Question: 1 Answer: C

1 Pt(s)

The Unit is operating at 100% power when the following conditions occur:

"A PRZR spray valve sticks open and PRZR pressure has lowered to 1870 psig.
2-FR-S.1 has been entered.
"Reactor Trip Breakers are 'CLOSED'.
"Neutron flux is NOT dropping.

For the conditions given which one of the following describes an Immediate Action required to be taken from memory?

A. Initiate emergency boration of the RCS.

B. Manually initiate an SI.

C. Dispatch an NPO to locally open the Reactor Trip Breakers

D. Verify auxiliary feedwater status.

Distracter Analysis:

A. **Incorrect**: this is not a immediate action (I.A.) per E-0 or FR-S-1
Plausible: Step 4 of FR-S.1

B. **Incorrect**: Not an I.A. in FR-S.1. Presssure in stem is higher than 1840 which would be the point in E-0 that an SI would be initiated in I.A.s
Plausible: A stuck open PORV might require an SI in E-0.

C. **Correct**: Step 1 of FR-S-1 (RNO)

D. **Incorrect**: Not an I.A.
Plausible: Step 3 of FR-S-1

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPE00, Rev. 0, obj. 4; : I2LP-ILO-EOPFS1, Rev. 0, obj. 7

Source: Mod (INPO 24996)

Level of knowledge: memory

Reference(s): 2-E-0, 2-FR-S.1 and background docs.

KA: 000007EA2.04 description…
Ability to determine or interpret the following as they apply to a reactor trip: (CFR 41.7 / 45.5 / 45.6) EA2.04 If reactor should have tripped but has not done so, manually trip the reactor and carry out actions in ATWS EOP. 4.4 4.6

Question: 2 Answer: B

1 Pt(s)

Given the following indications:

- RCS pressure is 2000 psig and decreasing.
-Pressurizer level is rising
-All Pressurizer heaters ON.
-PRT pressure is rising

What is a correct combination of (1) potential leak source/cause of pressure drop and (2) EOP mitigation strategy?

A. (1) Leaking Pressurizer Safety; (2) manually shut isolation valve.

B. (1) Leaking PORV; (2) manually shut PORV and shut block if required.

C. (1) Pressurizer spray valve stuck open; (2) manually shut spray valve and trip RCP's if required.

D. (1) Leaking letdown relief; (2) manually shut letdown isolation valves.

Distracter Analysis:

A. **Incorrect**: Strategy for safety leak is to cooldown and depressurize, Safeties do not have isolation valves.
Plausible: Indications fit a lifted/leaking safety

B. **Correct**: E-0 would have you manually close the affected PORV and if that did not work shut its block valve.

C. **Incorrect**: Spray valve would not affect PRT pressure
Plausible: Mitigation action is correct for stuck/leaking spray valve

D. **Incorrect**: L/D leak would not directly impact pressurizer level and pressure.
Plausible: L/D RV relieves to the PRT

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-E-0 rev. 0, 2-AOP-LEAK-1, Rev. 06

KA: 000008.2.4.6 description... Pressurizer (PZR) vapor space accident (Reflief valve stuck open) 2.4.6 Knowledge symptom based EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13) Importance: RO 3.1, SRO 4.0

Question: 3 Answer: A

1 Pt(s)

During which of the following scenarios does natural circulation or reflux cooling become important?

A. Any SBLOCA with leak rate such that SI flow is less than breakflow and core boiling is occurring.

B. Only LBLOCAs with leak rates greater than or equal to design base accident LOCA described in FSAR.

C. Any LBLOCA less than the leak rate of design basis accident. Assume water source is available to S/Gs and S/Gs safety valves work correctly.

D. Any SBLOCA that does not include vapor space accidents.

Distracter Analysis:

A. **Correct**: Natural circ and reflux are not required if ECCS flow and break flow are adequate to remove decay heat; consequently, the "larger" SBLOCA and LBLOCA do not require supplemental heat removal via the steam generators to adequately cool the core. With the conditions given (SI<break flow) inventory loss would occur until either the break was uncovered and RCS depressurized to allow adequate SI flow or the RCS would repressurize until operators took action to remove heat via the S/G's. Most SBLOCA's require some amount of secondary heat removal to support ECCS flows.

B. **Incorrect**: S/G heat removal is not required for LBLOCA's

C. **Incorrect**: S/G heat removal is not required for LBLOCA's

D. **Incorrect**: Leak in the pressurizer vapor space does not significantly relate to need to remove heat via the S/G's.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-LOCA, Rev. 0, obj. 2-7

Source: Bank (INPO 24620)

Level of knowledge: memory

Reference(s): E-1 background document Rev. 39

KA: 000009.EK.1.01description Small Break LOCA… Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: (CFR 41.8 / 41.10 / 45.3) EK1.01 Natural circulation and cooling, including reflux boiling 4.2 4.7

Question: 4 Answer: A

1 Pt(s)

Unit 2 is shutdown following a concurrent Loss of Offsite Power with a LOCA event. The operators are performing actions in. E-1, Loss of Reactor or Secondary Coolant.

Which ONE of the following statements is the basis for placing ALL non-running CCW pump control switches in PULL-TO-LOCK prior to resetting the SI signal?

A. Prevent an overload condition on the Emergency Diesel Generators.

B. Prevent Thermal shock to the RCP Thermal Barriers.

C. Prevent CCW System overpressure with all 3 CCW pumps starting simultaneously.

D. Prevent steam formation in the RHR heat exchanger CCW side.

Distracter Analysis:

A. **Correct**: During a LOCA with a loss of off-site power the (SI W/ blackout) sequencer will not load any CCW pumps. Conversely, during an SI w/o a blackout all CCW pumps will start since there is adequate load capacity to support them. The step referenced is basically testing to determine which condition exists and ensure that loading is maintained.

B. **Incorrect**: This is not mentioned in basis.
Plausible: thermal shock of the **seals** is a concern in some situations but mainly with respect to initiation of seal injection to a "hot" seal.

C. **Incorrect**: This is not mentioned in basis and auto start of all three pumps is expected under certain situations.
Plausible: All pumps running would increase system supply pressure.

D. **Incorrect**: This is not mentioned in basis.
Plausible: CCW does supply RHR Hx cooling later in a LOCA.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPE10, Rev. 0, obj. 6

Source: Bank INPO (IP2 28860)

Level of knowledge: memory

Reference(s): SD 10.0 Rev. 7; 2-EOP-1, Rev. 0 and background doc.

KA: 000011EK2.02 description... Large Break LOCA,Knowledge of the interrelations between the and the following Large Break LOCA: (CFR 41.7 / 45.7) EK2.02 Pumps 2.6* 2.7*

Question: 5 Answer: D

1 Pt(s)

Unit 2 was operating at 15% power, when a turbine trip occurred.

The crew entered 2-AOP-TURB-1, Main Turbine Trip Without A Reactor Trip, which contains a step which checks all 6.9 KV Buses (1-4) transferred to offsite power.

If this transfer did not occur to a single bus, the procedure directs "Trip the reactor and go to E-0".

According to 2-AOP-TURB-1 background document what is the reason for this action?

A. Steam dump capability is lost due to loss of circulating water pumps, resulting in loss of RCS temperature control.

B. Loss of Condensate Pumps will result in Loss of Feedwater due to low MBFP suction pressure.

C. Multiple plant malfunctions have occurred indicating loss of plant control.

D. RCPs will be lost, Technical Specifications prohibits continued power operation without all RCPs operating

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Distracter Analysis:

Per AOP-TURB-1 this step is to ensure that all four RCP's are running since running <4 even less than P-8 requires a unit shutdown. > P-8 reactor would trip. **D** is correct and **A-C** are plausible since the loss of 6.9 kv does impact the secondary equipment.

D. **Correct**: Per AOP-TURB-1 this step is to ensure that all four RCP's are running since running <4 even less than P-8 requires a unit shutdown. > P-8 reactor would trip

Plausible:

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-AOPTUR Rev. 0, obj. 3

Source: Bank (IP2 ILT I2WXILO-AOP2A-RO.doc question 16)

Level of knowledge: memory

Reference(s): 2-AOP-TURB-1 Rev. 03

KA: 000015/17.3.04 RCP Malfunction description 000015/17 RCP Malfunction; Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow) : (CFR 41.5,41.10 / 45.6 / 45.13) AK3.04 Reduction of power to below the steady state power- to-flow limit 3.1* 3.2*

Question: 6 Answer: C

1 Pt(s)

Given the following:

- Unit is operating at 100% power.
-All controls are in the normal full power lineup.
-Pressurizer level is lowering.
-VCT level is rising.
-"RCP THERMAL BARRIER LOW DELTA-P..." alarm is lit.
-"REGEN HX LETDOWN OUTLET HI TEMP..." alarm is lit.

Which ONE of the following describes the event that has occurred?

A. Letdown isolation.

B. Small break LOCA.

C. Loss of charging.

D. Pressurizer PORV failed open.

Distracter Analysis:

A. **Incorrect**: During a loss of letdown, PRZR level would be rising and VCT level would be lowering.

B **Incorrect**: if a SBLOCA PRZR level could be falling (depending on break size) but VCT level would also be falling due to increased charging flow and constant LTDN flow. REGEN HX LETDOWN OUTLET HI TEMP alarm would also not be in because there is max. cooling occuring due to the high CHG flow. RCP THERMAL BARRIER LOW DELTA-P should not be indicative of a leak either

C. **correct**: loss of charging (and seal injection) flow would cause inventory to be lost from the RCS at the rate of L/D and seal leak off. Inventory would be gained at the same rate in the VCT. Since the RHX has no charging water gong through it the letdown temperature will climb into the alarm (395F)

D **Incorrect:** Similar logic to B except pressurizer level could initially go up for a PORV, which would not fit with the conditions. If pressurizer level was decreasing due to a PORV then the logic in B above hold true.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-AOPCVC, Rev. 0, obj. 12

Source: Bank (INPO 26451)

Level of knowledge: comprehension / analysis

Reference(s): 2-ARP-SFF, Rev. 26; 2-AOP-1, Rev. 3

KA: 000022.AA1.02 Loss of Reactor Coolant Makeup; description Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: (CFR 41.7 / 45.5 / 45.6) AA1.02 CVCS charging low flow alarm, sensor, and indicator 3.0 2.9

Question: 7 Answer: C

1 Pt(s)

Given the following conditions:

-RHR is in service at Reduced Inventory conditions at 65 feet.
-2-AOP-RHR-1, Loss of RHR, has been entered.

Which ONE of the following indications in the Control Room are used to determine if cavitation is occurring.

A. RHR flow high coincident with RVLIS Full Range level low.

B. RHR flow and pump amps increasing as RCS inventory is raised.

C. RHR flow and pump discharge pressure oscillations.

D. RHR pump discharge pressure and RVLIS Full Range level oscillations.

Distracter Analysis:

A. **Incorrect**: RVLIS not used but describes a condition that could potentially lead to cavitation

B. **Incorrect**: Description of inventory restoration, not cavitation

C. **Correct**:

D. **Incorrect**: RVLIS is not used.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #23140)

Level of knowledge: comprehension / analysis

Reference(s): 2-SOP-4.2.2 , Rev. 19; 2-POP-4.2, Rev. 0

KA: 000025 Loss of RHR System; description: Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: (CFR: 43.5 / 45.13) AA2.07 Pump cavitation 3.4 3.7

Question: 8 Answer: D

1 Pt(s)

Given the following:

-Unit is operating at 100% reactor power, steady state conditions.
-All controlling systems are operating normally in automatic.
-"Supervisory Panel" SGF 1-2, Component Cooling Surge Tank Level is in alarm
-Operators are performing steps in 2-AOP-CCW-1 "Loss of Component Cooling Water" due to a slowly lowering level in the CC surge tank.
-Makeup is in progress and operators dispatched to locate the leak.

When the following sequence of annunciators/indications is received:

-"Supervisory Panel" SGF 1-1 "Component Cooling Pump Discharge Low Pressure".
-"Supervisory Panel" SGF 3-3 "Thermal Barrier CCW Header Low Flow"
-CCW surge tank is 7% and lowering rapidly

The NEXT procedure to be entered by the operators is _____(1)_____ because _____(2)_____.

A. (1) 2-SOP-4.1.1 Component Cooling Filling and draining and 2SOP-4.1.2 Component Cooling System Operations ; (2) Normal make-up to the surge tanks is insufficient and backup cooling and makeup are required.

B. (1) 2-ARP-SGF 3-3. (2) RCP seal failures are imminent due to the loss of thermal barrier cooling which will require a plant shutdown.

C. (1) 2-ARP-SGF 1-1. (2) Any standby pumps will need to be started if they do not auto start to restore header pressure.

D. (1) E-0 Reactor Trip or Safety Injection ; (2)The reactor must be manually tripped and all RCPs stopped.

Distracter Analysis:

A. **Incorrect**: Although these procedures do support system makeup and backup cooling to vital loads these would not address the imminent threat to plant equipment.
Plausible: Some mitigation guidance in contained in these procedures

B. **Incorrect**: Seal failure is not imminent. Charging is providing cooling to seals.
Plausible: ARP could be implemented and does contain guidance to trip reactor and RCP(s) if seal temperature limits are reached.

C. **Incorrect**: loss of header pressure is a result of the leak so the actions of AOP-CCW should take priority (i.e. trip running CCW pps, trip reactor, trip RCP's)
Plausible: given low header pressure a pump start is a logical response.

D. **Correct**: Per step 4.12 if surge tank level is approaching off-scale low the per for 4.13-4.16 ...trip CCW pumps, reactor and RCPs.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Mod (INPO 21478)

Level of knowledge: comprehension / analysis

Reference(s): 2-ARP-SGF, 2-AOP-CCW-1, 2-SOP-4.1.1, 2-SOP-4.1.2.

KA: 000026.G.2.4.4 Loss of Component Cooling Water description 2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR 41.10 / 43.2 / 45.6) 4.0,4.3.

Question: 9 Answer: D

1 Pt(s)

If the pressurizer master pressure controller were to fail in an "AS IS" condition during a large, rapid secondary load rejection, which of the following will occur in the Pressurizer to help limit the magnitude of the resulting initial pressure transient on the primary system?

A. An outsurge cools the Pzr. This allows some steam to condense to water and limits the resulting pressure increase in the RCS.

B. An outsurge causes the steam space to expand in the Pzr. This allows some liquid to flash to steam and limits the resulting pressure drop in the RCS.

C. An insurge of hotter water heats the Pzr. More liquid then flashes to steam helping to limit the resulting pressure drop in the RCS.

D. An insurge of cooler water compresses the steam space in the Pzr. Steam is condensed to water helping to limit the overall pressure increase in the RCS.

Distracter Analysis:

A. **Incorrect**: An insurge would be expected. During an outsurge water would flash not condense
Plausible: Second part of answer is correct for an insurge

B. **Incorrect**: An insurge would be expected.
Plausible: Second part of answer is correct for an outsurge

C. **Incorrect**: insurge cools the Pzr causing the liquid to be subcooled.
Plausible: second part of answer is correct for and outsurge.

D. **Correct**: RCS temperature would rise causing an insurge into the PZR and and increase in pressure. Since the pressure control system is failed as is, spray will not respond, leaving only condensation of steam in the vapor space which has been compressed.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-RCSPZR Rev. 2, obj. 4

Source: Bank (INPO 21479)

Level of knowledge: comprehension / analysis

Reference(s): N/A

KA: 000027.AK1.03 Pressurizer Pressure Control System Malfunction; description: Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: (CFR 41.8 / 41.10 / 45.3) AK1.03 Latent heat of vaporization/condensation 2.6 2.9

Question: 10 Answer: B

1 Pt(s)

Which of the following describes the reason for tripping all RCPs in step 1 of 2-E-3, "Steam Generator Tube Rupture"?

A. To minimize the potential for RCP damage when an RCS depressurization is initiated.

B. To insure against possible operator error, misdiagnosis or multiple failure events.

C. To minimize the heat input when a controlled RCS cooldown is initiated.

D. To prevent the automatic opening of a S/G safety.

Distracter Analysis:

A. **Incorrect**: Not mentioned in step basis.
B. **Correct**: Per 2-E-3 step 1 background document this is the basis for the action.
C. **Incorrect**: Not mentioned in step basis
D. **Incorrect**: Not mentioned in step basis

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPE30, Rev. 0, obj. 3

Source: Mod (INPO 20735)

Level of knowledge: memory

Reference(s): 2-E-3, Rev. 0 and background doc.

KA: 000038.EK3.08 Steam Generator Tube Rupture ;description: Knowledge of the reasons for the following responses as the apply to the SGTR: (CFR 41.5 / 41.10 / 45.6 / 45.13) EK3.08 Criteria for securing RCP 4.1 4.2

Question: 11 Answer: C

1 Pt(s)

Given the following:

-The plant was at 100% power.
-A main steam line break occurred in the Turbine Building.
-Operators were unable to close the MSIVs and transitioned to 2-ECA-2.1, Uncontrolled Depressurization of All Steam Generators.

Then, while the operating crew is performing the 2-ECA-2.1 step to check for secondary radiation levels:

-22 MSIV is closed locally.
-The ATC reports the 22 SG pressure is rising slowly.

Which ONE of the following actions should be performed?

A. Remain in 2-ECA-2.1 until SI is terminated.

B. Remain in 2-ECA-2.1 until faulted SG(s) blowdown is complete.

C. Enter 2-E-2, Faulted SG Isolation.

D. Enter 2-ES-1.1, SI Termination.

Distracter Analysis: (KA match analysis: K/A is related to SLB involving all SG's and heat removal systems and their proper operation. The question contains a SLB involving all SG's and the procedures used to guide proper operation (EOP's) In effect the question tests knowledge of how the plant procedures are properly used to mitigate the accident described)

A. **Incorrect**: Per the foldout page you would transition to 2-E-2
Plausible: If SI termination is commenced you would remain in 2-ECA-2.1 until it was complete. The step given, is prior to SI termination.

B. **Incorrect**: Per the foldout page you would transition to 2-E-2
Plausible: the completion of the blowdown is an important queue for the operators and timely control of SI flows and heat up is important to prevent thermal shock concerns; however that is managed elsewhere is the EOP network.

C. **Correct**: Per the foldout page you would transition to 2-E-2 as soon as any SG is isolated unless SI termination is in progress.

D. **Incorrect**:
Plausible: examinee may misinterpret step action and select the normal SI termination procedure vs. ECA 2.1

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPC21, Rev. 0, obj.1

Source: Bank

Level of knowledge: comprehension / analysis

Reference(s):ECA-2.1 background doc.

KA: 000040.W/E12.EK2.2 Steam Line Rupture - Excessive Heat Transfer ;description: Knowledge of the interrelations between the (Uncontrolled Depressurization of all Steam Generators) and the following: (CFR: 41.7 / 45.7) EK2.2 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. IMPORTANCE RO 3.6 SRO 3.9

Question: 12 Answer: A

1 Pt(s)

Given the following conditions:

- 15% Reactor Power
- Main Generator Breakers 7 and 9 CLOSED
- 21 MBFP in service supplying all required feedwater
- 22 MBFP secured
- ABFPs aligned for normal at power operations

- A loss of 21 MBFP occurs and the crew trips the Reactor as directed in 2-AOP-FW-1, Loss of Feedwater.
- No Reactor trip set points are reached after the trip.

Which one of the below describes the expected status and required actions for the Aux Feedwater system following the Reactor Trip?

A. Both Motor Driven Auxiliary Feedwater pumps delivering flow, manually start the Turbine Driven Auxiliary Feedwater pump as necessary.

B. Turbine Driven Auxiliary Feedwater pump delivering flow, immediately manually start the Motor Driven Auxiliary Feedwater pumps as necessary.

C. No Auxiliary Feedwater pumps delivering flow, manually start all Auxiliary Feedwater pumps.

D. Turbine Driven Auxiliary Feedwater pump delivering flow, manually start Motor Driven Auxiliary Feedwater pumps after time delay times out.

Distracter Analysis:

A. **Correct**: In the given situation the immediate actions of 2-AOP-FW-1 require the operators to trip the reactor. Since the situation has the operators manually tripping the reactor, the reactor did not trip automatically. This is important since the SG low-low level reactor trip also auto starts all three ABFW pumps. Since this did not happen, the tripping of the MBFP would auto start the two motor driven ABFW pumps (21/23) and not the turbine driven (22). The correct answer is A and the distracters are incorrect combinations of pump responses.

B. **Incorrect**: Turbine driven pump does not start and the motor driven do start.

C. **Incorrect**: Turbine driven pump does not start and the motor driven do start.

D. **Incorrect**: Turbine driven pump does not start and the motor driven do start.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-MFW01, Rev. 1 Obj. 13

Source: Bank (INPO 25741)

Level of knowledge: Comp/Anal.

Reference(s):2-AOP-FW-1, Rev. 9;

KA: 000054.AA1.02 Loss of Main Feedwater ; description: Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): (CFR 41.7 / 45.5 / 45.6) AA1.02 Manual startup of electric and steam-driven AFW pumps 4.4 4.4

Question: 13 Answer: A

1 Pt(s)

Consider the following plant conditions:

- Loss of all AC power has occurred and is affecting the entire site.
- 138KV and 13.8KV power sources are not available.
- The Turbine Driven ABF pump is providing flow to the SGs.
- A rapid cooldown has been commenced.

What are the expected methods of control for the following:

(1) 21-24 SG Turbine Driven ABFP flow control valves (FCV-405A,B,C&D) and
(2) 21-24 Atmospheric Steam Dumps (PCV-1134 thru' 1137)

A. (1) Manual remote (CCR) control using nitrogen.
(2) Manual local control using nitrogen

B. (1) Manual local control using nitrogen
(2) Manual local control using nitrogen

C. (1) Manual remote (CCR) control using nitrogen
(2) Manual remote (CCR) control using nitrogen.

D. (1) Manual local control using nitrogen
(2) Manual remote (CCR) control using nitrogen.

Distracter Analysis:

A. **Correct**: In a complete loss of AC power instrument and station air would be lost. Critical components have either safety related air or nitrogen. For AFW, nitrogen automatically aligns to supply and the CCR retains control. For the Atmospheric Steam Dumps nitrogen is aligned locally and the valves are controlled locally.

