
WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1

EA2.1 - Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery): Facility conditions and selection of appropriate procedures during abnormal and emergency operations

Tier: 1 Group: 1 RO Imp: 2.7
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBAB_E01.03

References: EOP-1.0, step 8.a.3

Question:

Given the following with the Plant initially at full power:

- The Plant is manually tripped due to a tube rupture in the 'A' Steam Generator (S/G)
- 'A' S/G level is 29% and stable
- 'B' S/G level is 23% and lowering slowly
- T_{AVE} is 535°F and stable
- EOP-1.0, "Standard Post-Trip Actions," Immediate Actions are currently in progress

Which one of the following describes the required action for the above conditions during verbal verification of the Immediate Actions of EOP-1.0?

- a. Cooldown the PCS to < 524°F Hot Leg temperature.
 - b. Restore 'A' and 'B' S/G levels to a band of 60 - 70%.
 - c. Close CV-0781 and CV-0782, 'A' S/G Atmospheric Dump Valves.
 - d. Secure Auxiliary Feedwater flow to the 'A' S/G.
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-

DISTRACTER ANALYSIS

- a. Plausible because this is accomplished in the Optimal Recovery Procedure (ORP) to prevent the S/G code safeties from lifting when the S/G is isolated but not during EOP-1.0.
 - b. Plausible because this would normally be accomplished but after EOP-1.0.
 - c. Plausible because this is accomplished during the ORP when the S/G is isolated but not during EOP-1.0.
 - d. **CORRECT - EOP-1.0 directs securing AFW flow to the S/G that has indications of a SGTR or ESDE.**
-
-

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000009 Small Break LOCA / 3

G2.4.31 - Knowledge of annunciator alarms, indications, or response procedures

Tier: 1 Group: 1 RO Imp: 4.2

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK05.0

References: EOP-4.0, step 26; ARP-4 window 64; EOP Supplement 9 (PROVIDE); EOP Supplement 1

Question:

Given the following:

- A Loss of Coolant Accident has occurred
- Primary Coolant pressure is 1000 psia
- Containment pressure is 3.0 psig
- Containment temperature is 180°F
- EOP-4.0, "Loss of Coolant Accident Recovery," has been implemented

Which one of the following alarms, if annunciating, provides indication that Safety Injection throttling criteria are not met?

- a. EK-0759, "NO PCS PROTECTION CHANNEL A"
- b. EK-1126, "CIS INITIATED"
- c. EK-0764, "PRESSURIZER LEVEL CH 'B' LO-LO"
- d. EK-0962, "STEAM GEN E-50A LO LEVEL"

DISTRACTER ANALYSIS

- a. Plausible because this alarm comes in when LTOP should be in service (PCS Tc < 460°F) and the student believes that Tc is one of the criteria for throttling safety injection.
- b. Plausible if the student believes that there is a requirement for not throttling safety injection if there has been a containment isolation signal.
- c. **CORRECT - for the given containment conditions corrected PZR level must be at least 40%, EK-0764 alarms at 36% by hot cal indicated level, which, when corrected per EOP supplement 9 is 31%.**
- d. Plausible because there is a requirement for S/G level being restored to the normal range but one S/G can be low as long as the other one is being restored.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000011 Large Break LOCA / 3

EK1.01 - Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: Natural circulation and cooling, including reflux boiling

Tier: 1 Group: 1 RO Imp: 4.1
Applicable 10CFR55 Section: 41.5

Palisades Learning Objective: TBCORE_CK05.0

References: EOP-4.0 bases page 4

Question:

During a Loss of Coolant Accident with two phase natural circulation (reflux boiling) as the primary method of core heat removal, which one of the following sets of temperature indications must be monitored to determine that heat removal and inventory functions are being satisfied?

- a. Loop ΔT and Core Exit Thermocouples.
 - b. T_H and Core Exit Thermocouples.
 - c. Loop ΔT and T_C .
 - d. T_H and T_C .
-
-

DISTRACTER ANALYSIS

- a. Plausible because loop delta T could be an accurate indication of PCS heat removal for single phase natural circulation, however, two phase natural circulation and reflux boiling are complex enough that loop delta T is not meaningful.
 - b. **CORRECT - these two temperature indications are important in assessing whether heat removal is occurring in the core for two phase natural circulation conditions.**
 - c. Plausible if the student believes that reflux boiling involves water moving past the S/G u-tubes, however, reflux boiling process involves the water moving back to the core from the S/Gs via the hot leg so cold leg temperature is not meaningful.
 - d. Plausible due to a combination of 'a' and 'c'.
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Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000015/17 RCP Malfunctions / 4

AK2.08 - Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: CCWS

Tier: 1 Group: 1 RO Imp: 2.6
Applicable 10CFR55 Section: 41.10/41.7

Palisades Learning Objective: IOTF_CK05.0

References: ONP-6.2, 4.3

Question:

The following alarm is received with the Plant operating at full power:

EK-0931, PRI COOLANT PUMP P-50A CLG WTR LO FLOW

Which one of the following describes (1) an indication for P-50A that can be used to validate the alarm and (2) a condition that requires the Reactor to be tripped for this event?

