Instrument Room Purge Supply Fan 1, trips

D. Containment ventilation isolation valves 1-VCR-201 through 1-VCR-207 close
1-HV-CPS-1/2, Containment Purge Supply Fans 1 and 2, trip
1-HV-CPX-1/2, Containment Purge Exhaust Fans 1 and 2, trip
1-HV-CPR-1, Containment Pressure Relief Fan, trips
1-HV-CIPX-1, Containment Instrument Room Purge Exhaust Fan, trips

ANSWER: %Answer% -
While Operating in the Clean-UP mode the Radiation Monitor switches are unblocked allowing actuations. VRS-1101 closes the Inside Containment Isolation valves and trips the Instrument Room Purge Supply fan only.

B - Incorrect - The Purge supply and exhaust and pressure relief fan will NOT trip
C - Incorrect - The Outside containment isolation valves will not close
D - Incorrect - These are the actions from the VRS-1201 monitor actuation.

Lesson Plan/Objective: RO-C-02800/#9

Reference: 12-OHP-4024-139 Annunciator #139 Response: Radiation Drop 1 pg. 1& Drop 2 pg. 5

Generic
Radiological Controls
Knowledge of the process for performing a containment purge.
RO-2.5 SRO-3.4