B. **Incorrect**: Manual local control of SG FCV's is not required
Plausible: (2) is correct and (1) is a potential way to take control of the valves.

C. **Incorrect**: Remote control of the dumps would be lost.
Plausible: (1) is correct and (2) is a potential way to take control of the valves.

D. **Incorrect**: Neither (1) or (2) is correct.
Plausible: both are potential ways to take control of the valves.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-ECA-0.0, rev. 0; 2-AOP-AIR-1, Rev.05; SD 18.0 & 21.

KA: 000055.EA2.01 Station Blackout ;description: Ability to determine or interpret the following as they apply to a Station Blackout: (CFR 43.5 / 45.13) EA2.01 Existing valve positioning on a loss of instrument air system 3.4 3.7

Question: 14 Answer: D

1 Pt(s)

A loss of offsite power occurred from 100% power 30 minutes ago.

The following conditions are noted:

-All SGs are available with pressures at 1015 psig and stable.
-RCS subcooling is 105^0F.
-Average of Qualified CETs is 550^0F
-Loop T-hots are 548^0F and rising slowly.
-Loop T-colds are 530^0F and stable.

In accordance with ES-0.1, Reactor Trip Response, which of the following actions is required to ensure adequate RCS coolant flow?

A. Turn on available pressurizer heaters

B. Throttle open the Auxiliary Feed Water control valves

C. Initiate Auxiliary Spray

D. Throttle open the Atmospheric Dump Valves

Distracter Analysis:

A. **Incorrect**: Subcooling is adequate;required subcooling is >19f.
Plausible: Candidate incorrectly believes that inadequate subcooling exists to verify NC flow and turns on heaters to increase subcooling.

B. **Incorrect**: Per step 10 and attachment 3 of 2-ES-0.1 the RNO action is increase dumping steam not increase AFW flow.
Plausible: Increasing AFW flow could assist in natural circ.

C. **Incorrect**: Per step 10 and attachment 3 of 2-ES-0.1 the RNO action is increase dumping steam.
Plausible: Candidate incorrectly believes that excessive subcooling exists and opens spray to lower subcooling.

D. **Correct**: Per step 10 and attachment 3 of 2-ES-0.1 the RNO action is increase dumping steam due to T-Cold not being at satuaration for SG pressure.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPS01, Obj. 2

Source: Bank (INPO 1971)

Level of knowledge: comprehension / analysis

Reference(s): 2-ES-0.1, Rev. 0

KA: 000056.G.2.1.23 Loss of Off-site Power ;description: G.2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 45.2 / 45.6)

Question: 15 Answer: B

1 Pt(s)

Given the following conditions:

- Unit is at 100% power.
- The crew has entered 2-AOP-SW-1, SERVICE WATER MALFUNCTION, due to a large leak on 23 FCU.
- The control room crew has closed the SW supply, return, motor cooler outlet and sample outlet as directed by the ARP-SMF (1-2) "CNTMT BLDG FAN COOLER CNDSR HIGH LEVEL".
-Subsequently, the 23 FCU is tagged for repairs and Service Water remains in normal two header operation.

Which of the following describes the alignment of the Fan Cooling Units (FCU) if a Loss of Off-Site Power, Reactor Trip and Safety Injection occurs and 22 EDG fails to load?

A. 2 Service Water pumps supplying 3 operating FCU's with flow through either TCV-1104 or TCV-1105.

B. 2 Service Water pumps supplying 3 operating FCU's with flow through both TCV-1104 and TCV-1105

C. 1 Service Water pumps supplying 2 operating FCU's with flow through either TCV-1104 or TCV-1105.

D. 1 Service Water pumps supplying 2 operating FCU's with flow through both TCV-1104 and TCV-1105

Distracter Analysis:

A. **Incorrect**: Both TCV's fail open on an SI
Plausible: candidate might believe they are train/header related.

B. **Correct**: In this situation the 23 FCU is disabled and the 22 EDG does for carry its loads. 22 EDG supplies buses 2A and 3A, 23 and 25 FCU's and 22 and 25 SW pumps. Consequently the remaining pumps and FCU's would start (SW pp: 21,23,24,26; FCU's 21,22,25). Due to the normal two header alignment the essential loads are supplied only by 24-26 SW pumps of which only 24 & 26 are available. Hence, the answer to the first part of the question is 2 SW pumps and 3 FCU's. During an SI TCV-1104 and TCV-1105 both fail open to ensure flow.

C. **Incorrect**: Both TCV's fail open on an SI; 24 & 26 SW pumps would supply 21, 22 & 25 FCU's
Plausible: candidate might not understand both header alignment and power supply alignment.

D. **Incorrect**: 24 & 26 SW pumps would supply 21, 22 & 25 FCU's
Plausible: candidate might not understand either header alignment or power supply alignment.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-ESS001, Rev. 0, obj. 3 & 5

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-SW-1, Rev. 03, 2-ARP-SMF (1-2), Rev. 22

KA: 000062.AK3.02 Loss of Nuclear Service Water; description: Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: (CFR 41.4, 41.8 / 45.7) AK3.02 The automatic actions (alignments) within the nuclear service water resulting from the actuation of the ESFAS 3.6 3.9

Question: 16 Answer: D

1 Pt(s)

Given the following conditions:

- Unit is at 100% reactor power.
- "INST AIR LOW PRESS" is in alarm on panel SJF.

If a ruptured Instrument Air header is causing a continuous lowering of Instrument Air header pressure. Which of the following will require a Reactor Trip IAW 2-AOP-AIR-1, "Air System Malfunction"?

A. LCV-459 (LETDOWN STOP VALVE) fails closed.

B. Pressurizer level 10% above program.

C. Charging pump speed can not be controlled from flight panel.

D. VCT Level 4%.

Distracter Analysis:

A. **Incorrect**: AOP step 4.19-4.21 has operator restore L/D or start a controlled shutdown
Plausible: Candidate might not know requirements/background

B. **Incorrect**: This would require a controlled shutdown per step 4.24 (PRZR level >= 5% above program)
Plausible: Candidate might not know requirements/background or might confuse with SG level trip criteria of +/- 10% change.

C. **Incorrect**: Step 4.23 has the operators take local control of the pump.
Plausible: Candidate might not know requirements/background

D. **Correct**: Per step 4.12, VCT< 5% requires a reactor trip due to imminent loss of seal injection flow with RCP's running.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Mod (IP3 WS#3 and INPO 30283)

Level of knowledge: memory

Reference(s): 2-AOP-AIR-1 Rev. 05

KA: 000065AA1.05 Loss of Instrument Air ; description: Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: (CFR 41.7 / 45.5 / 45.6) AA1.05 RPS 3.3* 3.3*

Question: 17 Answer: C

1 Pt(s)

A small break LOCA has occurred outside containment.

Actions of 2-ECA-1.2 "LOCA Outside Containment", have been completed and RCS pressure continued to decrease. A transition was made to 2-ECA-1.1, "Loss of Emergency Coolant Recirculation"

Which of the following is the reason a transition was made to ECA-1.1?

A. To attempt to diagnose the break location.

B. To terminate offsite release

C. To delay depletion of the RWST.

D. To reverify that all automatic actions have been completed

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Distracter Analysis:

A. **Incorrect**: This is the goal of E-1.2. E-1.1 primary goal is conservation of inventory.
Plausible: This is an important and ongoing goal.

B. **Incorrect**: transition is made to maximize the time until inventory for makeup is lost.
Plausible: This is an important and ongoing goal.

C. **Correct**: Primary concern is loss of RWST inventory which will at some point impact the ability to recirculate. By transitioning to E1.1 inventory loss will be minimized and make-up initiated to extend the time before RWST inventory is expended.

D. **Incorrect**: Done previously in EOP's
Plausible: might not understand the content of E-1.2 and 1.1

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPC12, Rev. Obj. 1 & 5

Source: Bank (INPO #140, 20847)

Level of knowledge: memory

Reference(s): 2-EOP-1.1

KA: W/E04.EK1.2 LOCA Outside Containment ;description: Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment) (CFR: 41.8 / 41.10, 45.3) EK1.2 Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment). IMPORTANCE RO 3.5 SRO 4.2

Question: 18 Answer: A

1 Pt(s)

A reactor trip and safety injection have occurred. While the team was performing the actions of E-0, Reactor Trip or Safety Injection:

-AFW flow has been lost.
-All SG NR levels are offscale low.

The crew then entered FR-H.1, Response to Loss of Secondary Heat Sink with the following condtions:

-RCS pressure is 200 psig.
-SG pressures are each 550 psig and lowering.

Which ONE of the following describes the required actions and basis?

A. Return to 2-E-0 which will direct transition to 2-E-1 because a large break LOCA is in progress AND a secondary heat sink is NOT required.

B. Return to 2-E-0 which will direct transition to 2-E-1 because a small break LOCA is in progress AND a secondary heat sink is NOT required.

C. Remain in 2-FR-H.1 because a large break LOCA is in progress AND a secondary heat sink is required.

D. Remain in 2-FR-H.1 because a small break LOCA is in progress AND a secondary heat sink is required.

Distracter Analysis:

A. **Correct**: With RCS pressure less than SG pressure, break is of a larger size and SI will provide heat removal. SG's are heat sources, not heat sinks.
B. **Incorrect**: Larger break is indicated
C. **Incorrect**: secondary heat sink is not required.
D. **Incorrect**: break is large and heat sink is not required.
Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #29438)

Level of knowledge: comprehension / analysis

Reference(s): 2-FR-H.1 Rev. 0

KA: W/E05.EK2.2 Inadequate Heat Sink Transfer - Loss of Secondary Heat Sink ; description: Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: (CFR: 41.7 / 45.7) EK2.2 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. IMPORTANCE RO 3.9 SRO 4.2

Question: 19 Answer: A

1 Pt(s)

The on-shift RO while taking manual logs has noticed an incorrect value he logged on the previous reading and that the reading is out of specification.

In accordance with OAP-17, "Plant Surveillance and Operator Rounds", in addition to notifying the CRS, which one of the following correctly describes the required actions the operator shall take to correct the log reading?

A. A single line shall be drawn through the incorrect value, the correct value logged and the change dated and initialed. The correct value should then be circled in red with a numbered explanation placed in the remarks section.

B. A single line shall be drawn through the incorrect value, the correct value logged and the change initialed and dated. A numbered explanation is then placed in the remarks section.

C. The incorrect value shall be circled in red and the correct value logged. These changes will be initialed and dated.

D. The incorrect value shall be circled in red and the correct value, with an explanation, placed in the remarks section. These changes will be initialed and dated.

Distracter Analysis:

A. **Correct**:

B. ~~**Incorrect**: This out of spec. reading should be red circled~~.

C. **Incorrect**: Incorrect value should be one-lined and the correct reading red circled. With an explanation in the comments section

D. **Incorrect**: Incorrect value should be one-lined and the correct reading red circled.

Based upon post-exam comments, B. is also a correct answer.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #27839)

Level of knowledge: memory

Reference(s): OAP-17 Rev. 04, OAP-5 Rev.01.

KA: 2.1.18 Ability to make accurate, clear and concise logs, records, status boards, and reports. (CFR: 45.12 / 45.13) IMPORTANCE RO 2.9 SRO 3.0 ;description:

Question: 20 Answer: B

1 Pt(s)

Given the following conditions at 0600:

-Unit 2 is shutdown, preparing for refueling.
-RCS temperature is 175 degrees F.
-RCS pressure is 100 PSIG.
-Normal Cooldown Alignments.
-RHR is lost and the RCS begins to heat up at 4 degrees F/minute.

If this trend were to continue which of the following correctly identifies the (1) initial MODE and (2) the MODE at 0640?

A. (1) Mode 5
(2) Mode 3

B. (1) Mode 5
(2) Mode 4

C. (1) Mode 6
(2) Mode 4

D. (1) Mode 6
(2) Mode 5

Distracter Analysis:

A. **Incorrect**: Final Mode is 4 since final temperature is $<350^0$F

B. **Correct**: Initial mode would be mode 5 base on temperature and RCS pressure. Heat up of 40min. * 4 deg./min.= 160^0F=> 175+160=335^0F Mode 4.

C. **Incorrect**: Mode 6 is closely associated with refueling operations, since the stem states that preps for refueling are underway, the examinee may wrongly assume that Mode 6 has been entered. If this error is made and the examinee recognizes that a Mode change has occurred, then MODE 4 would be the final Mode based on initial temp.

D. **Incorrect**: MODE 6 is closely associated with refueling operations, since the stem states that preps for refueling are underway, the examinee may wrongly assume that MODE 6 has been entered. If this error is made and the examinee recognizes that a mode change has occurred, then MODE 5 would be a logical step up from MODE 6.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #30345)

Level of knowledge: comprehension / analysis

Reference(s): Tech. Specs., 2-POP-3.3, Rev. 71.

KA: 2.1.22 **Ability to determine Mode of Operation.**
(CFR: 43.5 / 45.13) IMPORTANCE RO 2.8 SRO 3.3

Question: 21 Answer: B

1 Pt(s)

Which ONE of the following choices contains both (1) an RCS pressure that exceeds the "Safety Limit" and (2) the action required by the "Safety Limit Tech. Spec. for the given "Mode"?

A. (1) 2685 psig and
(2) in mode 2 restore compliance and be in Mode 3 within 1 hour.

B. (1) 2745 psig and
(2) in Mode 3 restore compliance within 5 minutes.

C. (1) 2730 psig and
(2) in Mode 1 restore compliance within 5 minutes and be in mode 3 within 1 hour.

D. (1) 2785 psig and
(2) in Mode 4 restore compliance within 15 minutes.

Distracter Analysis:

A. (1) incorrect ,<2735psig, (2) correct
B. (1) & (2) correct.
C. (1) incorrect, (2) incorrect; in mode 1 must restore compliance and be in mode 3 in 1 hour.
D. (1) correct, (2) In mode 4 must restore compliance in 5 minutes.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #20047)

Level of knowledge: memory

Reference(s):T.S. 2.1.2 & 2.2

KA: 2.2.22 ; description: 2.2.22 Knowledge of limiting conditions for operations and safety limits. (CFR: 43.2 / 45.2) IMPORTANCE RO 3.4 SRO 4.1

Question: 22 Answer: C

1 Pt(s)

Unit 2 is in Mode 1 at 12% reactor power with a plant start up in progress. Power is being raised to roll the main turbine and place it on the grid. 23 Instrument Bus (blue) is lost and can not be restored for approximately 1 hour. What is the expected reactor status and preferred mode of heat removal that is available to the operator?

A. The reactor remains in Mode 1with heat removal via the condenser HP Steam Dumps in pressure control mode.

B. The reactor is placed in Mode 2 with heat removal via Atmospheric Steam Dumps controlled remotely at set point.

C. Reactor is tripped and heat removal will be via the Atmospheric Steam Dumps controlled locally.

D. Reactor is tripped and heat removal is via the condenser HP Steam Dumps in pressure control mode.

Distracter Analysis:

(K/A analysis: The question attempts to test the candidates understanding of how systems respond to a malfunction, what the operator will be required to do procedurally and why. The candidate will need to understand how the plant is affected by the loss of power and based on that, will understand that the operator is required to shutdown the reactor (trip) vice take other manual action to stabilize the plant.

A. **Incorrect**: All MFRV's fail closed and a reactor trip is required. HP Dumps are not available and Atmospheric Dumps are available locally only.

B. **Incorrect**: All MFRV's fail closed and a reactor trip is required. Atmospheric Dumps are available locally only

C. **Correct**: Per AOP-IB-1 loss of 23 IB requires a manual trip due to loss of MFW and HP Dumps are unavailable and Atmospheric Dumps have no remote control (auto or manual).

D. **Incorrect**: Per AOP-IB-1 loss of 23 IB HP Dumps are unavailable and Atmospheric Dumps have no remote control (auto or manual).

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-AOPIB1, Rev. 0, obj. 3 & 4

Source: Mod (INPO # 26687 IP3)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-IB-1, Rev. 06 and background doc.

KA: 2.2.2 ; description: 2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 45.2)
IMPORTANCE RO 4.0 SRO 3.5

Question: 23 Answer: D

1 Pt(s)

Which of the following choices is NOT true concerning a "lockout device"?

A. They are only hung on energy isolation devices capable of being locked out.

B. When hanging one, a peer check is required.

C. The Tagout/Work Order Holder shall remove their lockout device prior to releasing the tagout unless associated with a tag swap.

D. It may be used on components that are tagged with Danger, Caution or Maintenance & Test tags

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Distracter Analysis:

A-C are requirments per EN-OP-102 Rev. 6
D in incorrect since Caution tags are not permitted to be hung with lockouts.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: memory

Reference(s): EN-OP-102 Rev. 6

KA: 2.2.13 ; description: 2.2.13 Knowledge of tagging and clearance procedures. (CFR: 41.10 / 45.13) IMPORTANCE RO 3.6 SRO 3.8

Question: 24 Answer: B

1 Pt(s)

Using station ALARA guidelines determine the best way to perform an upcoming evolution in the plant. The following facts are known:

-Past performance of this task without the use of shielding or special tools has resulted in an average exposure of 400 mrem and took 1 hour to complete.
-If shielding is hung it would lower the dose rate by 50%
-The total dose to hang and remove the shielding is estimated to be 100 mrem
-A special tool is available to perform the task that would allow the operator to be in a lower exposure area (325 mrem/hr)
-Use of the special tool is estimated to extend the job time by 35%.

Which of the following choices gives direction consistent with the principles of ALARA?

A. Hang the shielding AND use the special tool.

B. Hang the shielding, but DO NOT use the special tool.

C. DO NOT hang shielding, but use the special tool.

D. DO NOT hang the shielding AND DO NOT use the special tool

Distracter Analysis:
Doses are as follows:
(a) both shield and tool: 100mr+ (1.35 time to complete)(0.5 shield dose rate * 325mr/hr)=100 + 219.4 mr = 319.4 mr, (b) shield only: (0.5x 400mr/hr) + 100mr = 300mr, (c) (1.35 time to complete)(325mr/hr)= 438.75mr (d) no shield or tool: 400mr,

A. **Incorrect**: dose greater then (B)
B. **Correct**: dose rate is 400 mr/hr with no shielding or special tools
C. **Incorrect**: dose greater then (B)
D. **Incorrect**: dose greater then (B)

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #29677)

Level of knowledge: comprehension / analysis

Reference(s): EN-RP-110 Rev. 2

KA: 2.3.2 ; description: 2.3.2 Knowledge of facility ALARA program. (CFR: 41.12 / 43.4 / 45.9 / 45.10) IMPORTANCE RO 2.5 SRO 2.9

Question: 25 Answer: A

1 Pt(s)

Given the following Unit 2 conditions:

- Unit 2 is at 85% reactor power with Control Bank "D"' rods at 188 steps.
- A control rod in Control Bank "D" is at 158 steps.
- Control Room crew has entered 2-AOP-ROD-1, "Rod Control and Indication Systems Malfunctions," and actions to realign a single rod have been completed.

- During the realignment of the rod, the P/A converter was NOT placed in "Manual" as required in the procedure but was left in automatic.

- After the rod is realigned and restored to automatic, a plant transient occurs and rods begin to drive in.

Relative to ACTUAL Rod Insertion Limits, at what rod height will the alarm "APPROACHING ROD INSERTION LIMIT 12.5" " (SAF 3-9) Alarm actuate?

A. Alarm will actuate 10 steps BELOW Rod Insertion Limit.

B. Alarm will actuate 10 steps ABOVE the Rod Insertion Limit

C. Alarm will actuate 30 steps ABOVE Rod Insertion Limit.

D. Alarm will actuate 30 steps BELOW Rod Insertion Limit.

Distracter Analysis:

A. **Correct**: the alarm set point is sensed rod height 12.5" above RIL. Each step is 5/8", hence 12.5"=>20 steps. By not resetting the P/A converter the Rod Insertion Limit (RIL) sees the group at its current height plus the amount the misaligned rod was withdrawn (188+30=218). Consequently, the alarm which should come in 20 steps above the actual RIL, comes in 30 steps late or 10 steps below the RIL.

B. **Incorrect**: Incorrect
Plausible: If the 30 step disagreement was added to the 20 step alarm setpoint, but it was assumed that the alarm normally actuated 20 steps BELOW the Rod Insertion Limit, this would be plausible

C. **Incorrect**:
Plausible: If it is assumed that the 30 step disagreement would translate into 30 step above/below answer.

D. **Incorrect**:
Plausible: If it is assumed that the 30 step disagreement would translate into 30 step above/below answer.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SYS-C-161, obj. 10 & 13

Source: Mod (INPO #30286)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-ROD-1, Rev. 03.

KA: 000005.AK2.01 Inoperable/Stuck Control Rod ; description: Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: (CFR 41.7 / 45.7) AK2.01 Controllers and positioners 2.5 2.5

Question: 26 Answer: B

1 Pt(s)

Given the following conditions:

-The plant is at 100% power.
-All control systems are in automatic.
-Steady state conditions exist.
-The controlling pressurizer level channel, LT-460, experiences an internal diaphragm rupture.

Without operator action, which ONE (1) of the following describes the response of charging and letdown?

A. Charging flow will increase due to the level channel failure, and the letdown isolation valve, LCV-459, will close.

B. Charging flow will decrease due to the level channel failure, and the letdown isolation valve, LCV-459, will close.

C. Charging flow will increase due to the level channel failure, and the in-service letdown orifice isolation valve, LCV-200A, B, or C will close.

D. Charging flow will decrease due to the level channel failure, and the in-service letdown orifice isolation valve, LCV-200A, B, or C will close.

Distracter Analysis: (K/A match analysis: question relates directly to Pzr level control malfunction and a make-up/letdown imbalance. There is an impact on heater operation but the heater operation does not significantly impact pressure for the time period of the question and certainly not to the extent that letdown and charging flow are impacted. Consequently, the question tests the K/A related to level control malfunctions and one part of AK3.02 ... reactor makeup/letdown imbalance)

A. **Incorrect**: Charging flow drops as indicated level rises
Plausible: LCV-459, will close

B. **Correct**: Level channel fails high will cause backup heaters to turn on and charging flow to decrease. No action, actual level and backup channel will go low, causing 459 closure.