- a. (1) TIA-0133A, Controlled Bleedoff temperature, is rising.
(2) A bearing high temperature alarm is received for P-50A.
 - b. (1) TIA-0133A, Controlled Bleedoff temperature, is rising.
(2) A seal pressure off-normal alarm is received for P-50A.
 - c. (1) TIA-0135A, Motor Stator temperature, is rising.
(2) A bearing high temperature alarm is received for P-50A.
 - d. (1) TIA-0135A, Motor Stator temperature, is rising.
(2) A seal pressure off-normal alarm is received for P-50A.
-
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DISTRACTER ANALYSIS

- a. **CORRECT** – This temperature will be rising because the PCS water flowing upward through the seal is not being cooled by CCW and this is the correct trip criteria per ONP-6.2.
 - b. Plausible if the student believes that any pump seal pressure off-normal alarm is trip criteria because this indicates a potential for seal failure.
 - c. Plausible if the student believes that CCW cools the motor stator; air inside containment cools the motor stator.
 - d. Plausible for a combination of reasons for 'b' and 'c'.
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Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000022 Loss of Rx Coolant Makeup / 2

AK3.05 - Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: Need to avoid plant transients

Tier: 1 Group: 1 RO Imp: 3.2

Applicable 10CFR55 Section: 41.5

Palisades Learning Objective: CVCS_E11.01

References: SOP-2A, 7.3.1.b NOTE; DBD-1.04, page 78

Question:

With the Plant at 60% power, a loss of all Charging flow occurs. Which one of the following describes the impact on the Plant and the reason Main Steam flow is maintained as stable as possible until Charging flow has been restored?

- Pressurizer level is now lowering at 4 gpm. Lowering Main Steam flow will accelerate the level reduction.
- Letdown temperature is high due to loss of cooling to the Regenerative Heat Exchanger. Lowering Main Steam flow may cause letdown to automatically isolate on high temperature.
- Letdown temperature is high due to loss of cooling to the Regenerative Heat Exchanger. Raising Main Steam flow may cause letdown to automatically isolate on high temperature.
- Pressurizer level is now lowering at 4 gpm. Raising Main Steam flow will accelerate the level reduction.

DISTRACTER ANALYSIS

- Plausible if student correctly determines that PZR is lowering at 4 gpm due to letdown isolating but confuses the effects of lowering main steam flow on PZR level.
- Plausible if the student believes that letdown has not isolated but believes that the Letdown HX can cool the letdown sufficiently by itself. However, when charging flow is secured, the RHX loses cooling which will cause the letdown stop valve from Loop 2A to close.
- Plausible if the student believes that letdown has not isolated but believes that the Letdown HX can cool the letdown sufficiently by itself but believes that when main steam flow rises, that additional orifice stop valves open which causes letdown temperature to be even higher. However, when charging flow is secured, the RHX loses cooling which will cause the letdown stop valve from Loop 2A to close.
- CORRECT** - When charging flow is isolated, letdown flow will automatically isolate but 4 gpm of CBO flow will be going to the VCT which will cause PZR level to lower.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000025 Loss of RHR System / 4

AA1.09 - Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: LPI pump switches, ammeter, discharge pressure gauge, flow meter, and indicators

Tier: 1 Group: 1 RO Imp: 3.2

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: IOTF_CK08.0

References: ONP-17, 4.15.2.f.a.1.; SOP-3, 5.2.2

Question:

The Plant experiences a loss of Shutdown Cooling event due to a tripped Low Pressure Safety Injection (LPSI) Pump. The Control Room team is now ready to start the alternate LPSI Pump.

Which one of the following is the lowest flow rate that, if established, meets the minimum flow requirements for an operating LPSI pump?