C. **Incorrect**: Charging flow drops as indicated level rises and LCV-200 A,B, C do not auto close on low level

Plausible: Some Westinghouse designs have L/D orifices auto isolate on low pressurizer level or loss of charging.

D. **Incorrect**: LCV-200 A,B, C do not auto close on low level
Plausible: Charging flow will decrease and some Westinghouse designs have L/D orifices auto isolate on low pressurizer level or loss of charging.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-CVCS Rev.0, obj. 9

Source: Bank (INPO # 23278/26295)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-INST-1; SD-3

KA: 000028.AK3.02 Pressurizer Level Malfunction ; description: Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: (CFR 41.5,41.10 / 45.6 / 45.13) AK3.02 Relationships between PZR pressure increase and reactor makeup/letdown imbalance 2.9 3.2

Question: 27 Answer: C

1 Pt(s)

Given the following:

- The reactor has tripped from 100%.
- All control banks have been inserted.

Approximately twenty minutes after the trip:

- Intermediate range channel N35 is reading 1E-10 amps and steady and N36 is reading 2E-11 amps and decreasing slowly

- Source range channels N31 and N32 are deenergized

Which of the following choices correctly lists both (1) the problem with the Intermediate Range NI's and (2) how the Source Range NI's would be energized?

A. (1) N35 is under-compensated
(2) Place both source range "High Flux at Shutdown" switches in the BLOCK position.

B. (1) N35 is over-compensated
(2) Place both source range "High Flux at Shutdown" switches in the BLOCK position.

C. (1) N35 is under-compensated
(2) Depress both "IR TRAIN A (B) PERM DEFEAT" push buttons.

D. (1) N35 is over-compensated
(2) Depress both "IR TRAIN A (B) PERM DEFEAT" push buttons.

Distracter Analysis:

A. **Incorrect**: N35 is under-compensated and "High Flux at Shutdown" block will not energize the SRNI's.
Plausible: Candidate might not understand under and over compensation and the relate IRNI behavior and switch functions.

B. **Incorrect**: "High Flux at Shutdown" block will not energize the SRNI's.

Plausible: N35 is under-compensated and candidate might not understand switch functions.

C. **Correct**: Twenty minutes after a trip power should be in the source range. The N35 behavior shows it is under-compensated and is preventing the SRNI's from energizing (P6 ~5E-11 coming down in power). Per procedure the operators should reenergize the SRNI's if they fail to energize as expected.

D. **Incorrect**: N35 is under-compensated.
Plausible: Candidate might not understand under and over compensation and the relate IRNI behavior.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #101)

Level of knowledge: comprehension / analysis

Reference(s): 2-ES-0.1

KA: 000032.AA1.01 Loss of Source Range NI ; description: Ability to operate and / or monitor the following as they apply to the Loss of Source Range Nuclear Instrumentation: (CFR 41.7 / 45.5 / 45.6) AA1.01 Manual restoration of power 3.1* 3.4*

Question: 28 Answer: D

1 Pt(s)

Given the following plant conditions:

-2-AOP-SG-1, "Steam Generator Tube Leak" was entered due to increased radiation levels on R-45, "Condenser Off Gas Monitor"

Per 2-AOP-SG-1 which of the following choices would indicate the leak had progressed to point that plant conditions require an IMMEDIATE manual Reactor Trip?

A. Reactor Power is 55% and the leakrate is 60 gpm and slowly increasing

B. Reactor Power is 40% and the leakrate is 40 gpm and slowly increasing.

C. Pressurizer level 29% and steady with two Charging pumps in operation and 45 GPM letdown.

D. Pressurizer level 10% and slowly lowering with one Charging pump in operation and 0 GPM letdown.

Distracter Analysis:

(K/A analysis: question tests the candidates knowledge of proceduralized indications that a tube leak has progressed to a rupture and requires EOP entry to mitigate.)

A. **Incorrect**: Power needs to be < 50% and leakrate > 50gpm to require a trip.
Plausible: Leakrate is > 50gpm.

B. **Incorrect**: Power needs to be < 50% and leakrate > 50gpm to require a trip.
Plausible: Power is <50%.

C. **Incorrect**: Pressuizer level would need to be lowering to require a trip.
Plausible: Leak is larger then that given in the correct answer and may be selected based on this.

D. **Correct**: Pressurizer level < 11% regardless of charging and letdown status requires a reactor trip and SI.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-AOPSG1, Rev. 0, obj. 2 & 3

Source: New

Level of knowledge: memory

Reference(s): 2-AOP-SG-1 Rev. 07

KA: 000037.AA2.06 Steam Generator Tube Leak ; description: Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: (CFR: 43.5 / 45.13) AA2.06 S/G tube failure 4.3 4.5

Question: 29 Answer: A

1 Pt(s)

Given the following plant conditions:
-Unit is in mode 5 in preparation for post refueling start-up.
-1 Circulating Water pump is running in high speed and 4 Service Water pumps are in operation. (no Circulating Water pumps operating on Unit 3)
-Discharge of the 13 WDST is in progress.

Which of the following conditions would **NOT** require the discharge to be terminated?

A. Three of the running Service Water pumps trip.

B. It has been determined that the "Liquid Waste Radiation Monitor" was not source checked prior to the discharge.

C. The running Circulating Water pump trips.

D. The "R-54 Liquid Waste Distillate Hi Rad/Trouble" alarm actuates on SAF-1 during the release due to low flow.

Distracter Analysis:

A. **Correct**: The loss of 3 running SW pumps will not drop flow below the limits of permit (per IPEC input)
Plausible: Candidate might believe this violates the permit.

B. **Incorrect**: Per the permit in 2-SOP-5.1.5 att. 2 a source check is required prior to discharge. Without this the permit is not valid and must be reauthorized before continuing the release.

C. **Incorrect**: Per the permit in 2-SOP-5.1.5 att. 2 total dilution flow must be >100kgpm or special approval is required prior to discharge. Regardless of total flow the permit is not valid if the dilution flow is changed during discharge and must be reauthorized before continuing the release.

D. **Incorrect**: Per ARP-SAF-1 the discharge is secured until the condition is resolved or re-permitted using manual redundant samples etc.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: memory

Reference(s):2-ARP-SAF-1, Rev. 28; 2-SOP-5.1.5, Rev. 34

KA: 000059. 2.4.49 Accidental Liquid Radwaste Rel. ; description: 2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)

Question: 30 Answer: C

1 Pt(s)

A report has been received of a electrical fire in the "Electrical Tunnel". The installed fire protection system has initiated. The area must be entered to determine if fire is extinguished. (1) What is the Fire Classification of the fire reported? AND (2) What safety hazards should be considered prior to operators entering the area?

A. (1) Class C
(2) Suffocation from oxygen depletion due to the discharge of Halon in the area.

B. (1) Class B
(2) Suffocation from oxygen depletion due to the discharge of Halon in the area.

C. (1) Class C
(2) Electrical shock from water spray.

D. (1) Class B
(2) Electrical shock from water spray.

Distracter Analysis:

A. **Incorrect**: Protection is pre-action system (water).
Plausible: Some electrical areas have CO2 or Halon protection.

B. **Incorrect**: Fire is class C, protection is pre-action system (water)
Plausible: Some electrical areas have CO2 or Halon protection.

C. **Correct**: An electrical fire is class C and protection for the electrical tunnel is a pre-action system (water) so electrical shock would be a risk.

D. **Incorrect**: Fire is class C.
Plausible: Candidate might confuse classes of fire.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-FPS001, Rev. 0, obj. 2, 4

Source:Bank (INPO #19942)

Level of knowledge: memory

Reference(s): 2-ONOP-FP-001, R-1.

KA: 000067.AK1.01 Plant Fire On-site ; description: Knowledge of the operational implications of the following concepts as they apply to Plant Fire on Site: (CFR 41.8 / 41.10 / 45.3) AK1.01 Fire classifications, by type 2.9 3.9

Question: 31 Answer: A

1 Pt(s)

Which one of the following conditions is a loss of containment integrity as defined in Technical Specifications?

A. The 95' inner airlock door seal is leaking and the outer door is opened for 2 hours to allow access for repairs during power operation.

B. The 80' air lock inner door is found with strong backs installed in mode 3.

C. A manual valve is closed to isolate a penetration where an electrician disconnected the auto close feature of a containment isolation valve in mode 4.

D. The leakage rate of a containment penetration exceeds the limits of Technical Specifications while in mode 5.

Distracter Analysis:

A. **Correct**: 3.6.2 allows access through the locked closed airlock door to perform repairs but only for transit and for "short periods". Leaving the door open for 2 hours is not consistent with the spec.

B. **Incorrect**: This makes the ailock unusable but does not violate the spec.

C. **Incorrect**: This is permissible by the TS 3.6.3.A.1.

D. **Incorrect**: containment integrity is only required in modes 1-4.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-VCCIS, Rev. 0, obj. 11

Source: Mod

Level of knowledge: comprehension / analysis

Reference(s): Tech. Spec. and bases

KA: 000069.AK2.03 (W/E14) Loss of CTMT Integrity ; description: Knowledge of the interrelations between the Loss of

Containment Integrity and the following: (CFR 41.7 / 45.7) AK2.03
Personnel access hatch and emergency access hatch 2.8* 2.9

Question: 32 Answer: C

1 Pt(s)

Given the following:

-A small break LOCA has occurred.
-No SI pumps or RHR pumps are running
-Core Exit TCs are at 1240 F
-The operators are responding in accordance with the appropriate procedure.

Which of the following lists the major recovery actions in the correct sequence for the condition specified assuming that Core Exit TCs remain greater than 1200 F?

A. Depressurize SGs, start ECCS pumps, open RCS vent paths, start RCPs.

B. Depressurize SGs, open RCS vent paths, start RCPs, start ECCS pumps.

C. Start ECCS pumps, depressurize SGs, start RCPs, open RCS vent paths.

D. Start ECCS pumps, open RCS vent paths, depressurize SGs, start RCPs.

Distracter Analysis:

(K/A analysis: the K/A is related to inadequate/saturated core conditions and operation of plant systems to provide cooling. The knowledge being tested relates to the strategic use of plant cooling systems to provide cooling to the core. These systems are implemented sequentially to optimize core cooling and limit core damage. This is done in accordance with 2-FR-C.1.)

Per the guidance in 2-FR-C.1 the preferred sequence is (1)ECCS, (2)SGs and (3) start RCP's and open PORV(s). "C" is the only choice with a sequence in accordance with the EOP guidance. The distracters are various/incorrect combinations of the above.

A. **Incorrect**: ECCS is first priority.
B. **Incorrect**: ECCS is first priority.
C. **Correct**: Per the guidance in 2-FR-C.1 the preferred sequence is (1)ECCS, (2)SGs and (3) start RCP's and open PORV(s)
D. **Incorrect**: RCS vent is last option with RCP start.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-CSFFRC, Rev. 0, obj. 3

Source: Bank

Level of knowledge: comprehension / analysis

Reference(s): 2-FR-C.1, Rev. 0 and basis doc.

KA: 000074.EK2.2 (W/E06&E07) Inad. Core Cooling ; description: W/E07 Knowledge of the interrelations between the (Saturated Core Cooling) and the following: (CFR: 41.7 / 45.7) EK2.2 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. IMPORTANCE RO 3.5 SRO 3.9

Question: 33 Answer: B

1 Pt(s)

Given the following conditions:

-A rapid load reduction from 100% power to 65% power was performed approximately 3 hours ago.
-R-4, Charging Pump Room Area Radiation Monitor, is rising.
-Chemistry confirms RCS activity is rising but below Technical Specification limits.

The CRS directs actions per 2-AOP-HIACT-1 be performed.

Which of the following actions should be taken due to the rising RCS activity per 2-AOP-HIACT-1?

A. Minimize letdown flow to minimize radiation levels in the auxiliary building while continuing to provide cleanup using dimineralizers.

B. Increase letdown flow to maximize RCS activity cleanup using demineralizers.

C. Isolate letdown flow to minimize radiation levels in the auxiliary building

D. Bypass letdown demineralizers and swap the VCT inlet to the Hold Up tanks to minimize damage/loading of demineralizers and maximized dilution of RCS activity.

Distracter Analysis:
(K/A comment: IP2 does not have a dedicated failed fuel monitor and uses sampling and other RMS to determine RCS acitivty)

A. **Incorrect**: L/D in maximized
Plausible: this will reduce rad. levels.

B. **Correct**: AOP step 4.5.

C. **Incorrect**: L/D in maximized
Plausible: This will reduce rad. levels.

D. **Incorrect**: L/D in maximized through the demins.
Plausible: bypassing demins. Would "protect" them and diverting to waste would maximize "dilution" flow.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #25485/23264)

Level of knowledge: memory

Reference(s): 2-AOP-HIACT-1, Rev. 1

KA: 000076.AA2.02 High Reactor Coolant Activity ; Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: (CFR: 43.5 / 45.13) AA2.02 Corrective actions required for high fission product activity in RCS 2.8 3.4

Question: 34 Answer: B

1 Pt(s)

The NRC Legal Radiation Exposure limit for an Adult Occupational Worker at IP2 Station is __(1)__ TEDE.

The IPEC Exposure limit for an Emergency Worker to protect "Vital Plant Equipment", should the IP site enter the Emergency Plan due to an accident event, and with proper authorization, is __(2)__ TEDE.

A. (1) 5 Rem/year
(2) 25 Rem

B. (1) 5 Rem/year
(2) 10 Rem

C. (1) 2 Rem/year
(2) 25 Rem

D. (1) 2 Rem/year
(2) 10 Rem

Distracter Analysis:

10CFR limit is 5 Rem TEDE, IPEC-EP Rev. 04 section K limit for protecting property is 10 Rem. B is the answer. A, C & D are incorrect combinations of lower admin limit and limit for saving life.

B. Correct:

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #26508)

Level of knowledge: memory

Reference(s): IPEC-EP Rev. 04 (section K)

KA: 2.3.4 ; description: 2.3.4 Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized. (CFR: 43.4 / 45.10) IMPORTANCE RO 2.5 SRO 3.1

Question: 35 Answer: B

1 Pt(s)

Given the following conditions:

-A manual reactor trip was initiated on IP2.
-The Reactor did not trip.
-The team is entering FR-S.1, Response to Nuclear Power Generation/ATWS.

Which ONE (1) of the following actions, if required, MUST be performed from memory? (Immediate Action)

A. Manually start AFW pumps.

B. Manually close MSIVs.

C. Open MOV-333, Emergency Boration Valve.

D. Verify at least one 480V bus energized.

Distracter Analysis:

A. **Incorrect**: Not a immediate action (I.A.)
Plausible: It is the step after the I.A.s

B. **Correct**: Steps 1-2 are I.A. steps of FR-S.1. This is the response not obtained action of step 2 (I.A.)

C. **Incorrect**: This is in 4 step of FR-S.1
Plausible: It is two steps after the I.A.s

D. **Incorrect**: This is an I.A. of E-0.
Plausible: It is an I.A. of E-0.

Level: RO Exam / SRO Exam

Lesson Plan Objective: ????

Source: Bank(INPO #23364)

Level of knowledge: memory

Reference(s): 2-FR-S.1 Rev. 0

KA: 2.4.12 ; description: 2.4.12 Knowledge of general operating crew responsibilities during emergency operations. (CFR: 41.10 / 45.12) IMPORTANCE RO 3.4 SRO 3.9

Question: 36 Answer: A

1 Pt(s)

Given the following conditions:

- A power reduction is in progress from 22% per POP 3.1 due to degrading condenser vacuum.
-The unit is currently at 16% power and 140 MWE.
-Highest condenser differential pressure is 1.7 inches HG.
-Highest exhaust hood delta-T is 22^0F.
-Highest exhaust hood temperature is 157^0F.
-Condenser backpressure is 6 inches Hg absolute.
- NO cause has been determined for the loss of vacuum.

Which one of the following actions should be taken IAW 2-AOP-VAC-1, Loss of Condenser Vacuum? (Attachment 1 included for reference).

A. Trip the turbine and go to 2-AOP-TURB-1, Main Turbine Trip Without a Reactor Trip.

B. Trip the reactor and go to 2-E-0 Reactor Trip or Safety Injection.

C. Trip the turbine and go to 2-AOP-LOAD-1, Excessive Load Increase or Decrease.

D. Continue with the actions of 2-POP-3.1, Plant Shutdown from 45% Power.

NOTE: 2-AOP-VAC-1 Att. 1 to be supplied to candidate.

Distracter Analysis:

A. **Correct**: Per AOP-VAC step 4.5 with power <P-8 (20%) the operator is directed to trip the turbine and go to 2-AOP-TURB-1.

B. **Incorrect**: Reactor trip is not required at this point.
Plausible: >P-8 a reactor trip is directed.

C. **Incorrect**: This procedure could be entered due to an unanticipated loss of load. Under the conditions noted the actions are being directed by procedure and are not unanticipated. If you were to enter the loss of load AOP it would route you to the AOP for vacuum with no action taken
Plausible: A loss of load is occurring.

D. **Incorrect**: The operator is directed to enter 2-AOP-TURB-1 after tripping the turbine.

Plausible: SOP does direct how to shutdown the plant "normally" and AOP-VAC directs reducing load to maintain parameters in specification.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #28120)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-VAC-1, Rev. 01; 2-AOP-LOAD-1, Rev. 03

KA: 2.4.4 ; description: 2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR 41.10 / 43.2 / 45.6) IMPORTANCE RO 4.0 SRO 4.3

Question: 37 Answer: C

1 Pt(s)

You are an off-shift licensed Reactor Operator, working overtime on outage tagouts in the Work Control Center. You do not have assigned responsibilities in the Emergency Response Organization (ERO). A transient occurs that results in the declaration of an ALERT Emergency and activation of the Evacuation Alarm. To which of the following locations do you report?

A. The Emergency Operations Facility (EOF)

B. The Generation Support Building (GSB) or the Energy Education Center (EEC)

C. The Operations Support Center (OSC).

D. The IP2 Central Control Room (CCR)

Distracter Analysis:

A. **Incorrect**: OSC is the correct answer.
Plausible: This is an assembly location for essential personnel.

B. **Incorrect**: OSC is the correct answer.
Plausible: This is the assembly area for non-essential personnel

C. **Correct**: Any Operator (RO/SRO etc.) in the protected area are considered essential personnel and should assemble with in the OSC unless they are on shift.

D. **Incorrect**: OSC is the correct answer.
Plausible: This is an assembly location for essential personnel.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I0LP-ILO-ERT003, Rev. 1, obj. 3

Source: Bank (INPO #8781)

Level of knowledge: memory

Reference(s): IP-EP-430 Rev.4

KA: 2.4.39 ;description: 2.4.39 Knowledge of the RO's responsibilities in emergency plan implementation. (CFR: 45.11) IMPORTANCE RO 3.3 SRO 3.1

Per licensee feedback IP does not specify specific e-plan responsibilities for RO's. Will reselect with justification..

Question: 38 Answer: A

1 Pt(s)

23 CCW pump is running with 21 & 22 CCW pumps in a normal standby alignment. The plant has been operating at 100% power with no major equipment out of service when the following occurs:

- a loss of off-site power and a unit trip
- 21 Emergency Diesel Generator experiences a mechanical failure and trips.
- 3A 480vac bus experiences an electrical fault and does not reenergize.
- All other equipment functions as expected.

Immediately following available EDG loading and prior to any operator intervention...

A. -21 CCW would <u>not</u> automatically start.
-22 CCW pump would automatically start.
-23 CCW pump would trip and automatically restart.

B. -21 CCW pump would <u>not</u> automatically start.
-22 CCW pump would <u>not</u> automatically start.
-23 CCW pump would trip and automatically start.

C. -21 CCW pump would automatically start.
-22 CCW pump would <u>not</u> start.
-23 CCW would trip and automatically start.

D. All three CCW pumps will trip and remain tripped until started via the EOP's.

Distracter Analysis:

A. **correct**: All CCW pumps will receive a trip signal and the available CCW pumps will start during a blackout without an SI. The pumps start in sequence 21, 22, 23 with 6, 9 and 12 second delays. Since 21 EDG fails to power the 5A bus the 21 CCW pump will not start. The 3A bus does not supply one of the CCW pumps so 22 CCW pp will start and 23 will receive a start signal

B. **Incorrect**: 22 pump will start.
Plausible: Candidate may confuse 2A, 3A, 5A & 6A bused and CCW pumps they supply and specifically may think 22 pump is powered off of 3A bus which is powered from the same EDG as 2A bus (22 EDG); leaving 23 pump to auto start. Candidate may also

believe the previously running pump restarts or remains running as it would during a normal unit trip.

C. **Incorrect**: 21 pump does not start due to 21 EDG failure, 22 & 23 pumps will start.
Plausible: This is the correct answer if the individual does not know that 21 EDG powers 5A bus and 21 CCW pump and 22 CCW pump is powered from 2A bus and 22 EDG.

D. **Incorrect**: available pumps would receive an auto start.
Plausible: This is the correct answer for a blackout with an SI

Level: RO Exam / SRO Exam

Lesson Plan Objective: LP-SYS-C-041 Rev 8 obj. 100 : STATE the Bus Power Supplies for the System components. A. CCW Pumps 21,22 and 23

Source: New

Level of knowledge: comprehension / analysis

Reference(s): LP-SYS-C-041 Rev 8, 2-SOP-04-01 rev. 7,

KA: 003.K2.02 Reactor Coolant Pump ; description: Knowledge of bus power supplies to the following: (CFR: 41.7) K2.02 CCW pumps 2.5* 2.6*

Question: 39 Answer: B

1 Pt(s)

The following plant conditions exist :

90% power.
All systems are in normal at power condition.

The instrument air line to HCV 142, "Charging Flow Control Valve" has just broken loose.

What would be the effect on the following as a result of this failure?

	RCP Seal Injection flows	Charging Flow
A.	**Increase**	**Increase**
B.	**Increase**	**Decrease**
C.	**Decrease**	**Increase**
D.	**Decrease**	**Decrease**

Distracter Analysis:

To be able to predict the system response the candidate needs to understand how the system in configured and how the normal flow control valve fails. Since HCV-142 fails closed and is in the normal charging path the charging flow will decrease. Since the seal injection line is upstream of the HCV-142 it will be at higher pressure after it closes and this will cause an increase in the individual seal injection flows. The correct answer is "B" Seal Inj. Flow will increase and Charging flow will decrease. The distraters are incorrect combinations of these and are plausible if the candidate does not understand system configuration and fail position of the HCV142.

A. **Incorrect**: See above.
B. **Correct**: See above.
C. **Incorrect**: See above.
D. **Incorrect**: See above.

Level: RO Exam / SRO Exam

Lesson Plan Objective:
-I2LP-ILO-AOPCVC obj:6

DESCRIBE the major physical connections and/or cause-effect relationships between the Chemical and Volume Control System and the following systems:

a. Reactor Coolant System

b. Instrument Air System.....

-I2LP-ILO-CVCS obj: 6 DRAW a one-line diagram of the CVCS to include

Source: Bank

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-CVCS-1 CVCS Malfunctions

KA: 004.K3.04 Chemical Volume Control ;description: Knowledge of the effect that a loss or malfunction of the CVCS will have on the following: (CFR: 41.7/45/6) K3.04 RCPS 3.7 3.9

Question: 40 ***Answer: D***

1 Pt(s)

Given the following determine the correct alignment for Containment Spray, RHR and Recirculation.

- Unit trip and SI due to a large break LOCA inside containment.
- All ECCS systems functioned as required and RWST level is 1.5'
- Crew has performed EOP actions through ES-1.3 TRANSFER TO COLD LEG RECIRCULATION and determined that Containment Spray was still required and aligned the plant systems accordingly.

The following would be the expected alignment:

A. One Recirculation pump supplying one CS header only, via one RHR Heat Exchanger
and
the other Recirculation pump supplying injection into RCS cold legs only, via the other RHR Heat Exchanger.

B. One CS pump supplying one CS header only
and
both Recirculation pumps supplying injection into RCS cold legs only via the RHR Heat Exchangers.

C. One RHR pump supplying one CS header only, via one RHR Heat Exchanger
and
one Recirculation pump supplying injection into all RCS cold legs only via the other RHR Heat Exchanger.

D. Both recirculation pumps supplying one CS header
and
injection into all RCS cold legs via one RHR Heat Exchangers.

Distracter Analysis:

A. **Incorrect**: Not a correct alignment per ES-1.3
Plausible: It is a potential way to align the system.

B. **Incorrect**: CS pumps are secured at 2' in the RWST (ES-1.3 step 20)
Plausible: this would be correct if RWST level was higher than 2.0'

C. **Incorrect**: RHR used only if Recirc pumps fail.
Plausible: RHR can be aligned to CS but only if no recirc. Pump is operating or can be started

D. **Correct**: Without additional malfunctions ES-1.3 will align systems as described as long as RWST is <2', containment pressure remains high requiring spray and all systems function normally post LOCA.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPS13 obj. 1-4, I2LP-ILO-CS001 Rev.0 obj. 6-7

Source: New

Level of knowledge: comprehension / analysis

Reference(s): E-1 rev. 42 LOCA, ES-1.3 rev. 46 transfer to cold leg recirc.

KA: 005.K4.12 Residual Heat Removal ; description: Knowledge of RHRS design feature(s) and/or interlock(s) which provide or the following: (CFR: 41.7) K4.12 Lineup for piggyback mode with CSS 3.1* 3.7*

Question: 41 Answer: C

1 Pt(s)

A small break LOCA is in progress with the following conditions:

-All ECCS Pumps are operating except 21 SI pump which failed to start.
-RCS pressure is 1200 psig and stable.
-Pressurizer level is 5% and stable.
-RCS average temperature is slowly lowering about 5 F/hour.
-No Charging pumps are operating.

For this condition what is the approximate break flow?

A. 100-200 gpm

B. 300-500 gpm

C. 700-900 gpm

D. 1100-1300gpm

Distracter Analysis: candidate must know pump design pressure and flow (400 gpm @1200psig) and calculate two pumps would product 800 gpm with given plant parameters.
Distractors are designed to cover the range of one (B), two (C) and three (D) pump flows. Answer "A" was a leak that is beyond charging capacity but within SBLOCA criteria.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SIS001 EO 7b

Source: Modified (Prarie Island)
Level of knowledge: comprehension / analysis

Reference(s): I2LP-ILO-SIS001

KA: 006.K5.06 Emergency Core Cooling ;description: Knowledge of the operational implications of the following concepts as they apply to ECCS: (CFR: 41.5 / 45.7) K5.06 Relationship between ECCS flow and RCS pressure 3.5 3.9

Question: 42 Answer: A

1 Pt(s)

The following PRT parameters are noted:

- Temperature is 135^0F
- Level is 74%
- Pressure is 5 psig
- Hydrogen concentration is 1.3%

What action is to be taken regarding these conditions?

A. Decrease temperature to less than 130^0F.

B. Decrease level to less than 70%

C. Decrease pressure to less then 3 psig

D. Increase Hydrogen concentration to greater than 2 %

Distracter Analysis:

A. **Correct**: Per ARP for high PRT temp (2-ARP-SAF) the alarm would come in at 130F and the operator is directed to spray the PRT to reduce the temperature to clear the alarm.

B. **Incorrect**: high level limit is 75% with an alarm at 77%
Plausible: The normal level band is 67-75, so this level is high in that band and may distract a candidate who does not understand the normal operating band.

C. **Incorrect**: 5 psig is in normal pressure range.
Plausible: Candidate may not understand normal operating pressure limits. Alarm for high pressure is 7 psig.

D. **Incorrect**: PRT is assumed to maintain < 2% oxygen with Nitrogen cover gas so there is no hydrogen limit.
Plausible: 2% hydrogen in the presence of oxygen is approaching flammable limits

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-RCSPZR Rev. 2 Obj 13 For the Pressurizer and Pressure Relief System annunciators, state the initiating signal and setpoint; and, utilizing the alarm response

procedures, determine the appropriate operator action.....B. ARP SAF, Reactor Coolant System

Source: Bank (Kewaunee 1 12/11/00)

Level of knowledge: comprehension / analysis

Reference(s): 2-SOP-1.6, Revision: 27 PRESSURIZER RELIEF TANK OPERATIONS,
KA: 007.A1.03 Pressurizer Relief/Quench Tank ; description: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: (CFR: 41.5 / 45.5) A1.03 Monitoring quench tank temperature 2.6 2.7

Question: 43 Answer: D

1 Pt(s)

Given the following plants conditions:

-Unit is operating at 100%, steady state power.
- CCW surge tank level has increased since the last log reading.
- High CCW pump inlet radiation alarm exists (R47).

These conditions describe a/an:

A. RHR heat exchanger tube-to-shell side leak.

B. S/G blowdown heat exchanger tube leak.

C. Seal return heat exchanger tube-to-shell side leak.

D. RCP thermal barrier cooling coil leak.

Distracter Analysis:

A. **Incorrect**: RHR is not in-service and is not a potential source.
Plausible: AOP does list RHR as a potential source (if it is in service)

B. **Incorrect**: It would not be expected that a S/G blowdown sample HX tube leak cause the R47 alarm.
Plausible: S/G blow–down sample HX is a potential source of inleakage per AOP-LIC but elevated activity would not be expected.

C. **Incorrect**: Not at a high enough pressure. Not listed as a potential source in AOP-LIC
Plausible: CCW does interface with seal leak-off and if it were at higher pressure would be a strong candidate for a leak source.

D. **Correct**: Only source with high enough activity and pressure to be source.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-AOP-LIC Obj. 6; Identify the CCW cooled components which are the potential sources of CCW in leakage.

Source: Bank (Point Beach 1 7/26/01)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-LICCW-1, Revision: 02

KA: 008.K1.03 Component Cooling Water ; description: Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.9) K1.03 PRMS 2.8* 3.0

PRMS Process Radiation Monitoring System?

Question: 44 Answer: C

1 Pt(s)

Given the following:

Pressurizer Pressure Control is selected to the normal alignment (Defeat 3-4 position).
Pressurizer pressure is 2225 psig AND slowly INCREASING.
PC 455K, Przr Spray Control Master Controller, fails to an output equivalent to 2215 psig.

Which ONE of the following describes:

(1) If manual control is promptly taken of heaters and spray, and pressure restored to 2222 psig and you are directed to modulate heater load with PC-455K given the attached table from SOP 1.4, what would the expected output be of PC-455K?
and
(2) the response of the pressure control system if the operator takes NO action?

A. (1) ~50%
and
(2) Pressure will rise until the high pressure Reactor Trip setpoint is reached AND the Reactor will trip.

B. (1) ~60%
and
(2) Pressure will rise until the spray valves open to control pressure.

C. (1) ~50%
and
(2) Pressure will rise until PCV-456, Przr PORV, opens to control pressure.

D. (1) ~60 %
and
(2) Pressure will cycle on the variable heaters at a higher setpoint.

Provide the table of Pressurizer Pressure Control vs. Main Controller Output on page 10 or 22 of 2-SOP-1.4 Rev. 27

PRESSURIZER PRESSURE CONTROL VS. MAIN CONTROLLER OUTPUT	
Control Function	PC-455K Percent Output
Backup Heaters On	37.5
Modulating Heaters Full On	46.3
Modulating Heaters Full Off	53.8
Neutral Band	53.9 to 56.2
Spray Initiation	56.3
Spray Full On	68.8
PORV PCV-455C Open	75.0

Distracter Analysis:

A. **Incorrect**: (1) is correct and (2) is not since the PORV will open to control pressure
Plausible: Lack of understanding of control scheme could lead to this answer in particular since the pressure will initially trend up.

B. **Incorrect**: (1) at this signal the spray valves would be partially (~1/3) open and this is not what was required or directed. (2) is not true since the failed controller also controls the spray valves.
Plausible: Lack of understanding of control scheme could lead to this answer in particular since the pressure will initially trend up and the spray valve would be the first automatic action to control pressure should the controller function.

C. **Correct**: Heaters modulate from 46.3-53.8% on PC-455K. This information in a caution on page 7 of 22 (SOP-1.4) and also on page 10 of 22 in a table (1) required some knowledge of procedure and controller function and if the candidate is not careful they may assume question is about heater or spray controllers (PC455L and PCV-455A/B) which could have 0-100% and 0-10% output respectively. (2) This is the bank answer from the IP, Only one PORV sees the high pressure and opens.

D. **Incorrect**: (1) at this signal the spray valves would be partially (~1/3) open and this is not what was required or directed. (2) is not true since the failed controller also controls the modulating heaters.
Plausible: Lack of understanding of control scheme could lead to this answer in particular since the pressure will initially trend up and

the heaters would modulate to control pressure should the master controller function..

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-RCSPZR Rev. 2 obj. 5,8, 9, 11, 13

Source: Mod (INPO bank)

Level of knowledge: comprehension / analysis

Reference(s): 2-ARP-SAF rev. 36, 2-SOP-1.4 rev. 27

KA: 010. A2.01 Pressurizer Pressure Control ; description: Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13) A2.01 Heater failures 3.3 3.6

Question: 45 Answer: B

1 Pt(s)
Given the following conditions:

- The reactor is critical at 1E-8 amps.
- A loss of Instrument Bus 22 occurs due to a fault.

Which of the following occurs as a result of the loss of 22 Instrument bus?

A. The reactor trips due to Intermediate Range Channel N-35 de-energizing.

B. The reactor trips due to Intermediate Range Channel N-36 de-energizing.

C. Reactor power remains at 1E-8 amps AND Power Range Channel N-41 de-energizes.

D. Reactor power remains at 1E-8 amps AND Power Range Channel N-42 de-energizes.

Distracter Analysis:

A. **Incorrect**: N35 is powered off of 21 IB
Plausible: might confuse power supplies and impact on reactor is correct (trip)

B. **Correct**:

C. **Incorrect**: IRNI loss below 10% power will cause reactor trip
Plausible: A PRNI will lose power. Candidate might not recognize mode two plant response

D. **Incorrect**: IRNI loss below 10% power will cause reactor trip
Plausible: N-42 PRNI will lose power. Candidate might not recognize mode two plant response

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EDS04 Rev. 0 obj. 7

Source: Bank (IP3 WS#38)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-IB-1 rev. 06

KA: 012.A3.03 Reactor Protection ; description: Ability to monitor automatic operation of the RPS, including: (CFR: 41.7 / 45.5) A3.03 Power supply 3.4 3.5

Question: 46 Answer: A

1 Pt(s)

Given the following conditions:

-The plant was operating at 100% power.
-A PORV failed open.
-The reactor has tripped on low pressurizer pressure.
-Pressurizer pressure is at 1700 psig and dropping.
-Containment pressure is 0.4 psig and rising slowly

Plant status is as follows:

-All control rods are fully inserted.
-Normally running Charging pump is in service.
-No SI or RHR pumps running.
-Phase "A" not actuated.
-Phase "B" not actuated.
-Main Steam Lines not isolated.
-Feedwater Isolation not actuated.

Based upon the current plant conditions, which of the following ESF systems must be manually actuated in E-0, Reactor Trip or Safety Injection?

A. Safety Injection only.

B. Main Steam Line Isolation only.

C. Safety Injection and Main Steam Line Isolation.

D. Safety Injection, Main Steam Line Isolation, and Containment Spray.

Distracter Analysis:

A. **Correct**:

B. **Incorrect**: Incorrect. Pressure below SI setpoint, not MSLI (close on steam flows w/(low RCS T or low steam press) or Hi-Hi containment pressure (24#).
Plausible: Candidate needs to integrate conditions with set points and determene required actuations and may confuse/not understand stepoints and/or logic.

C. **Incorrect**: Incorrect. Pressure below SI setpoint, not MSLI.

Plausible: Candidate needs to integrate conditions with set points and determene required actuations and may confuse/not understand stepoints and/or logic.

D. **Incorrect**: Incorrect. Pressure below SI setpoint, not MSLI or CS.
Plausible: Candidate needs to integrate conditions with set points and determene required actuations and may confuse/not understand stepoints and/or logic.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-ESF001 obj. 5

Source: Bank (IP 2, 3/10/03)

Level of knowledge: comprehension / analysis

Reference(s): I2LP-ILO-ESF001, various logic prints.

KA: 013.A3.02 Engineered Safety Features Actuation ; description: Ability to monitor automatic operation of the ESFAS including: (CFR: 41.7 / 45.5) A3.02 Operation of actuated equipment 4.1 4.2

Question: 47 Answer: C

1 Pt(s)

Consider each listed Containment Spray Pump (CS Pump) and Containment Fan Cooler Unit (FCU) combination as it applies to the design basis LOCA.

I. Both Containment Spray (CS) Pumps and no FCU's
II. No CS Pumps and all five FCU's
III. No CS Pumps and any four FCU's
IV. No CS Pumps and any three FCU's
V. Either CS Pump and any four FCU's
VI. Either CS Pump and any three FCU's
VII. Either CS Pump and any two FCU's
VIII. Either CS Pump and no FCU's

Which one of the choices contains only combinations meeting the design basis assumptions for the running equipment necessary to provide containment overpressure protection?

A. I and IV

B. III and V

C. II and VI

D. VII and VIII

Distracter Analysis:

Acceptable alignments are 2 CS pumps or 1 CS pump and 3 FCU's or 5 FCU's. Based on this I, II, V and VI are possible combinations that are correct.

A. **Incorrect**: IV is not a correct combination
Plausible: I is a correct combination

B. **Incorrect**: III is not correct
Plausible: V is a correct answer

C. **Correct**: Acceptable alignments are 2 CS pumps or 1 CS pump and 3 FCU's or 5 FCU's. Based on this I, II, V and VI are possible combinations that are correct. Only "C" has a combination of two of these four.

D. **Incorrect**: Neither VII or VIII are correct
Plausible: Candidate may believe that 1 CS pump is adequate for this accident. If so, options I, and V-VIII would be possible options. "D" is the only answer with a combination of these.

Level: RO Exam / SRO Exam

Lesson Plan Objective: ????

Source: Bank (INPO Salem 11/4/02)

Level of knowledge: memory

Reference(s): UFSAR, sect. 5, Sys. Decrip. 10.0 rev. 7

KA: 022.2.1.28 Containment Cooling ; description: 2.1.28 Knowledge of the purpose and function of major system components and controls. (CFR: 41.7)

Question: 48 Answer: A

1 Pt(s)

Which one of the following variables does **NOT** affect the Containment Spray System's ability to depressurize the containment in the injection phase of a Design Basis (DBA) LOCA?

A. Component Cooling Water temperature

B. Containment temperature

C. RWST temperature

D. Containment pressure

Distracter Analysis:

A. **Correct**: CS system operation is not impacted or supplied by CCW **Plausible**: CCW cools various critical components and candidate may not know the relationship with CCW. Candidate may think CCW could lead to a failure of another system that would affect the CS system as a secondary effect. (note plausible note added to correct answer since it is the single wrong item while the distracters are testing if the candidate recognizes correct relationships; hence no explanation of plausibility since they are in effect correct statements.)

B. **Incorrect**: Max. Containment temperature is a design basis assumption for containment and peak pressure (referenceT.S. 3.6.5 Cont. temp)

C. **Incorrect**: Injection water temperature directly impacts pressure suppression capacity of spray system (T.S. 3.5.4 RWST temp)

D. **Incorrect**: Initial containment pressure is a design basis assumption for containment and peak pressure (referenceT.S. 3.6.4 Cont. press.)

Level: RO Exam / SRO Exam

Lesson Plan Objective: SYS-C-041 Rev 8 Obj. 107 & 109

Source: Bank (Surry 1 3/14/03)
Level of knowledge: memory

Reference(s): SD 4.1 rev. 7. Various Tech Specs and their bases.

KA: 026.K1.02 Containment Spray ; description: Knowledge of the physical connections and/or cause effect relationships between

the CSS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.02 Cooling water 4.1 4.1

Question: 49 Answer: B

1 Pt(s)

Given the following conditions:

-Reactor power is 11%, with a plant startup in progress
-Steam dumps are modulated open in Pressure Control mode
-Tave - 551 degrees F
-RCS press - 2235 psig
-Main Steam Header pressure transmitter PT404 fails at its current pressure value.

Which ONE of the following is the steam dump response as startup continues?

A. Steam dumps modulate based on the Tref/Tave error signal generated as power rises.

B. Steam dumps remain open until the Steam Dump Mode Selector Switch is placed in Temperature Control Mode.

C. Steam dumps will modulate closed as power is increased, and will only reopen when the Steam Dump Mode Selector Switch is placed in Temperature Control Mode

D. Steam dumps modulate further open based on the steam pressure input as power is increased, and close when Tave decreases to less than the Low Tave setpoint

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Distracter Analysis:

A. **Incorrect**: Tave mode not selected yet per procedure
Plausible: Normal mode of operation is Tave mode and most operators will be more familiar with this alignment and would only see the pressure control mode in off normal/ transient conditions.

B. **Correct**: At this point in a start-up the dump system is in Pressure Control mode. In this mode the PT-404 provides the process input into the comparator with the set point that the operator sets for the dump pressure. With the PT-404 failed as is the and without the operator changing the pressure setpoint the signal to the dumps will remain constant until another signal is input (i.e. low Tave block, loss of vacuum/CW pumps, etc.)

C. **Incorrect**: PT-404 will provide a constant input, so steam dumps will remain at their current position until other action is taken
Plausible: Candidate might not recognize the impact of this particular failure and reason that changing RCS temperature or MS pressure would cause a dump valve response as would be the case normally.

D. **Incorrect**: Dumps will not go further open, Temperature control signals only impact dumps if pressure control mode not selected.
Plausible: Candidate might not recognize the impact of this particular failure and reason that changing RCS temperature or MS pressure would cause a dump valve response as would be the case normally.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SDSHP Rev 0, Obj. 4

Source: Bank (INPO 23229 IP2)

Level of knowledge: comprehension / analysis

Reference(s): IP2-SOD-41, 2-POP-1.3

KA: 039.K3.06 Main and Reheat Steam ; description: Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: (CFR: 41.7 / 45.6) K3.06 SDS 2.8* 3.1

Question: 50 Answer: C

1 Pt(s)

IP2 is at 790 Mwe (~78% power) returning to full power at 10%/hour following a 3 day forced outage with the following conditions:

-21 and 23 Condensate pumps are operating, 22 Condensate Pump in standby.
-21 & 22 BFP are operating.
-21, 22 & 23 ABFP's are in standby

Then 21 BFP trips.
Consider the listed automatic and manual actions.

I. Auto turbine runback
II. Auto start of 22 Condensate Pump
III. Auto Start of 21, 22 & 23 ABFP's
IV. Auto start of 21 and 23 ABFP's
V. Auto isolation of SGBD
VI. Manual turbine runback
VII. Manual start of 22 Condensate Pump

Which one of the choices contains only combinations of expected automatic and/or manual actions for this situation?

A. I, II and IV

B. I, III and V

C. II, V and VI

D. III, VI and VII

Distracter Analysis:
In this situation the plant is transitioning up in power. The candidate must understand several things:
- The auto turbine runback is not armed until ~827 Mwe on the way up in power.
- The condensate pump auto start is armed at ~50% power on the way up in power.
- Only 21 & 23 AFW pumps start on a MFP trip.
-Recognize SGBD isolates on a MFP trip.

Consequently items II, IV, V & VI are correct options and items I, III, & VII are incorrect. Candidate can answer the question through the process

of elimination knowing only two of the above relations (i.e. knows II and VI are correct…"C" is answer.) but this tests the targeted knowledge.

A. **Incorrect**: I is not correct
Plausible: As described above the candidate must understand system auto function and alignment at the given power to recognize the auto run back is not armed yet.

B. **Incorrect**: I and III are incorrect
Plausible: Same as number one but may also assume that either all ABF pumps auto start or that low S/G level will trigger an auto start (this is not expected to distract as well as A)

C. **Correct**:

D. **Incorrect**: III & VII are incorrect
Plausible: similar logic to "B" comment.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-MFW01, rev. 1, obj. 5

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-FW-1 rev. 09,

KA: 059.K4.02 Main Feedwater ; description: Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7) K4.02 Automatic turbine/reactor trip runback 3.3 3.5

Question: 51 Answer: A

1 Pt(s)

Given the following condtions:

-A reactor trip has occurred from 100% power
-The operators have not operated any controls post-trip.
-The crew has just entered ES-0.1 Reactor Trip Response.
-PZR level is 25% and slowly decreasing.
-S/G pressures are approximately 990 psig and slowly decreasing.
-S/G levels are all ~15% and slowly increasing
-Tave is 545F and slowly decreasing.
- Steam Dumps are operating properly in automatic.
RCS pressure is 2020 psia and slowly decreasing.