- a. 150 gpm.
 - b. 220 gpm.
 - c. 500 gpm.
 - d. 1000 gpm.
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DISTRACTER ANALYSIS

- a. Plausible because this would meet the minimum flow requirements for a HPSI pump.
 - b. **CORRECT - The minimum allowable flow for a LPSI pump is 170 gpm.**
 - c. Plausible as this would meet the requirements for Containment Spray pump operation.
 - d. Plausible as this would meet the requirements for minimum SDC flow when throttling in MODE 6.
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Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000026 Loss of Component Cooling Water / 8

AA2.01 - Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water:
Location of a leak in the CCWS

Tier: 1 Group: 1 RO Imp: 2.9

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK02.0

References: ARP-7, window 72; CCW system lesson plan

Question:

Given the following with the Plant at full power:

- EK-1172, "COMPONENT CLG SURGE TANK T-3 HI-LO LEVEL" is annunciating
- T-3, Component Cooling Water (CCW) Surge Tank, level is 33% and lowering
- The Control Room team diagnoses a leak in the CCW system and enters ONP-6.2, "Loss of Component Cooling"

Assuming the CCW leak is intersystem, i.e., from the CCW system to another fluid system, which one of the following is a possible location?

- a. E-58, CVCS Letdown Heat Exchanger.
 - b. P-50D, Primary Coolant Pump, Seal Heat Exchanger.
 - c. E-64, Shield Cooling Heat Exchanger.
 - d. Control Rod Drive Mechanism seal cooler.
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DISTRACTER ANALYSIS

- a. Plausible if the student believes that E-58 is located downstream of the backpressure regulator.
 - b. Plausible if the student believes that the seal heat exchanger is subject to controlled bleed-off pressure.
 - c. **CORRECT - Shield Cooling pressure in E-64 is less than CCW pressure.**
 - d. Plausible if the student believes that the water is cooled after it flows across the seal face or that the cooling coil is external to the seal housing.
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Level of Knowledge: HIGH

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000027 Pressurizer Pressure Control System Malfunction / 3

G2.2.37 - Ability to determine operability and/or availability of safety related equipment

Tier: 1 Group: 1 RO Imp: 3.6

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK04.0

References: E-17, sheet 4; E-253, sheet 1

Question:

Given the following:

- The Plant is in MODE 3
- Pressurizer level is 42%
- Pressurizer Proportional Heater Control Switches are in the "ON" position
- Pressurizer Backup Heater Control Switches are in the "MANUAL" position
- A loss of offsite power occurs
- Both Diesel Generators start and sequence loads as designed

Following Diesel Generator load sequencing, which one of the following describes which Pressurizer Heaters, if any, are energized? (Assume no operator action occurs.)

- a. No Pressurizer Heaters will be energized.
 - b. Pressurizer Heaters powered from Bus 1D only will be energized.
 - c. Pressurizer Heaters powered from Bus 1E only will be energized.
 - d. Pressurizer Heaters powered from Bus 1D and Bus 1E will be energized.
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-

DISTRACTER ANALYSIS

- a. **CORRECT - Heaters from Bus 1D must be manually restored due to a lockout feature which prevents D/G overloading and Bus 1E will not be energized on a loss of offsite power.**
 - b. Plausible if the student but does not recognize that heaters from Bus 1D will lock out.
 - c. Plausible if the student believes that bus 1E is still available.
 - d. Plausible for a combination of 'b' and 'c'.
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Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000038 Steam Gen. Tube Rupture / 3

EK1.02 - Knowledge of the operational implications of the following concepts as they apply to the SGTR: Leak rate vs. pressure drop

Tier: 1 Group: 1 RO Imp: 3.2
Applicable 10CFR55 Section: 41.5

Palisades Learning Objective: TBCORE_CK05.0

References: ARP-4, window 63; DBD 2.02, 3.4.1; DBD-1.04, 3.2.1

Question:

With the Plant operating at full power, a 230 gpm tube rupture occurs in the 'A' Steam Generator (S/G). The Plant is then manually tripped and all systems operate as designed with the following conditions:

- PZR level is 13%
- PCS pressure is 1545 psia
- T_{AVE} is 532°F and stable
- EOP-1.0, "Standard Post-Trip Actions," are complete

The S/G tube leak rate is now approximately (1) and Pressurizer level will be (2) .

- a. (1) 115 gpm
(2) rising
- b. (1) 160 gpm
(2) rising
- c. (1) 115 gpm
(2) lowering
- d. (1) 160 gpm
(2) lowering

DISTRACTER ANALYSIS

- a. Plausible if the student believes that there is a linear relationship between leak rate and ΔP .
- b. Possible if the student believes that since SIS initiated (PCS pressure < 1605 psia) that HPSI pumps will be injecting but HPSI pump shutoff head is approximately 1200 psia.
- c. Plausible if the student believes that there is a linear relationship between leak rate and ΔP and that letdown is still in service, however since Pressurizer level is < 36%, letdown is isolated.
- d. **CORRECT** - At full power PCS Pressure is 2060 psia and S/G pressure is 770 psia. This is a 1290 psia ΔP . After the trip the ΔP is 645 psia because no load S/G pressure is 900 psia. Leak rate is proportional to the square root of the ΔP which yields 160 gpm and charging flow rate is approximately 133 gpm with zero letdown flow so PZR level will be lowering.