Which of the following actions would be taken <u>first</u> by the crew per ES-0.1 to address the cooldown?

A. Throttle Auxiliary Feedwater flow

B. Commence immediate boration.

C. Initiate SI and return to step 1 of E-0.

D. Close the MSIVs and MSIV bypass valves.

Distracter Analysis:

A. **Correct**: Per ES-0.1 rev. 45 step 2 you would
-stop dumping
-verify SGBD isolated
-Throttle AFW
-Isolate MSIV's
<u>In that order</u>.
In this case AFW is the first item on that list.

B. **Incorrect**: Boration would only be required for stuck rods
Plausible: Candidate might see lower temperature as a reduction in SDM and believe that negative reactivity addition is required.

C. **Incorrect**: Lowering level is not due to a LOCA.
Plausible: Candidate might interpret lowering Pressurizer level as a LOCA and determine that the 9% pressurizer level limit could not be maintained per the ES0.1 foldout page.

D. **Incorrect**: This action is required but only after throttling AFW flow.

Plausible: It is an action that would be taken to address lowering RCS temperature but in this case AFW flow was the cause and will resolve the trend with least operational impact.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPS01 obj. 5

Source: Mod/ Bank (INPO #27090)

Level of knowledge: comprehension / analysis

Reference(s): ES-0.1 rev 45

KA: 061.K5.01 Auxiliary/Emergency Feedwater ; description: Knowledge of the operational implications of the following concepts as the apply to the AFW: (CFR: 41.5 / 45.7) K5.01 Relationship between AFW flow and RCS heat transfer 3.6 3.9

Question: 52 Answer: D

1 Pt(s)

Which of the following choices list only equipment that can be powered from 2A 480V bus?

A. 21 SI pump, 21 CS pump, 21 FCU and MCC 29A

B. 21 SI pump, 24 FCU, 25 SW pump and 21 ABFP

C. 22 SI pump, 22 FCU, 22 SW pump and MCC 24A

D. 22 SI pump, 23 FCU, 25 SW pump and MCC 24A

Distracter Analysis:

A. **Incorrect**: all are powered from 5A
Plausible: could confuse 5A and 2A

B. **Incorrect**: 21 SI is powered from 5A, 24 FCU and 21 ABFO are powered from 3A
Plausible: 2A and 3A share a common EDG and several swing loads consequently confusion may develop between loads and supplies.

C. **Incorrect**: 22 FCU is powered from bus 5A
Plausible: other loads are powered from 2A

D. **Correct**: the following major loads are powered from 2A 480 volt bus: 22 & 25(B/U power) SW pumps, 22 SI pp, 23 FCU, 22 CC pp, 21 RDMG, 22 Pzr heater, 21, 23, 24A.... MCC's

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SW001 rev. 0, obj. 5; I2LP-ILO-SIS001 obj. 6; I2LP-ILO-EDS01 obj. 5,6,7,15; I2LP-ILO-VCCARC obj. 6

Source: New

Level of knowledge: memory

Reference(s): 2-AOP-480V rev. 05

KA: 062.K2.01 AC Electrical Distribution ; description: Knowledge of bus power supplies to the following: (CFR: 41.7) K2.01 Major system loads 3.3 3.4

Question: 53 Answer: D

1 Pt(s)

Given the following plant conditions:

-A Station Blackout has occurred.
-21, 22, 23 and 24, 125 Volt Batteries are discharging at their design rate.
-Restoration of AC Electrical Power is not expected for 6 hours.
-Required Emergency Operating Procedure actions have been completed.

By design, the Station Batteries will last a minimum of...?

A. 8 hours

B. 6 hours

C. 4 hours

D. 2 hours

Distracter Analysis: Per design the battery will last 2 hours. IP OE from a 1999 event showed the batteries would fail a ~ 8 hours. Candidates may confuse the actual behavior with design, hence the distracters cover times in the range of 2-8 hours.

D. Correct:

Level: RO Exam / SRO Exam

Lesson Plan Objective: IP2LP-ILO-EDS03 rev. 0, obj. 8

Source: Bank (INPO 26733 IP3)

Level of knowledge: memory

Reference(s): UFSAR 8.2.3.5

KA: 063.A1.01 DC Electrical ; description: A1 Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: (CFR: 41.5 / 45.5) A1.01 Battery capacity as it is affected by discharge rate 2.5 3.3

Question: 54 Answer: A

1 Pt(s) The 21 Diesel Generator is NOT running. The 21 Fuel Oil Transfer pump starts in response to low level in the Fuel Oil Day Tank but fails to develop any discharge pressure.

The interlocked Fuel Oil Transfer pump will ...

A. start if in AUTO.

B. start if in AUTO only when the 21 Fuel Oil Day Tank "Low-Low" level is reached.

C. NOT start because Jacket Water pressure is not >10# (engine start).

D. NOT start because its lead pump is running.

Distracter Analysis:

Per System Description 27.3 the interlocked pump will start under the following if in auto and the lead pump fails to develop adequate discharge pressure after 10 seconds (assume normal system configuration and no other failures)

A. **Correct**: 23 pump would start in auto after 10 seconds

B. **Incorrect**: There is no auto start interlock on a "low-low' level in the FODT
Plausible: There is a "low-low" interlock that prevents the start of associated FOTP on the FOST (i.e. 23 FOST low-low level would prevent the start of 23 FOTP).

C. **Incorrect**: This function is not interlocked with the EDG running (JCW pressure)
Plausible: JCW is interlocked with several EDG systems/protections

D. **Incorrect**: Interlocked pump starts on low discharge pressure regardless of power to lead pump
Plausible: Some plants and other systems at this plant have standby pump starts based on pump not running (breaker position etc.)

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EDSEDG rev. 5, obj. 9

Source: Mod

Level of knowledge: comprehension / analysis

Reference(s): SD 27.3 pages 55-60

KA: 064. K6.08 Emergency Diesel Generator ; description: Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: (CFR: 41.7 / 45.7) K6.08 Fuel oil storage tanks 3.2 3.3

Question: 55 Answer: C

1 Pt(s)

A planned release of radioactive gas is in progress from Gas Decay Tank No. 23.

Which ONE of the following radiation monitoring detector channels failing HIGH will result in both an automatic TERMINATION of the release in progress and "VC evacuation alarm"?

A. R-27 Plant Vent Wide Range Gas Monitor

B. R-41 VC Particulate Radiation Monitor

C. R-44 Plant Vent Radiation Monitor

D. R-50 Gas Decay tank Radiation Monitor

Distracter Analysis:

A. **Incorrect**: No auto functions are related to this RM
Plausible: Per procedure R-27 is the back up to R-44 but it does not have the R-44 auto termination function.

B. **Incorrect**:
Plausible: Will result in VC evacuation alarm and termination of containment purge/relief but not termination of the WG release

C. **Correct**: R-44 performs all the same auto funtions of R-41 & R-42 but also terminates WG releases (closes RCV-014) and diverts PAB exhaust through the charcoal beds.

D. **Incorrect**: no auto functions are related to this RM
Plausible: This monitor is directly related to WG tank activity and radiation levels.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-RMS001 obj. 3, 9; : I2LP-ILO-GWR001 obj. 3698

Source: New

Level of knowledge: memory

Reference(s): 2-SOP-5.4.2 rev. 06

KA: 073.A2.02 Process Radiation Monitoring ; description: Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13) A2.02 Detector failure 2.7 3.2

Question: 56 Answer: B

1 Pt(s)

The following plant conditions exist:

- The Unit is tripped and a SI has occurred.
- Bus 5A fault light is NOT lit.
- Bus 5A normal feed breaker amber and green lights are lit.

For the given conditions:

What is the expected position of the FCV-1176 and 1176A valves (Service water from the EDG's) and the reason they are in that condition?

A. When EDG's power the 480v buses this causes both valves to open fully.

B. When the SI signal occurs the EDG's are started and both valves fully open.

C. When EDG's power the 480v buses this causes both valves to throttle flow to 1200 GPM.

D. When the SI signal occurs the EDG's are started and both valves throttle flow to 1200 GPM.

Distracter Analysis:

A. **Incorrect**: SI signal causes the valves to fail full open
Plausible: candidate may believe that the EDG accident start causes the FCV's to fail open.

B. **Correct**: When EDG's are started on a SI this causes both valves to open fully. Otherwise, the valves throttle to control flow on any other diesel start.

C. **Incorrect**: SI signal causes the valves to fail full open
Plausible: Under blackout without SI this is how the valves respond

D. **Incorrect**: SI signal causes the valves to fail full open
Plausible: Under blackout without SI this is how the valves respond

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EDSEDG Rev. 6 obj. 15,16,17

Source: Bank (IP2 ILO question from I2WX-ILO-SYS02)
Distracters C & D altered to make better distracters)

Level of knowledge: memory

Reference(s): SD 24.0 Rev. 11

KA: 076.A3.02 Service Water ; description: A3 Ability to monitor automatic operation of the SWS, including: (CFR: 41.7 / 45.5) A3.02 Emergency heat loads 3.7 3.7

Question: 57 Answer: B

1 Pt(s)

The plant is operating at 100% power when SJF (1-5) "Instrument Air Low Pressure" just came into alarm.

Based on this, select the choice that best completes the following statement:

"The IA compressors __(1)__ be running and highest PI-1144 Instrument Air Header Pressure would be expected to indicate __(2)__ .

A. (1) will
(2) 95 psig

B. (1) will
(2) 90 psig

C. (1) will not
(2) 95 psig

D. (1) will not
(2) 90 psig

Distracter Analysis: Alarm set point is 90# with the IA compressor auto start of 95#. Consequently "B" is the correct answer. Distracters are combinations of either the wrong pressure (95# vice 90#) or the correct pressure without the compressors running.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SA01 obj. 8, 9, 12

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-ARP-SJF Rev. 35

KA: 078.A4.01 Instrument Air ; description: A4 Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.01 Pressure gauges 3.1 3.1

Question: 58 Answer: C

1 Pt(s)

Unit 2 is in HOT SHUTDOWN.

In order to maintain the design function of the Containment, operators monitor and maintain containment temperature and pressure within specified limits. Which of the following is the closest to, but still in compliance with, the positive or negative limit on containment internal pressure in accordance with Technical Specifications 3.6.4 "Containment Pressure"?

A. -0.5 psig

B. -1.5 psig

C. +1.7 psig

D. +2.2 psig

Distracter Analysis:
The operators monitor the parameters listed to ensure that pre-transient conditions do not invalidate design assumptions and threaten the containment's ability to remain intact. This makes these tech specs. related to both purpose and function of the containment.

A. **Incorrect**: allowed by T.S but further from the limit then "B" & "C"
Plausible: candidate might not know the pressure limits +/-1 # are common limits elsewhere and at IP2 the normal band is +/- 1psig. This is true for other distractors.

B. **Incorrect**: This is within T.S (+/- 2 psig) but is further from the limit then "C" (i.e. 0.5 psig vice 0.3psig).

C. **Correct**: Maximum pressure for Containment is 2 psig. This value is within T.S. but only by 0.3 psig making it the closest to the limit.

D. **Incorrect**: This is above the positive pressure limit.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-VCVCB Rev. 0, obj. 11

Source: Mod (INPO 20710)
Level of knowledge: memory

Reference(s): Technical Specifications 3.6.4 & 3.6.5

KA: 103.2.1.28 Containment ; description: 2.1.28 Knowledge of the purpose and function of major system components and controls. (CFR: 41.7)

Question: 59 Answer: C

1 Pt(s)

During a small break LOCA with pressure above RHR pump shutoff head, in accordance with the Emergency Operating Procedures how are the pumps protected against overheating?

A Both pumps will be shutdown in E-0.

B. A recirculation flowpath is provided back to the RWST, allowing cool RWST water to cool the pumps.

C. One pump is procedurally shutdown in E-0; the other is runs on recirc. through an RHR heat exchanger back to RHR pump suction.

D. No protection is required; the pumps are designed to run indefinitely at shutoff head.

Distracter Analysis:

A. **Incorrect**: One pump is shutdown in E-0.
Plausible: Both are eventually shutdown after verifying no need for low head.

B. **Incorrect**: Flow path is back to the pump suction via MOV's 1870 and 743 and a flow orifice.
Plausible: There is a line that provides for aligning pump discharge to the RWST but this is not aligned (MOV 883 LC)

C. **Correct**: Per EOP one pump is stopped in E-0 and one in E-1 after verifying pressures and flows etc. This is done to protect a weak pump from damage should it remain running in parallel with another (stronger) pump. The pump that remains running is protected by the minimum flow line through the RHR heat exchanger until it s shut down

D. **Incorrect**: The pumps do need protection from shut-off head conditions
Plausible: Candidate may not understand pump min. flow requirements

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SIS001 Rev. 1 obj. 2 & 3
Source: Bank (INPO 10363 IP2, modified distracters)

Level of knowledge: memory

Reference(s): SD 4.2 Rev. 8; 2-E-0 Rev. 0; 2-E-1 Rev. 0

KA: 005.K1.06 Residual Heat Removal ; description: Knowledge of the physical connections and/or cause effect relationships between the RHRS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.06 ECCS 3.5 3.6

Question: 60 Answer: C

1 Pt(s)

Given the following:

-A Steam Generator Tube Rupture occurred and the team has completed all steps through Step 16 of E-3, Steam Generator Tube Rupture.
-Offsite power is lost during preparations to depressurize the RCS to minimize break flow per Step 17 of E-3.
-The EDGs automatically supply power to all 480V buses.
-Fifteen seconds later, the Watch Engineer observes that the SI pumps are no longer running. They were running before the loss of offsite power.

Should the SI pumps have restarted automatically by this point in time and why?

A. Yes. The Safety Injection timers should have started the SI pumps.

B. Yes. The Blackout timers should have started the SI pumps.

C. No. The Safety Injection timers did not actuate because the SI signal has been reset.

D. No. The Safety Injection timer has actuated but they did not have sufficient time to start the pumps.

Distracter Analysis:

Per E-3 step 9 SI is defeated and reset. The caution and the basis discusses that should a loss of power occur the Safeguards buses would not load in accident but would load in blackout. Consequently, any required accident loads would need to be (re)started as conditions require.

A. **Incorrect**: SI pumps should not have started.
Plausible: Candidate might not understand that at this point in E-3 that the SI signal was defeated and reset.

B. **Incorrect**: SI pumps should not have started
Plausible: blackout timer would have actuated

C. **Correct**: SI pumps would trip and not reload since the SI signal is defeated and reset.

D. **Incorrect**: SI timers have not actuated.
Plausible: Timing is such that candidate could determine that the SI pumps have not been loaded by the timer yet.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPE30 obj. 5

Source: Bank (INPO 28886)

Level of knowledge: comprehension / analysis

Reference(s): 2-E-0, 2-E-3

KA: 013.K2.01 Engineered Safety Features Actuation ; description: Knowledge of bus power supplies to the following: (CFR: 41.7)
K2.01 ESFAS/safeguards equipment control 3.6* 3.8

Question: 61 Answer: D

1 Pt(s)

Given the following conditions:

-Unit at 100% power
-SW aligned for "three header operation" with 11 River Water Pump in-service and 12 River Water Pump in standby.

When:
-The alarm for "UNIT 1 RIVER WTR PUMP BEARING TEMP HI/AUTO TRIP" annunciates concurrent with the trip of 11 River Water Pump.

Assuming all other alignments are normal and automatic features function properly after this occurs, which of the choices below correctly completes the following statement:

In accordance with 2-ARP-SJF the Operators should...

A. trip the Reactor and Turbine and go to E-0.

B. verify that Non-essential Service Water is providing cooling to conventional plant loads.

C. manually align the Non-Essential Service Water to supply conventional plant loads prior to reaching temperature limits.

D. verify the 12 River Water Pump starts and is providing cooling to conventional plant loads.

Distracter Analysis:

A. **Incorrect**: This is only required if the standby pump does not start
Plausible: This is the action should neither River Water Pump be available in this alignment.

B. **Incorrect**: Non-essential Service Water is the supply during two header operations but in this alignment the manual isolation is closed from Non-essential Service Water to conventional SW loads.
Plausible: Candidate might believe the manual isolation is not closed or can be opened quickly enough to recover.

C. **Incorrect**: ARP does not have this as an option.
Plausible: This is a possible operator response but not correct per procedures.

D. **Correct**: In this alignment the standby pump would auto start on low pressure (47#) when the running pump trips.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SW0001 Rev. 1, obj.

Source: New

Level of knowledge: comprehension / analysis

Reference(s): SD 24.0 Rev. 11; 2ARP-SJF Rev. 35;

KA: 076.K3.02 Service Water ; description: K3 Knowledge of the effect that a loss or malfunction of the SWS will have on the following: (CFR: 41.7 / 45.6) K3.02 Secondary closed cooling water 2.5* 2.8*

Question: 62 ***Answer: B***

1 Pt(s)

The Unit is operating at 100% power with all control systems properly aligned and operating normally. During a board walk down the Balance of Plant Operator (BOP) notices that the 24 MSIV Trip Circuit neon light (white sugar cube lights on SBF-1 above the MSIV 86s) is extinguished.

Which one of the following correctly identifies the significance of the above condition assuming it is NOT just a burned out bulb?

A. 24 MSIV cannot be opened or closed from the Central Control Room.

B. If 24 MSIV were to come off of the OPEN seat, a direct Main Turbine trip will NOT occur as required.

C. The Main Turbine will automatically trip if continuity were lost through any of MSIV Trip Circuit neon bulbs for the other three MSIVs.

D. 24 MSIV will NOT close in response to ANY Main Steam Isolation signal.

Distracter Analysis:

Neon lights above MSIV's on SBF-1 86's indicate power and continuity through the "86" relay. Loss of power or relay continuity will result in loss of Turbine trip when the MSIV leaves the open seat. The distracters are possible effects of loss of control power etc. and could be selected if the candidate does not understand the impact of loss of power.

A. **Incorrect**: see above.
Plausible: see above.

B. **Correct**: see above.

C. **Incorrect**: see above.
Plausible: see above.

D. **Incorrect**: see above.
Plausible: see above.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO EDS03- OBJ. 4

Source: Bank (IP2 ILO I2WX-ILO-SYS06 #41)

Level of knowledge: memory

Reference(s): I2LP-ILO EDS03

KA: 063.K4.02 DC Electrical ; description: Knowledge of DC electrical system design feature(s) and/ or interlock(s) which provide for the following: (CFR: 41.7) K4.02 Breaker interlocks, permissives, bypasses and cross-ties. 2.9* 3.2*

Question: 63 Answer: D

1 Pt(s)

Given the following plant conditions:

- Unit at 80% reactor power steady state conditions
- Rod Control Automatic
- Letdown 75 gpm orifice inservice

The NRHX CCW temperature control valve (TCV-130), repositions due to a loss of IA to the valve positioner. Which of the following describes the plant response to the event?

A. TCV-149 opens bypassing flow around the demineralizers with minimal change in RCS temperature.

B. RCS temperature falls requiring dilution to restore temperature.

C. Control rods step out due to a reduction in RCS temperature.

D. Control rods step in due to rising RCS temperature.

Distracter Analysis:

A. **Incorrect**: Temperature will lower the demin, bypass valve diverts at >145F increasing.
Plausible: Candidate might not understand the impact of loss of air to TCV-130

B. **Incorrect**: Temperature would increase.
Plausible: Candidate might not understand the impact of loss of air to TCV-130.

C. **Incorrect**: Temperature would increase and auto rod withdrawal is blocked at IP2.
Plausible: Candidate might not understand the impact of loss of air to TCV-130, the impact of temperature on Demin. boron affinity or that auto withdrawal is blocked.

D. **Correct**: TCV fails open which will provide full cooling to the NRHX and lower the temperature of L/D. This will increase the boron affinity of the demins and lower the boron concentration of the effluent and then the RCS. This will add positive reactivity and increase power and RCS temperature. The rod control system will respond by inserting rods to restore T-ave.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-CVC Rev. 0; obj. 2, 4, 6, 9, 10, 15

Source: Bank (INPO 19243)

Level of knowledge: comprehension / analysis

Reference(s): SD 3.0 Rev. 12

KA: 004.K6.20 Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following: K6.20 Function of demineralizer, including boron loading and temperature limits 2.5,3.1

Question: 64 Answer: A

1 Pt(s)

A LOCA is in progress with the following conditions:

-All ECCS Pumps are operating except 22 RHR pump which failed to start
-RCS pressure is 100# psig and stable
-Pressurizer level is 5% and stable

For this condition how will **break flow** and the **21** RHR pump flow respond to the start of **22** RHR pump?

A. Break flow will increase and 21 RHR pump flow will decrease.

B. Break flow will increase and 21 RHR pump flow will stay the same

C. Break flow will decrease and 21 RHR pump flow will decrease

D. Break flow will decrease and 21 RHR pump flow will stay the same

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Distracter Analysis: if the 22 pump is started the total RHR pump flow will increase and establish a new equilibrium RCS pressure where break flow equals make-up flow. The operating RHR pump will sense higher discharge pressure and will follow the pump curve to a new equilibrium pressure (higher) and flow (lower). "A" is the correct combination. The other distracters are combinations with one or both incorrect system responses.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SIS001 Rev. 1; obj. 7

Source: New

Level of knowledge: comprehension / analysis

Reference(s): N/A

KA: 006.K5.08 Emergency Core Cooling ; description: Knowledge of the operational implications of the following concepts as they apply to ECCS: (CFR: 41.5 / 45.7) K5.08 Operation of pumps in parallel 2.9* 3.1*

Question: 65 Answer: B

1 Pt(s)

During the final stages of an RCS heatup, the Steam Dump System is being used to control RCS temperature at No-Load conditions.

Which ONE of the following is the correct (1) Steam Dump mode of control and (2) its set point/control point.

A. (1) Pressure control –auto
(2) 1015 psig.

B. (1) Pressure control –auto
(2) 1005 psig.

C. (1) Temperature control – Turbine Not Tripped
(2) 550^0F.

D. (1) Temperature control –Turbine Trip
(2) 547^0F

Distracter Analysis:

A. **Incorrect**: Set point would be 1005 psig for no load. Could be in pressure control manual so this was not given as an option.
Plausible: It is a set point that you might see on the ADV's

B. **Correct**:

C & D. Incorrect: Pressure control is used during heat-up and turbine S/U
Plausible: it is a potential alignment

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SDSHP Rev. 0

Source: New

Level of knowledge: memory

Reference(s):2-SOP-18-01 Rev. 34 , 2-POP-01-03 Rev. 74

KA: 039.A1.06 Main and Reheat Steam; description: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: (CFR: 41.5 / 45.5) A1.06 Main steam pressure 3.0 3.1

Question: 66 Answer: C

1 Pt(s)

The plant is operating normally at 100% power. PT-412A fails low. Which of the following describes the response of the high pressure steam dumps?

A. Steam dumps will modulate open due to simultaneous indication of a load rejection and T-ref less than T-ave.

B. One of two dump valves per condenser section will modulate open due to the single channel arming and actuation signals.

C. Steam dumps will remain closed despite the temperature error signal because there is no arming signal present.

D. Steam dumps will remain closed despite the arming signal because there is no temperature error signal present.

Distracter Analysis:

A. **Incorrect**: There would be no arming signal (PT412B) only a Tave-Tref demand signal.
Plausible: Candidate might not understand that arming and control come off of separate channels.

B. **Incorrect**: All dumps arm from the same signal and in this case no arming signal is present.
Plausible: Candidate might not understand that the arming signals are not separate for different groups of dumps.

C. **Correct**: Although the Tave-Tref differential is enough to provide an open demand, no arming signal is present.

D. **Incorrect**: no arming signal present although there is a temperature error.
Plausible: Partially true, dumps will remain closed.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-SDSHP-Rev. 1, obj.

Source: Bank (INPO 10394)

Level of knowledge: comprehension / analysis

Reference(s):

KA: 041.K3.01 Steam Dump/Turbine Bypass Control ; description: Knowledge of the effect that a loss or malfunction of the SDS will have on the following: (CFR: 41.7 / 45.6) K3.01 S/G 3.2* 3.3

Question: 67 Answer: D

1 Pt(s)

Given the following conditions:

- The Unit is at 100% power.
- PT-412A, First Stage Pressure begins to fail DOWNSCALE.

Assuming NO action by the crew, which one of the options below describes the correct response of RCS Tavg and RCS loop Delta-T as a result of the transmitter failure?

A. RCS Tavg will increase and RCS loop Delta-T will increase.

B. RCS Tavg will increase and RCS loop Delta-T will decrease.

C. RCS Tavg will decrease and RCS loop Delta-T will increase.

D. RCS Tavg will decrease and RCS loop Delta-T will decrease.

Distracter Analysis:

As first stage pressure input fails low, rods will insert. RCS temperature will decrease as a result of the rod insertion with no change in steam demand. As temperature decreases to compensate for the negative reactivity being added by rods power will lower slightly due to lowering steam header pressure etc.. As power decreases, loop Delta-T also decreases.

A. **Incorrect**: Tavg and Delta-T will decrease.
B. **Incorrect**: Tavg will decrease.
C. **Incorrect**: Delta-T will decrease.
D. **Correct**:

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO 24959)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-INST-001

KA: 045.K4.01 Main Turbine Generator ; description: Knowledge of MT/G system design feature(s) and/or interlock(s) which provide

for the following: (CFR: 41.7) K4.01 Programmed controller for relationship between steam pressure at T/G inlet (impulse, first stage) and plant power level 2.7 2.9

Question: 68 Answer: D

1 Pt(s)

Of the following mixtures containing various concentrations of Hydrogen and Oxygen, which ONE requires IMMEDIATE SUSPENSION of additions to the WASTE GAS HOLDUP SYSTEM?

	H_2 CONCENTRATION	O_2 ONCENTRATION
A.	1.5%	6%
B.	7%	2%
C.	1%	7%
D.	5%	5%

Distracter Analysis:

To require immediate suspension of additions the WG system must have both > 4% oxygen and >2% hydrogen. Only D has a combination of greater than both these concentrations. The distracters have one or both concentrations less then or equal to these limits.

A. **Incorrect**: hydrogen in not >2%.
B. **Incorrect**: Oxygen is not >4%
C. **Incorrect**: Hydrogen is not >2%
D. **Correct**:

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-GWR001, Rev.0; obj. 3693, 3702

Source: Mod

Level of knowledge: memory

Reference(s): TRM 3.7.B

KA: 071.K5.04 Waste Gas Disposal ; description: Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: (CFR: 41.5 / 45.7) K5.04 Relationship of hydrogen/oxygen concentrations to flammability 2.5 3.1

Question: 69 Answer: C

1 Pt(s)

Normal plant alignment of the air systems exist. The 11 Centac has tripped, Station air pressure is 110 psig and declining. Which of the following best describes the sequence that alternate air supplies automatically start and/or supply as pressure continues to decline? (Assume NO operator action.)

A. 12 Centac, 21 Station air compressor, 21 and 22 Instrument air compressors, Station Air back up to WCCPPS, nitrogen backup to WCCPPS.

B. 21 and 22 Instrument air compressors, 21 Station air compressor, station air back up to WCCPPS, Nitrogen backup to WCCPPS.

C. 21 Station air compressor, 21 and 22 Instrument air compressors, Station Air back up to WCCPPS, nitrogen backup to WCCPPS.

D. 21 Station air compressor, 21 and 22 Instrument air compressors, Nitrogen back up to WCCPPS, Station air backup to WCCPPS.

Distracter Analysis: One of two Centac compressors are the usual supply for all of IP1 & 2 loads which are cross connected. The Centac compressors do not auto start.

The system should respond as follows to a loss of pressure:

~110# IA/SA: SAC starts to supply loads

~95# IA/SA: IA compressors both start

~90# IA supply to WCCPP air receivers: PCV 1140 opens to align SA B/U to WCCPPS

~49# in individual WCCPP header (4): nitrogen PCV opens to supply 100# nitrogen.

A. **Incorrect**: 12 Centac would not start.
Plausible: Otherwise answer is correct

B. **Incorrect**: SAC would start first
Plausible: Otherwise sequence is correct

C. **Correct**:

D. **Incorrect**: Nitrogen would not supply until 49# downstream of WCCPP header PCV
Plausible: Otherwise correct.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-VCCIS Rev. 0, obj. 12,13,14; I2LP-ILO-SA01, Rev. 1,Obj. 2,8,9,15.

Source: Bank (IP2 I2WX-ILO-SYS06 #29)

Level of knowledge: memory

Reference(s): 2-SOP-29.2 Rev. 23; 2-SOP-29.3 Rev. 23: 2-AOP-AIR-1, Rev. 5,

KA: 079.A2.01 Station Air ; description: Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13) A2.01 Cross-connection with IAS 2.9 3.2

Question: 70 Answer: A

1 Pt(s)

A malfunction of ONE of the diesel building area Fire Protection thermostat switches occurs, causing it to fail HIGH. Which of the following describes the response of the sprinkler system in the diesel building?

A. No effect, diesel building sprinklers will still function normally if required.

B. The sprinkler system will actuate automatically only if another thermostat switch actuates.

C. Sprinkler system actuates and will need to be manually stopped.

D. The sprinkler system is prevented from actuating automatically with the thermostat failed.

Distracter Analysis:

(analysis of K/A: The question targets knowledge of a malfunction and its impact on the FP system. Since, as written, the K/A involves loss or malfunction of the FP system and a malfunction of the FP system does not impact the detectors but the reverse is true; the question was written relating how a malfunction of the detectors impacts the FP system. This was a reasonable match of the knowledge in light of actual system function.)

A. **Correct**: The diesel building has a wet pipe sprinkler system. Any 1 of 21 "thermostats" provide alarm function to "DIESEL BLDG FIRE OPERATION" alarm. This alarm is also actuated by water flow or 1 of 9 tamper switches for critical valves. Only the flow switch input implies actuation of a sprinkler. The sprinklers actuate a 175F locally at individual sprinkler head "bulbs". Consequently, the failure of a thermostat does not affect the sprinkler system function, although the alarm will come in erroneously

B. **Incorrect**: Thermostats do not actuate the system and provide alarm function only.

C. **Incorrect**: Thermostats do not actuate the system and provide alarm function only.

D. **Incorrect**: Thermostats do not affect sprinkler system actuation and provide alarm function only.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-FPS001 Rev. 0, obj. 2, 10 d.

Source: New

Level of knowledge: memory

Reference(s): 2-ARP-SOF, Rev. 20; 2-ONOP-FP-001, Rev. 1,

KA: 086.K6.04 Fire Protection ; description: Knowledge of the effect of a loss or malfunction on the Fire Protection System following will have on the : (CFR: 41.7 / 45.7) K6.04 Fire, smoke, and heat detectors 2.6 2.9

Question: 71 Answer: A

1 Pt(s)

During the first two (2) minutes of a moderately sized steam line break or a moderately sized RCS LOCA both inside containment, which one of the following parameters should be used to differentiate between them?

A. Containment radiation

B. RCS pressure

C. Containment pressure

D. Pressurizer level

Distracter Analysis:
All of the answers are indications of both a LOCA and a steam line break with the exception of radiation levels (A) which is an indication of a LOCA only.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-EOPE00, obj. 5

Source: Bank (21408)

Level of knowledge: memory

Reference(s):2-E-0 Rev. 0, 2-E-2 Rev. 0 and associated basis

KA: 002.A3.03 Reactor Coolant ; description: Ability to monitor automatic operation of the RCS, including: (CFR: 41.7 / 45.5) A3.03 Pressure, temperatures, and flows. 4.4 4.6

Question: 72 Answer: B

1 Pt(s)

Given the following conditions:

-The Unit is in Mode 1
- 90% power and stable.
-All Tavg channels are approximately 3 F higher than Tref.

Which one of the following modes on the Rod Control System Bank Selector Switch will provide the FASTEST rod speed if rod motion is demanded?

A. Control Bank "A"

B. Shutdown Bank "A"

C. Automatic

D. Manual

Distracter Analysis:

A. **Incorrect**: Incorrect. 66 spm.
Plausible: close to SD rod speed

B. ~~**Correct**: 72 SPM~~ Incorrect based upon given conditions
Plausible:

C. **Incorrect**: Incorrect. 3 degree mismatch will move bank "D" rods at approximately 8 spm (8 - 72 spm band).
Plausible: required candidate to understand auto rod demand is at minimum and that it is 8 spm

D. ~~**Incorrect**: Manual moves control banks at 66 spm~~
~~**Plausible**: close to SD rod speed.~~

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-ICRODr1, obj. 8 & 9
Source: Bank (INPO 24932)

Level of knowledge: memory

Reference(s): SD 16.1 Rev. 4

Based upon post-exam comments D is the correct answer for the given conditions.

KA: 014.A4.02 Rod Position Indication ; description: Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.02 Control rod mode-select switch 3.4 3.2

Question: 73 Answer: C

1 Pt(s)

Which ONE (1) of the following describes the MINIMUM Core Exit Thermocouple (CET) input to determine that a RED Path exists on the Core Cooling Critical Safety Function Status Tree?

A. The single highest CET indicates greater than 1200F.

B. The highest CET in each core quadrant indicates 1200F.

C. The five highest CETs all indicate greater than 1200F.

D. The average of the five highest CETs calculated value is greater than 1200F.

Distracter Analysis:

A. **Incorrect**: Per F-0.2 the determination is made based on the five highest anywhere in the core.

B. **Incorrect**: Per F-0.2 the determination is made based on the five highest anywhere in the core. If each quadrant had one CET >1200, only 4 would meet the criteria

C. **Correct**: Per F-0.2 the determination is made based on the 5 highest reading CET's to ensure the transition is not made based on failed indications.

D. **Incorrect**: five highest, not average.

Level: RO Exam / SRO Exam

Lesson Plan Objective:

Source: Bank (INPO 23343)

Level of knowledge: memory

Reference(s): E-0.2 Rev. 30

KA: 017.2.4.31 In-core Temperature Monitor ; description: 2.4.31 Knowledge of annunciators alarms and indications, and use of the response instructions. (CFR: 41.10 / 45.3) IMPORTANCE RO 3.3 SRO 3.4

Question: 74 Answer: B

1 Pt(s)

Which ONE (1) of the following describes the function of the Interlock Override Key switch on the Fuel Handling Manipulator Crane?

Provides a bypass for

A. Bridge and Trolley Boundary interlock and Slack Cable interlock only.

B. Bridge and Trolley as well as Hoist interlocks, including the gripper unlatch solenoid valve.

C. Bridge and Trolley interlocks but cannot bypass the Hoist interlocks.

D. Hoist interlocks, including the gripper unlatch solenoid valve, but cannot bypass the Bridge and Trolley interlocks.

Distracter Analysis:

A. **Incorrect**: Incorrect. All interlocks bypassed and these have their own individual bypass

B. **Correct**:

C. **Incorrect**: Incorrect. All interlocks bypassed

D. **Incorrect**: Incorrect. All interlocks bypassed

Level: RO Exam / SRO Exam

Lesson Plan Objective: I2LP-ILO-FHD001 Rev. 0, obj. 9

Source: Bank (INPO 23240)

Level of knowledge: memory

Reference(s): 2-SOP-17.30 Rev. 1

KA: 034.K1.01 Fuel Handling Equipment ; description: Knowledge of the physical connections and/or cause effect relationships between the Fuel Handling System and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.01 RCS 2.5 3.2

Question: 75 Answer: D

1 Pt(s)

What effect (if any) does a Small Break LOCA have on the Steam Generators (S/G) AND what actions are taken to mitigate this effect? (Assume degraded containment conditions.)

A. The Steam Generators are not affected, since adequate Reactor Coolant System (RCS) heat removal occurs through the pipe break.

B. Nitrogen gas from the Safety Injection Accumulators would cause the S/G tubes to become gas bound. S/G pressures should be maintained high in the control band to avoid this condition.

C. Void formation in the S/G U-tubes may occur if there are no Reactor Coolant Pumps operating. S/G pressures should be maintained HIGHER than RCS pressure to avoid this condition.

D. Due to changing containment conditions, adverse affects on calibration of S/G level indications may occur. S/G levels should be maintained between 27% and 50%.

Distracter Analysis:

A. **Incorrect**: S/G level indications would be affected and S/G's are generally necessary in SBLOCA's to remove decay heat.
Plausible: in some injection may be adequate to remove decay heat

B. **Incorrect**: Maintaining S/G pressure is not a strategy used to prevent gas binding of the S/G tubes. If during a LOCA the accumulators inject they are later isolated or vented to prevent excessive nitrogen injection.

C. **Incorrect**: Void formation would be made more likely at higher S/G pressure and void formation is more dependant on other factors such as leak rate and ECCS flow. Maintaining S/G pressure lower than RCS helps ensure the S/G is a heat sink vice a source.

D. **Correct**: The basis of the adverse EOP control bands/points is that the instruments are affected by the containment conditions. Maintaining level support the S/G's being effective heat sinks.

Level: RO Exam / SRO Exam

Lesson Plan Objective: I@LP-ILO-EOPE10 Rev. 0, obj. 6

Source: Bank (INPO 21007)

Level of knowledge: comprehension / analysis

Reference(s): 2-E-1 Rev. 0 and background doc.

KA: 035.A2.06 Steam Generator ; description: Ability to (a) predict the impacts of the following malfunctions or operations on the SG; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5) A2.06 Small break LOCA 4.5 4.6

Question: 76 Answer: D

1 Pt(s)

Which of the following does NOT require a "4-hour" report to the NRC?

A. A valid automatic SI signal results in ECCS pumps starting and injecting while mode 3.

B. One ABFW pump inoperable for 73 hours, shutdown in progress, Unit is at 94% power and decreasing.

C. An automatic Reactor trip occurs and ALL ABFW pumps automatically start as designed and inject feed into all four SG's.

D. Two ABFW pumps inoperable for 4 hours, shutdown preps in progress, Unit is at 100% power

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Distracter Analysis:

A. **Incorrect**: Valid signal that results in ECCS injection is reportable (4-hr).

B. **Incorrect**: A shutdown has been initiated, consequently it has crossed the reportability threshold (4-hr).

C. **Incorrect**: An auto RPS actuation is a 4 hour report and AFW actuation is an 8 hour report.

D. **Correct**: A shutdown has not been initiated, consequently it has not crossed the reportability threshold.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): Tech. Specs., IP-SMM-LI-108 Rev. 7

KA: 061.2.4.30 Auxiliary/Emergency Feedwater ; description: 2.4.30 Knowledge of which events related to system operations/status should be reported to outside agencies. (CFR: 43.5 / 45.11)

Question: 77 Answer: A

1 Pt(s)

Following a trip, operators recognize several abnormal indications:

- 6.9KV buses 1 and 2 are deenergized.
- 480v bus 2A is deenergized.
- No EDG's are running.
- Alarm lights on panels FAF and SLF are dark.
- Letdown flow is 0 gpm.

Based on these indications:

(1) What has happened? and
(2) What AOP's will be used to mitigate it?

A. (1) 21, 125V DC panel has been lost.
(2) Implement 2-AOP-DC-1 followed by 2-AOP-480V-1.

B. (1) 23, 125V DC panel has been lost.
(2) Implement 2-AOP-DC-1 followed by 2-AOP-138KV-1.

C. (1) 21, Vital Instrument bus has been lost.
(2) Implement 2-AOP-IB-1 followed by 2-AOP-480V-1.

D. (1) 23, Vital Instrument bus has been lost.
(2) Implement 2-AOP-IB-1 followed by 2-AOP-138KV-1.

Distracter Analysis:

Per the indications 21 DC panel has been lost. The proper procedures to implement in conjunction with the EOP's are the AOP's for DC power and 480V power. The Loss of DC AOP drives both the initiation of 2-AOP-480v and the restoration of power to the 6.9KV buses via the normal operating procedures. The distractors are combinations of either the wrong bus loss and/or the wrong AOP's. The question was written so the candidate needed to know both whether it was an AC or DC loss and generally how the AOP's have you recover.

A. **Correct**: These are all indications in the control room of loss f 21 125vdc panel per 2-AOP-DC-1. Only the loss of 21 or 22 VDC panels results in the trip breakers opening immediately. 2-AOP-DC-1 directs the initiation of 2-AOP-480V-1 to restore 2A bus but the other buses are restored after the DC panel and are restored with their normal operation procedures.

B. **Incorrect**: None of these are related to 23 DC bus. AOP-138KV is used to restore power to the 6.9 KV buses but is not used to restore power in this situation.

C. **Incorrect**: This loss would not result in: a trip, loss of 6.9kv buses, loss of 2A 480v bus.
Plausible: This failure will impact charging and letdown including L/D flow indication failing low and loss of letdown if channel 1 is not defeated. This will also result in the loss of FCF panel annunciators.

D. **Incorrect**: This loss would not result in: an immediate trip, loss of 6.9kv buses, loss of 2A 480v bus or loss of the alarm panels.
Plausible: Loss of 23 IB will fail closed the MFRV's closed and will required a manual trip to avoid a low SG level auto-trip. It is important to note that the loss of power and auto trip would not be concurrent as described in stem. It will also cause loss of letdown if channel 3 is not defeated.

Level: SRO Exam

Lesson Plan Objective: I2LP-ILO-AOPDC1, Rev. 0, obj. 1

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-DC-1, Rev. 2 and 2-AOP-IB-1, Rev. 06.

KA: 063.A2.01 DC Electrical ; description: A2 Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13) A2.01 Grounds 2.5 3.2*

Question: 78 Answer: C

1 Pt(s)

Given the following conditions:
-Unit is shutdown at 250^0F, 150 psig.
-Actual Pressurizer level is 65%.
-No RCP's operating.
-One HHSI pump and two Charging pumps capable of injection.
-Both PORV's setpoints on Panel SF read 1200 psig.

Using the reference provided (T.S. 3.4.12), determine from the choices below which contains the MINIMUM action(s) required by Tech. Spec. 3.4.12, if any.

A. No action required.

B. Disable the one HHSI pump capable of injection, only.

C. Disable the one HHSI pump capable of injection and one of the Charging pumps capable of injection, only.

D. Disable the one HHSI pump capable of injection and one of the operable Charging pumps capable of injection and reduce pressurizer level to <51%.

Distracter Analysis:

T.S 3.1.12 applies in mode 4 <280^0F. Per table 3.4.12-1 Option "B" with 1 HHSI pump and 2 Charging pumps and PORV's operable their setpoints must be reduced to ~1100 psig. In the stem the PORV's set point is 1150 psig. Per action "A" of T.S. 3.4.12 the operators must immediately do one of two things: (1) disable pumps to regain compliance with table 3.4.12-1; in this case this would mean disabling one operable HHSI and charging pumps or lowering the PORV set point to <1100# (not given as a choice). By disabling the pumps the operator would be complying with table 3.4.12-1 option "D".

A. **Incorrect**: PORV set point is out of spec high and action is required
Plausible: Might not read figure 3.4.12-1 correctly.

B. **Incorrect**: either pressurizer level must be reduced or $\leq$ one charging pump be capable of injection.
Plausible: if candidate does not understand that no pressurizer level >51% is covered by the graph in figure 3.4.12-3 and plots the temp. and press. given it will appear to be in the acceptable region.

C. **Correct**: T.S 3.1.12 applies in mode 4 <280^{0}F. Per table 3.4.12-1 Option "B" with one HHSI pump and two charging pumps and PORV's operable their setpoints must be reduced to ~1100 psig. In the stem the PORV's set point is 1200 psig. Per action "A" of T.S. 3.4.12 the operators must immediately do one of two things: (1) disable pumps to regain compliance with table 3.4.12-1; in this case this would mean disabling one operable HHSI and charging pumps (or lowering the PORV set point to <1100# not given as a choice) or (2) restore pressurizer level, RCS temp. and pressure into compliance with options "C", "D" or "E". By disabling all but 1 Charging pump the operator would be complying with table 3.4.12-1 option "C" and Figure 3.4.12-2.

D. **Incorrect**: This is more then the minimum required since either of the last two actions would restore compliance (i.e. disabling one operable HHSI & Charging pump would comply with Option "C"; disabling one operable HHSI pump and lowering pressurizer level to <51% would comply with Option "D"
Plausible:

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): T.S. 3.4.12 (provided)

KA: 004. Chemical Volume Control; description: 2.1.33 Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications. (CFR: 43.2 / 43.3 / 45.3)

Question: 79 Answer: B

1 Pt(s)

The following conditions exist on Unit 2

- Mode 5 operations with 21 RHR aligned and providing shutdown cooling.
- RCS temperature is 190F.
- RCS pressure is 330 psig.
- Pressurizer level is >98% and rising to go solid.
- RHR letdown in service via HCV-133.
- Charging is in service.
- PCV-135 is controlling RCS pressure in automatic.
- When PCV-135 controller fails to 100% demand.

Which of the following describes the INITIAL (1) primary system response and (2) which procedure gives guidance specific to this failure?

A. (1) RCS Pressure will decrease.
(2) 2-POP-3.3, "Plant Cooldown, Mode 3 to Mode 5."

B. (1) RCS Pressure will increase.
(2) ARP SGF 2-6 "IMPENDING RCS OPS"

C. (1) RCS Pressure will decrease.
(2) ARP for FCF 4-7 "SATURATION TEMPERATURE MARGIN APPROACHED"

D. (1) RCS Pressure will increase.
(2) ARP for SGF 1-9 "RCS OPS TEMP TRIP"

Distracter Analysis:

A. **Incorrect**: PCV-135 will close and pressure will rise.
Plausible: POP-3.3 step 4.5.18 provides guidance specific to control of the PCV-135 in manual.

B. **Correct**: 100% demand on PCV-135 results in a closure of the valve. This will increase pressure since charging is still inservice with no letdown, pressurizer level will increase more quickly. POP-3.3 step 4.5.18 provides guidance specific to control of the PCV-135 in manual along with ARP SGF 2-6.

C. **Incorrect**: Pressure will increase.
Plausible: ARP for FCF 4-7 could be implemented if the alarm is not already in. This is an alarm that could be related to lowering pressure and it does direct increasing pressure.

D. **Incorrect**: Alarm should already be in given the conditions and provides no guidance for high or low pressure since the alarm is related to being less then 300F.
Plausible: Pressure response is correct and Alarm is related to OPS system which could respond if pressure gets high enough.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s):2-AOP-INST-1 Rev. 03, 2-POP-3.3, Rev. 71, 2-ARP-SGF Rev. 32, 2-ARP-FCF Rev 27.

KA: 005.A2.02 Residual Heat Removal ; description: Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13) A2.02 Pressure transient protection during cold shutdown 3.5 3.7

Question: 80 Answer: B

1 Pt(s)

A surveillance of the Trisodium Phosphate indicates it is below the Tech. Spec. required amount. What impact would this have on ECCS effectiveness during the recirculation phase of a LOCA assuming recirculation spray is in service?

A. Corrosion rate would increase and iodine removal efficiency would decrease due to recirculation water being more caustic than design.

B. Corrosion would increase and iodine removal efficiency would decrease due to recirculation water being more acidic than design.

C. Corrosion would decrease and iodine removal efficiency would decrease due to recirculation water being more caustic than design.

D. Corrosion would increase and iodine removal efficiency would increase due to recirculation water being more acidic than design.

Distracter Analysis:

A. **Incorrect**: The sump would be more acidic not caustic.
Plausible: The impact is correct.

B. **Correct**: TSP is added to the sump to make the sump contents more caustic during a LOCA. If there was less TSP than required, the sump would be more acidic than design and this would increase corrosion and decrease iodine removal efficiency.

C. **Incorrect**: The sump would be more acidic not caustic and corrosion rate would increase.
Plausible: Impact on iodine removal is correct.

D. **Incorrect**: Iodine removal efficiency would decrease.
Plausible: The other impacts are correct.

Level: SRO Exam

Lesson Plan Objective: I2LP-ILO-CS001, obj. 3 & 5

Source: New

Level of knowledge: comprehension / analysis

Reference(s): T.S. 3.6.6 bases

KA: 026.2.2.25 Containment Spray system; description: 2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (CFR: 43.2)

Question: 81 Answer: D

1 Pt(s)

During fuel handling:

- A fuel assembly dropped from the mast back into the reactor vessel.
- Bubbles are observed coming from the area where the assembly was dropped.
- Radiation monitors R-27 and R-44 are in alarm and monitors R-41, R-42 are NOT in alarm.
- 2-AOP-FH-1, (Fuel Damage or Loss of SFP/Refueling Cavity Level) has been implemented.

What actions are required?

A. Evacuate VC of non-essential personnel only. Discontinue fuel movement in the VC and manually close the VC purge supply, exhaust and VC pressure relief valves.

B. Evacuate all personnel from VC and manually close the VC purge supply, exhaust and VC pressure relief valves.

C. Evacuate all personnel from VC and verify the R-27 signal auto-closure of the VC purge supply, exhaust and VC pressure relief valves.

D. Evacuate all personnel from VC and verify the R-44 signal auto-closure of the VC purge supply, exhaust and VC pressure relief valves.

Distracter Analysis:

A. **Incorrect**: AOP requires all personnel evacuate VC (step 4.11)

B. **Incorrect**:
Plausible: Candidate might not understand procedure or auto closure features of purge. Note that the R-41/42 are the tech. spec. required radiation monitors with auto closure features but R-44 although not tech. spec. does have an auto closure signal.

C. **Incorrect**: The R-27 does not cause an auto closure signal
Plausible: The R-27 alarm does require containment evacuation and suspending fuel movement.

D. **Correct**: Per AOP-FH-1 all personnel would be evacuated on the R-44 or R-27 alarm and the R-44 would require the operator to verify the auto closure (CVI) occurred (steps 4.11-4.15)

Level: SRO Exam

Lesson Plan Objective: I2LP-ILO-RMS001, obj. 3 (RMS auto features)

Source: Mod (I2WX-ILO-SYS04)

Level of knowledge: comprehension / analysis

Reference(s): T.S. 3.3.6 and 2-AOP-FH-, Rev. 03

KA: 029.A2.01 Containment Purge ; Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 5.13) Maintenance or other activity taking place inside containment. 3.6

Question: 82 Answer: B

1 Pt(s)

Given the following plant conditions:

- Unit 2 has just completed a shutdown to Mode 5 due to high RCS activity (90 µci/cc peak value).
- RCS degas is complete and activity levels in the WGDT's are very high.

Subsequently a large leak has developed in the WGDT's with the highest activity and the following conditions are observed/reported for the last 20 minutes:

- Most recent RCS activity is 50 µci/cc I-131 equivalent and lowering.
- CCR ventilation has automatically shifted to INCIDENT mode
- R-1 is in alarm and reading off scale high.
- RP has measured CCR rad levels are currently 11 mr/hr and increasing slowly.
- R-27 in alarm and reading 4.7E-2 µci/sec
- R-44 in alarm and reading 4.5E-1 µci/cc

Using the IP-EP-120 provided, what is the correct EAL classification, if any, based on this information alone?

A. Unusual Event

B. Alert

C. Site Area Emergency

D. No event threshold met.

Distracter Analysis:

K/A match analysis: There are few Waste Gas related events that require reports to outside agencies that are not Emergency Action Levels. This question tests the candidates knowledge of those EAL's all of which have a 1 hour report to the NRC. To answer this question the candidate must understand and review the EAL thresholds, determine whether a threshold is exceeded and based on this, determine if a specific Emergency Action Level needs to be reported. Note that although all the answers, except "D", have a 1 hour reports associated, what will be reported changes based on the "classification" of the event.

A. **Incorrect**: EAL is 5.1.2 due to the R-44 >4.4E-1 µci/sec.

Plausible: U.E. criteria met for 5.3.1 due to R-1 area rad. monitor being off scale high. Also levels for R-27 & 44 for EAL 5.1.1 are met but for < 1 hour.

B. **Correct**: EAL is 5.1.2 due to the R-44 >4.4E-1 μci/sec

C. **Incorrect**: EAL is 5.1.2 due to the R-44 but <4.4E-0 μci/sec required for SAE.
Plausible: Candidate might make comparison error.

D. **Incorrect**: EAL is 5.1.2 due to the R-44 >4.4E-1 μci/sec
Plausible: candidate might focus on section 2.0, I-131 levels and not note the section 5.0 limits have been crossed.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): IP-EP-120 Rev. 2 section 5.0

KA: 071.2.4.30 Waste Gas Disposal ; description: 2.4.30 Knowledge of which events related to system operations/status should be reported to outside agencies. (CFR: 43.5 / 45.11)

Question: 83 Answer: A

1 Pt(s)

Given the following plant conditions:

-Unit is at 100% power with all plant equipment in a normal alignment.
-Charging Pump 21 is running in Automatic.
-Charging Pump 22 is running in Manual.
- During the disassembly of a scaffold the positioner and air line were damaged to LCV-459, Letdown Isolation Valve. The valve has gone to the failed position.
-Repair efforts are expected to take 2-4 hours.

Which of the following choices is correct regarding: (1) The automatic response of the Pressurizer Level Control System to this failure and (2) the actions required to mitigate this event?

A. (1) 21 Charging pump speed will lower.
(2) Charging flow must be reduced to one pump at minimum speed with HCV-142 fully closed, and then Excess Letdown placed in service.

B. (1) 21 Charging pump speed will lower.
(2) 22 Charging Pump speed must be lowered manually to minimum with HCV-142 fully closed until Normal Letdown can be reestablished.

C. (1) 21 Charging pump speed will rise.
(2) Charging flow must be reduced to one pump at minimum with HCV-142 fully opened until Excess Letdown is inservice and then HCV-142 can be restored to normal.

D. (1) 21 Charging pump speed will rise.
(2) Charging flow must be reduced to one pump at minimum speed with HCV-142 fully closed, and then Excess Letdown placed in service.

Distracter Analysis:

A. **Correct**: LCV-459 fails closed on loss of air and will isolate letdown flow. With the loss of letdown the level in the pressurizer will rise and the demand to the 21 charging pump will lower. The

AOP directs the closure of the HCV142 and the 204A&B to isolate all normal charging and reducing the charging pump (not pumps) speed to minimum. The AOP does not specifically direct the operator to stop second pump but notes and the bases assume that there is only one charging pump running. The CRS then may open the charging pump bypasses and place excess letdown inservice.

B. **Incorrect**: 22 Charging pump must be stopped not reduced to minimum and excess letdown should be put inservice

C. **Incorrect**: 21 charging pump speed will lower and HCV should be closed not opened.

D. **Incorrect**: 21 pump speed will lower; other information is correct.

Level: SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #26250)

Level of knowledge: comprehension / analysis

Reference(s):

KA: 011.A2.07 Pressurizer Level Control ; description: Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13) A2.07 Isolation of letdown .3.0 3.3

Question: 84 Answer: A

1 Pt(s)

A Component Cooling water leak inside containment has caused reduced flow to the RCPs. The following conditions exist:

- Unit 2 is at 100% power.

Temperatures / RCP #	21	22	23	24
Seal Inlet	195F	185F	205F	200F
Stator Winding	220F	195F	215F	229F
Motor Bearing	189F	205F	177F	181F
Seal Inlet	195F	185F	205F	200F
Annunicator RCP Hi Vibration	Not Lit	Not Lit	Not Lit	Not Lit

Which ONE of the following set of actions must be taken?

A. Trip Reactor, secure 22 RCP, initiate E-0

B. Trip Reactor, secure 23 RCP, initiate E-0

C. Trip Reactor, secure 21, 22 & 23 RCPs, initiate E-0

D. Perform a rapid plant shutdown, secure RCPs as necessary to isolate CCW leak

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Distracter Analysis:

A. **Correct**: Bearing temperature limit for RCP's per AOP-RCP-1 and AOP-CCW-1 is 200^0F. When this temperature is reached the reactor is tripped and then the affected RCP

B. **Incorrect**: No trip criteria for 23 RCP have been reached
Plausible: 23 RCP has the highest seal inlet temperature which has a limit of 225^0F.

C. **Incorrect**: Only 22 RCP trip criteria has been reached.
Plausible: candidate might believe that stator temperature limit is 200 degrees and would require the trip of all but 22 RCP.

D. **Incorrect**: 22 RCP must be tripped after the reactor per AOP-RCP-1
Plausible: A leak that did not cause a temperature limit to be violated could require a shutdown.

Level: SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #28922, IP2)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-RCP-1, Rev. 7, 2-AOP-CCW-1, Rev. 1

KA: 000015/17.G2.4.4 RCP Malfunction ; description: 2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR 41.10 / 43.2 / 45.6)

Question: 85 Answer: D

1 Pt(s)

During a LOCA, emergency coolant recirculation capability was lost, and ECA-1.1, "Loss of Emergency Coolant Recirculation" is currently in progress.

A RED path is identified on the CONTAINMENT status tree, and transition to FR-Z.1, "Response to High Containment Pressure," has occurred.

What procedure should be used to operate the containment spray pumps, and why?

A. FR-Z.1 because it takes PRECEDENCE over ECA-1.1.

B. FR-Z.1, because it provides for GREATER containment spray.

C. ECA-1.1, because an ECA should be completed PRIOR to transferring to an FR.

D. ECA-1.1, because it provides for REDUCED containment spray.

Distracter Analysis:

A. **Incorrect**: Per 2-FR-Z.1 caution before step 3, the operators are directed to use 2-ECA-1.1 guidance for the operation of spray.
Plausible: FR does take precedence but in this case the FR directs use of the ECA-1.1 guidance for CS pump operation.

B. **Incorrect**: The FR-Z.1 may provide greater CS flow but in a loss of recirc situation CS flow needs to be minimized but adequate.
Plausible: For most Containment "red path" situations maximum CS flow is an objective.

C. **Incorrect**: FR transition is required but the FR directs use of ECA-1.1 guidance to control CS pump operation.
Plausible:

D. **Correct**: Per 2-FR-Z.1 caution before step 3 2ECA-1.1 directs the operation of spray. The bases of 2-ECA-1.1 step 5 is to reduce CS while providing adequate containment pressure control.

Level: SRO Exam

Lesson Plan Objective: I2LP-ILO-FEOPFZ1, obj. 5

Source: Bank (INPO #22504)

Level of knowledge: comprehension / analysis

Reference(s): 2-ECA-1.1, Rev. 0, 2-FR-Z.1, Rev. 0

KA: W/E11.EA2.1 Loss of Emergency Coolant Recirc ;
description: Ability to determine and interpret the following as they apply to the (Loss of Emergency Coolant Recirculation) (CFR: 43.5 / 45.13) EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
IMPORTANCE RO 3.4 SRO 4.2

Question: 86 Answer: C

1 Pt(s)

Given the following plant conditions:

-Unit 2 has experienced a "Loss of All AC Power"
-2-ECA-0.0 is being implemented and the team has reached the step to "BLACK START" the Gas Turbines per the applicable SOP.

Based on these conditions, which of the following choices contains a correct combination of:

(1) What is an action which would have been taken prior to power restoration
and
(2) What is the first 480V load started or verified started when an AC power train is restored?

A. (1) Place ALL ECCS (Emergency Core Cooling System) pumps in PULLOUT.
(2) A SW pump on the essential header.

B. (1) Place selected, but not all, ECCS (Emergency Core Cooling System) pumps in PULLOUT.
(2) An AFW pump.

C. (1) Locally trip all running EDG's
(2) A SW pump on the essential header.

D. (1) Remotely trip all running EDG's
(2) An AFW pump.

Distracter Analysis:

(1) Any running EDG's are tripped locally (0.0 step 5) to protect them from overheating due to lack of cooling, (2) A Service Water pump on the essential header is the first load stared or verified after restoration of the bus/train.

Based upon exam comments, A is also a correct answer.

The question attempts to determine the candidates understanding of the relation of Essential Service Water and the recovery strategy of ECA-0.0. The student needs to know several pieces of information to logically select the correct answer one or both were related to Essetial Service Water

A. ~~**Incorrect:** ALL ECCS pumps are not placed in PULLOUT~~
~~**Plausible:** An Essential SW pump is the first load started/verified~~

B. **Incorrect**: AFW pump is not first load.
Plausible: (1) is correct

C. **Correct**: (1) Any running EDG's are tripped locally (0.0 step 5), (2) (2) A Service Water pump is the first load stared or verified after restoration of the bus.

D. **Incorrect**: (1) EDG are tripped locally (2) An Essential SW pump is the first load started/verified.
Plausible: All items are possible and reasonable actions for the operators.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-ECA-0.0 Rev. 0, 2-SOP 27.5.3 Rev. 11.

KA: 000062.2.4.6 Loss of Nuclear Service Water ; description: 2.4.6 Knowledge symptom based EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)

Question: 87 Answer: C

1 Pt(s)

Given the following conditions:
- Unit 2 is operating at 100% power.
- 22 charging pump is operating with 60 gpm charging flow.
- Seal injection flows for 21-24 RCP's are: 6.5, 7.0, 7.5, 9.5 gpm respectively.
- Letdown is 87 gpm.
-VCT level is 23% with LCV112C open.

Then:
- The Reactor Operator reports 22 charging pump has tripped.
- As the SRO, you direct entry into 2-AOP-CVCS-1. You have the RO isolate letdown, verify VCT level which is 23% with LCV112C open.

Which of the choices below correctly describes both:
(1) what has occurred and the most urgent operational concern
and
(2) the required actions per 2-AOP-CVCS-1?

A. (1) Gas binding of the charging pumps has occurred and common mode failure of the remaining charging pumps is possible.
(2) Isolate charging, verify charging pump suction source, vent standby pump suction for pump to be started and start a standby charging pump.

B. (1) Gas binding of the charging pumps has occurred and common mode failure of the remaining charging pumps is possible.
(2) Isolate charging and VCT outlet, align charging pump suction to the RWST, start standby a pump.

C. (1) Gas binding of the charging pumps has NOT occurred and the most urgent concern is that RCP seal injection has been lost.
(2) "Immediate restart" of charging per 2-AOP-CVCS-1 is permitted in this situation. Start a standby charging pump, adjust seal flow to normal and then restore charging and letdown to normal per AOP attachment.

D. (1) Gas binding of the charging pumps has NOT occurred and the most urgent concern is that RCP seal injection has been lost.
(2) "Immediate restart" of charging per 2-AOP-CVCS-1 is NOT permitted in this situation. Isolate seal injection locally then start a standby charging pump, restore charging, letdown and seal injection per AOP attachment.

Distracter Analysis:

A. **Incorrect**: No indication of gas binding is given.
Plausible: Candidate might believe that note prior to step to evaluate gas binding makes it correct to assume gas binding. While the step does permit the candidate to assume gas binding as a conservative action if uncertain; given the indication above there is no gas binding concern and utilizing the procedure to restore seal injection per the AOP/SOP after venting is not "required". Actions for recovery are generally correct were a gas binding event to occur.

B. **Incorrect**: No indication of gas binding is given. Alignment of charging pump suction to the RWST does not permit start of standby charging pump without venting if gas binding did occur.
Plausible: See "A' above.

C. **Correct**: Seal injection flow has been lost and there is no indication of gas binding of the charging pumps. Per 2-AOP-CVCS-1 background immediate restart is permitted followed by the restoration of charging and letdown to normal per Att. 1.

D. **Incorrect**: "immediate restart" is permitted and manual isolation of seal injection is not required.
Plausible: Manual isolation is required in situations where immediate restart is not permitted and/or high seal injection temperatures are experienced.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-CVCS-1 Rev. 03 and background

KA: 000022.AA2.02 Loss of Reactor Coolant Makeup ;
description: Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: (CFR: 43.5 / 45.13) AA2.02 Charging pump problems 3.2 3.7

Question: 88 Answer: A

1 Pt(s)

Following a load rejection from 100% to 60% power, the crew is attempting to stabilize the plant. Plant conditions are as follows:

-The RO reports that a 'Pressurizer High Pressure ' first out annunciator on Panel FDF.
-Indications exist that the Pressurizer PORVs have opened
-Pressurizer pressure spiked to approximately 2370 psig and is now 2310 psig dropping.
-The reactor and turbine are on-line

Which ONE (1) of the following actions is required next?

A. Trip the reactor, enter E-0, Reactor Trip or Safety Injection

B. Stabilize the plant at 60% power. Initiate boration for AFD control.

C. Trip the reactor, enter FR-S.1, Response to Nuclear Power Generation/ATWS

D. Verify the PORVs have closed. Close the PORV block valves. Monitor RCS pressure for Reactor Trip and Safety Injection initiation setpoints

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Distracter Analysis:

A. **Correct**: Trip setpoint on PRZR pressure was exceeded
B. **Incorrect**: Trip setpoint on PRZR pressure was exceed. These are action for a rapid down power.
C. **Incorrect**: FR-S.1 can be entered from either E-0 or Status trees which are not in use at this point.
D. **Incorrect**: Trip setpoint on PRZR pressure was exceeded reactor needs to be tripped. 2310 psig is below the PORV setpoint but listed action would be performed in E-0.

Level: SRO Exam

Lesson Plan Objective:
Source: Bank (INPO #23448 IP3)

Level of knowledge: comprehension / analysis

Reference(s): 2-FR-S.1 Rev. 0

KA: 000029. G 2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)
IMPORTANCE RO 4.0 SRO 4.0

Question: 89 Answer: B

1 Pt(s)

Given the following conditions:

- The Unit is operating at 100% power.
- PRZR Level Control is selected to Channel 2
- The following alarm is received in the Control Room: SDF 1-4 "21 OR 22 INVERTER TROUBLE"
- The crew determines that NIS NI Rack C6 (N32, N36 & N42) is deenergized along with numerous control board indications.
- DC Battery 22 indicates 125 volts.
- An attempt to restore the inverter by pressing the ALTERNATE SOURCE TO LOAD button was unsuccessful.

Which one of the following actions is required?

A. Restore 22 Vital Instrument Bus by aligning to 22 DC power panel; remove inverter from service and restore letdown in accordance with 2-AOP-IB-1 "Loss of Power to an Instrument Bus".

B. Restore 22 Vital Instrument Bus by bypassing the inverter; control plant parameters manually as necessary and restore letdown if required in accordance with 2-AOP-IB-1 "Loss of Power to an Instrument Bus".

C. Trip the reactor; enter E-0. Post trip, restore letdown and defeat containment pressure high-high bistable channel 2 in accordance with 2-AOP-IB-1 "Loss of Power to an Instrument Bus".

D. Trip the reactor; enter E-0, Reactor Trip Or Safety Injection only if boration rate from RWST exceeds capability to control prior to restoring bus in accordance with 2-AOP-IB-1 "Loss of Power to an Instrument Bus".

Distracter Analysis:

A. **Incorrect**: 22 Inverter is normally aligned to 22 DC power panel and this has failed if the inverter is removed from service the DC bus can not supply the AC bus.
Plausible: candidate might believe that there is an alternate way to align DC power to supply AC.

B. **Correct**: Per the ARP and AOP the operators will attempt to manually transfer the inverter using the Alternate Source pushbutton.

If that does not work the next action is to bypass the inverter which is the only correct answer given. Note : as written the ARP does not have all actions required to stabilize and restore the plant to normal. Although the ARP does not required entry into the AOP until after the attempt to bypass is unsuccessful the operator will need to implement the AOP to recover systems etc. In short the AOP has all the required direction for a loss of the IB while the ARP has some but not all required actions and is less comprehensive.

C. **Incorrect**: Neither a Trip or defeat of containment pressure bistable is required per AOP or ARP. The bistable fails to un-actuated state for containment pressure high-high. There is a trip required if <P-10 due to loss of IRNI.
Plausible: Containment pressure bistable is affected but if power can not be restored action is to align alternate power from "topaz" inverter not defeat the bistable.

D. **Incorrect**: This is a trip criteria for loss of the 21 IB.
Plausible: Candidate might not recall loss of power effects.

Level: SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #24988)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-IB-1, Rev. 06, 2-ARP-SDF Rev. 23

KA: 000057.AA2.06 Loss of Vital Ac Elec. Inst. Bus. ; description: Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: (CFR: 43.5 / 45.13) AA2.06 AC instrument bus alarms for the inverter and alternate power source 3.2 3.7

Question: 90 Answer: D

1 Pt(s)

Unit 2 is at 100% power with:

- Letdown Orifice Isolation Valve 200C, is aligned for service.
- LT-459, Pressurizer Level Transmitter is selected for alarm and fails offscale LOW.
- You direct the RO to place L/460A (Pressurizer Level Defeat Transfer Switch) to the correct position which he does.

Which one of the following describes the effect on the plant and the additional action required to stabilize the plant?

A. Letdown flow will indicate 85 GPM. Turn off backup heaters and adjust charging flow as necessary.

B. Letdown flow will indicate 85 GPM. Turn off backup heaters and establish excess letdown.

C. Letdown flow will indicate 0 GPM. Manually energize backup heaters as necessary and establish excess letdown.

D. Letdown flow will indicate 0 GPM. Reset backup and modulating heaters as necessary and establish normal letdown.

Distracter Analysis:

A. **Incorrect**: Letdown will isolate.
Plausible: Action is for LT-459 failing HIGH.

B. **Incorrect**: Letdown will isolate.
Plausible: Variation of distracters.

D. **Correct**: LT-459 failing low will cause temporary loss of heaters and letdown.

C. **Incorrect**: Excess L/D is not necessary because normal L/D is available.
Plausible: Flow is correct.

Level: SRO Exam

Lesson Plan Objective: I2LP-ILO-AOPINT, Rev. 0, Obj. 4, 5, 6.

Source: Bank (INPO #25012)

Level of knowledge: comprehension / analysis

Reference(s): 2-AOP-INST-1 Rev. 03, 2-SOP-1.5, Rev. 13

KA: 000028.AA2.09 Pressurizer Level Malfunction ; description: Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: (CFR: 43.5 / 45.13) AA2.09 Charging and letdown flow capacities 2.9 3.2

Question: 91 Answer: A

1 Pt(s)

Given the following conditions:

- The plant is at 100% power.
- All control systems are operating in their normal alignments
- Tavg and Tref are matched and stable
- Control Bank D begins stepping out at a rate of 8 steps per minute.

Which ONE (1) of the following conditions will require initiation of a manual reactor trip in accordance with 2-AOP-ROD-1?

A. Rod motion continues with the bank selector switch in MANUAL.

B. Rod motion continues beyond actuation of the OT Delta T rod stop.

C. Any control rod drops during the rod motion.

D. Rod motion continues beyond actuation of any Power Range High Flux Rod Stop

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Distracter Analysis:

A. **Correct**: Trip required per AOP-ROD-1
B. **Incorrect**: Not specified as a trip criteria
Plausible: It would be AOP entry condition.
C. **Incorrect**: Not specified as a trip criteria
Plausible: Multiple rod drops is a trip criteria.
D. **Incorrect**: Not specified as a trip criteria.
Plausible: It would be AOP entry condition.

Level: SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #22797)

Level of knowledge: memory

Reference(s): 2-AOP-ROD-1 Rev. 3

KA: 000001.G.2.4.4 Continuous Rod Withdrawal ; Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (CFR 41.10 / 43.2 / 45.6)
IMPORTANCE RO 4.0 SRO 4.3

Question: 92 Answer: C

1 Pt(s)

Given the following conditions:

-Unit 2 has tripped from 100% power
-All SG NR levels are 22-40%
-21-23 SG's atmospheric dumps are cycling to maintain SG pressure.
-The 24 SG atmospheric dump is inoperable
-The first safety of 24 SG is cycling 5 psig above its design setpoint
-Containment conditions are normal.
- AFW flow indicates: 100-120 gpm to each SG.

Given the F-0.3 flow chart, which one of the following identifies the applicable yellow path procedure that is used to mitigate these conditions?

A. 2-FR-H.2
B. 2-FR-H.3
C. 2-FR-H.4
D. 2-FR-H.5

Distracter Analysis:

Students are to be provided the F-0.3 "HEAT SINK" flow chart.

A. **Incorrect**: 2-FR-H.2 entry condition is 1120 psig, which is the lift point for last SG safety. Per the stem pressure is ~1070 psig
B. **Incorrect**: 2-FR-H.3 for high SG level (>73%)
C. **Correct**: 2-FR-H.4 is designed to address loss of dumps from a SG. The entry condition is >1065 psig which is the setpoint of the first SG safety. The stem gives conditions equivalent to 1070 psig.
D. **Incorrect**: 2-FR-H.5 is entered on low SG level (<10%)

Level: SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #25792)

Level of knowledge: memory

Reference(s): 2-FR-H.2,3,4,5 Rev.0 and F-0.3 Rev. 39

KA: W/E13. EA2.1 Steam Generator Over-pressure ; description: Ability to determine and interpret the following as they apply to the (Steam Generator Overpressure) (CFR: 43.5 / 45.13) EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations. IMPORTANCE RO 2.9 SRO 3.4

Question: 93 Answer: D

1 Pt(s) Given the following conditions:

- Tavg is 558F and slowly decreasing
- Power is 35% with the main turbine on-line.
- Pressurizer pressure is 2150 psig and stable
- 21, 22 & 23 Circulating Water pumps are either out of service or tripped
-The "First Out" annunciator for "Condenser Vacuum Low" is in (FAF 4-1)
- Condenser vacuum has degraded to 23" Hg and continues to lower.
-The Team determines that the turbine must be tripped.

From the choices below select the one that contains: (1) the reason a turbine trip is required and (2) what subsequent mitigating action will be directed per plant procedures?

A. (1) A turbine trip would be required since an automatic turbine trip has failed.
(2) Go to 2-AOP-TURB-1, Main Turbine Trip Without a Reactor Trip and continue to shutdown while controlling RCS temperature with the Atmospherics and/or Dumps to 22 and 23 Condenser.

B. (1) A reactor and turbine trip would be required since an automatic turbine trip has failed.
(2) 2-E-0 will be implemented and RCS temperature will be stabilized using the Atmospheric Dumps per 2-ES-0.1.

C. (1) Although no automatic trip set point has been reached the reactor and turbine must be tripped per procedure due to low condenser vacuum.
(2) 2-E-0 will be implemented and RCS temperature will be stabilized using the Dumps to the 22 and 23 Condensers per 2-ES-0.1.

D. (1) Although no automatic trip set point has been reached the reactor and turbine must be tripped per procedure due to low condenser vacuum.
(2) 2-E-0 will be implemented and RCS temperature will be stabilized using the Atmospheric Dumps per 2-ES-0.1.

Distracter Analysis:

A. **Incorrect**: Although manual trip criteria has been reached the turbine trip on low vacuum has not reached its' set point and since

power is >20% (P-8) the AOP directs tripping the reactor and entering 2-E-0

B. **Incorrect**: No reactor trip setpoint has been reached and the auto trip of the turbine is still in the normal band of 18-22" so it has not failed.
Plausible: Low RCS pressure given in stem may cause the student to select this distracter. Atmospheric Dumps are the available heat removal path.

C. **Incorrect**: Condenser dumps will not be available due to low vacuum.
Plausible: (1) is correct and the dumps listed are those that would be available based on CW pumps inservice.

D. **Correct**: The turbine will trip at ~18"-22" vacuum and at this vacuum the condenser dumps will not be available (<25" vac interlock). The low vacuum annunciator comes in at ~25" Hg (well before the auto trip)

Level: SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #2772)

Level of knowledge: comprehension / analysis

Reference(s): 2-ES-0.1 Rev.0, 2-E-0 Rev. 0, 2-ARP-FAF Rev. 21, 2-AOP-VAC-1 Rev. 01.

KA: 000051.2.4.6 Loss of Condenser Vacuum ; description: 2.4.6 Knowledge symptom based EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)

Question: 94 Answer: C

1 Pt(s)

Following a reactor trip:

- RCS pressure is 1600 psig and lowering.
- Pressurizer level 10% and slowly lowering.
- Pressurizer spray valves are closed
- PRT parameters are: 69% level, 4 psig, 115^{0}F and steady
- 21-24 steam generator water levels are: 22%, 27%, 24%, 31% and steady.
- AFW flows are 100 gpm, 105 gpm, 110gpm, 120 gpm.
- Primary auxiliary building radiation monitors are rising.
- Plant ventilation radiation monitors are rising.
- Containment pressure and sump levels are normal.

Based on these conditions, which of the following has occurred and what procedure will be used to mitigate it?

A. Faulted Steam Generator, 2-E-2

B. Ruptured Steam Generator, 2-E-3

C. LOCA Outside Containment, 2-ECA-1.2

D. LOCA Inside Containment, 2-E-1

Distracter Analysis:
Note all procedures are correct matches to accident listed.

A. **Incorrect**: No indication of steam/feed leak. In particular AFW flow rates and SG levels are responding normally and a steam leak would not result in elevated radiation levels.
Plausible: A loss of secondary coolant could cause a lowering of RCS pressure.

B. **Incorrect**: No indication of tube rupture. In particular AFW flow rates and SG levels are responding normally
Plausible: A SGTR could cause low RCS pressure and some elevation of secondary radiation levels.

C. **Correct**: Elevated radiation levels outside the containment and lowering RCS pressure with no evidence of a SGTR leaves a LOCA outside containment.

D. **Incorrect**: Containment parameters are not indicative of a LOCA inside containment.
Plausible: Large LOCA's can elevate radiation levels outside containiment.

Level: SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #20585)

Level of knowledge: comprehension / analysis

Reference(s):2-E-0 Rev. 0, 2-E-1 Rev. 0

KA: 2.1.7 ;description: 2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (CFR: 43.5 / 45.12 / 45.13) IMPORTANCE RO 3.7 SRO 4.4

Question: 95 Answer: D

1 Pt(s) An RO left shift work on 6/3. The RO worked all scheduled workdays this year as a control room watchstander until leaving shift. Since leaving shift, the RO performed the following shifts as a control room watchstander:

-7/19 worked 12 hours
-7/21 worked 9 hours
-8/18 worked 12 hours
-8/30 worked 12 hours
-9/10 worked 12 hours
-9/11 worked 8 hours

Which of the following is correct with regard to the RO's license status as of 9/12?

A. License became inactive on 8/31.

B. License is active and only stays active with another 12-hour shift anytime before 1/1/08.

C. License is active and only stays active with another 12-hour shift anytime before 11/1.

D. License is active and only stays active with another 12-hour shift anytime before 10/1.

Distracter Analysis:

A. **Incorrect**: watchstanding proficiencies expire at the end of calendar quarters; 8/31 in not the end of the quarter.

B. **Incorrect**: RO is one 12-hour watch short for the third quarter and will become inactive on 10/1.

C. **Incorrect**: RO is one 12-hour watch short for the third quarter and will become inactive on 10/1 and 11/1 is not the beginning of the quarter.

D. **Correct**: The RO was on shift prior to 6/3 and would have maintained proficiency previous to this. Since he would have had adequate proficiency watches previous to 6/3 he would have needed no more watched through 6/30 (end of the quarter) This proficiency would carry through the next quarter; allowing him to perform licensed duties until 9/30 at which point he would have needed 5, 12-hour watches completed between 6/30 and 9/30 for his license to stay active into the last quarter. Note that in this situation the individual

had more than the 60 hours required but did not have the 5 "full" 12 hour watches. Per plant procedures (also 10CFR55.53) the performance of partial shifts does not count toward proficiency.

Level: SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #24024)

Level of knowledge: comprehension / analysis

Reference(s):10CFR55, OAP-032 Rev. 8

KA: 2.1.10 ; description: 2.1.10 Knowledge of conditions and limitations in the facility license. (CFR: 43.1 / 45.13)
IMPORTANCE RO 2.7 SRO 3.9

Question: 96 Answer: B

1 Pt(s) Given the following:

- The plant is operating at 100% power.
- Annunciator RCP MOTOR BEARING OIL LEVEL LOW LEVEL alarms.
- The cause was determined to be a faulty low level switch for 22 RCP upper radial bearing.

The following decisions have been made:

- Repair the level switch during the upcoming outage scheduled to begin in 30 days and lift the input leads from the faulty switch into the alarm circuit between now and the outage.

Which of the choices below correctly completes the following statement concerning the process for approving this activity?

Per plant procedures this activity is reviewed using the "Process Applicability Determination (PAD)" process which determines the need for a 50.59___(1)___.
If it (1) is required it must be completed and approved by _____(2)_____ performing the change.

A. (1) Screening Review.
(2) On-site Safety Review Committee prior to...

B. (1) Evaluation.
(2) On-site Safety Review Committee prior to ...

C. (1) Screening Review.
(2) On-site Safety Review Committee within 14 days of..

D. (1) Evaluation.
(2) a licensed SRO within 14 days of...

Distracter Analysis:

A & C Incorrect: PAD determines whether a 50.59 "evaluation" is required. PAD performs the "screening" as necessary and may be confused by the candidate. If the candidate believes that screening is the answer no OSRC or SRO review is required.

B. **Correct**: PAD determines whether a 50.59 "evaluation" is required and if it is it must be completed prior to the change and be approved by OSRC.

D. **Incorrect**: (1) is correct but an SRO approval is not required for the 50.59 evaluation (preparer, reviewer and OSRC chairman sign evaluation)
Plausible: SRO might sign t-mod etc. or approve the work once the 50.59 is approved.

Level: SRO Exam

Lesson Plan Objective:

Source: Mod (INPO #29276)

Level of knowledge: memory

Reference(s): EN-LI-100 Rev. 4, EN-LI-101 Rev. 3

KA: 2.2.7 ; description: 2.2.7 Knowledge of the process for conducting tests or experiments not described in the safety analysis report. (CFR: 43.3 / 45.13) IMPORTANCE RO 2.0 SRO 3.2

Question: 97 Answer: B

1 Pt(s)

There are two I & C activities scheduled for the CCR at once, both of which are in progress in the "At the Controls Area" and causing minimal distractions. Additionally, the CRS is requested to allow the emergent repair of a turbine vibration probe that is causing a locked in CCR alarm. This repair will cause the "MAIN AND/OR MBFP TURBINE VIBRATION" alarm to come in and clear 5-10 times over a ½ hour period.

Which of the following correctly states whether these activities are permitted Per IP-SMM-100 and if so what additional approval/concurrence is required, if any?

A. Not permitted.

B. Permitted if both the CRS and SM concur.

C. Permitted, AOM/OM approval required.

D. No additional approval/concurrence required for this work.

Distracter Analysis:

A. **Incorrect**: It is permitted with if both the CRS and SM concur.

B. **Correct:** Emergent work in excess of 2 items affecting the ATC area may be permitted with CRS and SM concurrence.

C. **Incorrect**: It is permitted if both the CRS and SM concur.
Plausible: This would require AOM/OM approval prior to T-0 (i.e. prior to the current week).

D. **Incorrect**: It is permitted but only if both the CRS and SM concur.
Plausible: Candidate might not be familiar with CCR activity limits and supplemental approvals.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: memory

Reference(s): IP-SMM-WM-100 Rev. 6

KA: 2.2.17 ; description: 2.2.17 Knowledge of the process for managing maintenance activities during power operations. (CFR: 43.5 / 45.13) IMPORTANCE RO 2.3 SRO 3.5

Question: 98 Answer: A

1 Pt(s)

During a plant emergency an operator receives a radiation exposure of 10 REM to the lenses of both eyes.

Regarding 10 CFR 20, "Standards for Protection Against Radiation" and Entergy's administrative radiation control limits, which, if any, of these limits have been exceeded?

A. NEITHER of the exposure limits listed have been exceeded.

B. BOTH 10CFR20 AND plant admin. limits have been exceeded.

C. Plant quarterly administrative limits only, have been exceeded, but NOT 10CFR20 limits.

D. Plant annual limits have been exceeded, but NOT10CFR20 limits..

Distracter Analysis:

A. **Correct:** Limit per 10CFR20.1201 and IP-SMM-RP-102 is 15 Rem to the lens of the eye and this has not been exceeded. Additionally, per IP-SMM-RP-102, each rad worker at IP must track their own dose and ensure they do not exceed any of the referenced limits.

B-D **Incorrect:** No listed limits have been exceeded

Level: SRO Exam

Lesson Plan Objective:

Source: Bank (INPO #28898 IP2)

Level of knowledge: memory.

Reference(s): 10 CFR 20, IP-SMM-RP-102 rev. 0.

KA: 2.3.1 ; description: 2.3.1 Knowledge of 10 CFR: 20 and related facility radiation control requirements. (CFR: 41.12 / 43.4. 45.9 / 45.10) IMPORTANCE RO 2.6 SRO 3.0

Question: 99 Answer: C

1 Pt(s)

Review the following list of Emergency Director Emergency Plan responsibilities:

1. Declares and upgrades the emergency as warranted and initiates recovery phase when appropriate;
2. Authorization of Emergency Exposures and issuance of KI to Entergy personnel outside the Protected Area;
3. Establish communications with the emergency response facilities and obtain information on the diagnosis and prognosis of the accident condition;
4. Review all radiological, meteorological and operational data and update the offsite authorities and the Joint Information Center (JIC);
5. Reviews and approves notifications to the State and Local authorities recommend protective actions for the general public to offsite authorities;
6. Receive designated responding representatives from offsite emergency agencies and assist in their information and communication needs;
7. Arrange for and dispatch any special assistance or service requested (e.g., radiological measurement or protection equipment, onsite medical treatment);
8. Coordinate offsite radiological evaluations with the State and Counties;
9. Recommend protective actions for the general public to offsite authorities;
10. Release of non-essential personnel from the site;

Which of the choices below lists ONLY items that CAN be delegated by the Emergency Director?

A. 1, 3, 6, 8

B. 2, 3, 5, 7

C. 2, 4, 6, 10

D. 4, 7, 8, 9

Distracter Analysis:

Per IPEC E-Plan three responsibilities can not be delegated: declaration, review/approval of notifications and PAR's which correspond to

items 1, 5 & 9 any answer with one of these is incorrect. Every item listed is a responsibility of the Emergency Director.

A. **Incorrect**: 1 is incorrect.
B. **Incorrect**: 5 is incorrect.
C. **Correct**: Does not contain 1, 5 or 9.
D. **Incorrect**: 9 is incorrect.
Plausible: all of these tasks are re

Level: SRO Exam

Lesson Plan Objective:

Source: Mod (INPO # 20)

Level of knowledge: memory

Reference(s): Indian Point Energy Center Emergency Plan Rev. 04

KA: 2.4.29 ; description: 2.4.29 Knowledge of the emergency plan. (CFR: 43.5 / 45.11) IMPORTANCE RO 2.6 SRO 4.0

Question: 100 Answer: D

1 Pt(s)

An event has occurred resulting in a Site Area Emergency declaration. Which of the following is **NOT** a responsibility of the CCR Health Physics Technician according to IP-EP-210?

A. Obtain a list of personnel in the RCA and provide to SM.

B. Evaluate the need and make recommendation on the establishment of Radiological access to the CCR.

C. Upon notification of a personnel medical emergency onsite, report to the scene with survey instrument(s) and support medical response

D. Perform initial dose assessment calculation for the SM until the EOF is activated.

Distracter Analysis:

Each "distracter" is an item taken from IP-EP-210 attachment 9.5. The incorrect item is a responsibility of the SM per IP-EP-210 (section 4.8)

A. **Incorrect**: IP-EP-210 attachment 9.5 item.

B. **Incorrect**: IP-EP-210 attachment 9.5.

C. **Incorrect**: IP-EP-210 attachment 9.5.

D. **Correct**: This is a responsibility of the SM per IP-EP-210 (section 4.8).
Plausible: has to do with dose assessment and that is a reasonable responsibility for a Health Physics Technician.

Level: SRO Exam

Lesson Plan Objective:

Source: New

Level of knowledge: memory.

Reference(s): IP-EP-210 Rev. 5

KA: 2.4.36 ; description: 2.4.36 Knowledge of chemistry / health physics tasks during emergency operations. (CFR: 43.5)
IMPORTANCE RO 2.0 SRO 2.8