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4

EK2.2 - Knowledge of the interrelations between the (Excess Steam Demand) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility

Tier: 1 Group: 1 RO Imp: 3.7
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK02.0

References: EOP-6.0 bases step 7

Question:

Given the following with the Plant operating at full power:

- P-55C, Charging Pump, is out of service for maintenance
- A steam line break occurs causing a Safety Injection Signal to actuate
- EOP-1.0, "Standard Post-Trip Actions," have been completed
- The Control Room team has implemented EOP-6.0, "Excess Steam Demand Event"
- 2400 VAC Bus 1D de-energizes and locks out due to a fault on the bus
- As PCS pressure lowers below 1300 psia and stabilizes, the Reactor Operator trips all four Primary Coolant Pumps (PCPs)

Tripping all four PCPs under these conditions will adversely impact the ability to ...

- a. detect core parameters.
- b. reduce PCS pressure to establish HPSI flow.
- c. remove decay heat using Steam Generators.
- d. prevent void formation in the Reactor Vessel upper head.

DISTRACTER ANALYSIS

- a. Plausible if the student does not know that CET temperature indications are accurate for this with no PCP flow.
- b. **CORRECT - When PCPs are tripped, PZR main spray is lost, auxiliary spray flow is also lost due to P-55C being out of service and the loss of Bus 1D.**
- c. Plausible if the student does not take into consideration that natural circulation can remove all decay heat.
- d. Plausible if the student confuses the effects of a LOCA with the effects of an excess steam demand event.

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: Palisades 2008 NRC RO EXAM #73

K/A: 000054 (CE/E06) Loss of Main Feedwater / 4

EK3.3 - Knowledge of the reasons for the following responses as they apply to the (Loss of Feedwater):

Manipulation of controls required to obtain desired operating results during abnormal and emergency situations

Tier: 1 Group: 1 RO Imp: 3.7

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK02.0

References: EOP-7.0, step 8

Question:

EOP-7.0, "Loss of All Feedwater Recovery," contains the following guidance concerning restoration of feedwater to a dry Steam Generator (S/G):

CAUTION

Limit feed flow to less than 300 gpm
for any S/G with level less than -84%

What is the reason for this guidance?

- a. Avoid a loss of PCS pressure control due to Pressurizer insurges and outsurges.
 - b. Prevent a rapid PCS cooldown, avoiding a Pressurized Thermal Shock to the Rx vessel.
 - c. Prevent uneven cooling of the PCS which may result in a localized reactivity excursion.
 - d. Minimize the probability of causing significant damage to the S/G tube bundle.
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DISTRACTER ANALYSIS

- a. Plausible because there is a similar caution in ONP-25.2 for fire in the plant and evacuation of the control room.
 - b. Plausible as this could occur but is not the reason for the caution.
 - c. Plausible as this will occur but is not a concern in this case.
 - d. **CORRECT - EOP-7.0 step 8 contains a caution to limit feed to 300 gpm due to the possible of tube bundle damage.**
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Level of Knowledge: **LOW**Difficulty: **2**

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000055 Station Blackout / 6

EA1.07 - Ability to operate and monitor the following as they apply to a Station Blackout: Restoration of power from offsite

Tier: 1 Group: 1 RO Imp: 4.3

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK01.0

References: EOP-3.0, step 16; EOP supplement 29, 4.1.i

Question:

Given the following with the Plant in MODE 3:

- Diesel Generator 1-2 is out of service for maintenance
- A loss of all offsite power occurs
- 'F' and 'R' Switchyard buses are de-energized
- Diesel Generator 1-1 will not start automatically or manually

Which one of the following lists the Switchyard 345kV Line and Breaker that must be available to restore offsite power via backfeed to the Main Transformer?

- a. Cook #1 Line, Switchyard Breaker 25F7.
 - b. Cook #1 Line, Switchyard Breaker 25H9.
 - c. Cook #2 Line, Switchyard Breaker 25F7.
 - d. Cook #2 Line, Switchyard Breaker 25H9.
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DISTRACTER ANALYSIS

- a. Plausible because 25F7 is where power is normally fed to the 'F' bus but since all offsite power is lost this breaker must be open.
 - b. **CORRECT - Power flows from Cook 1 line through 25H9 to the Main Generator line.**
 - c. Plausible because 25F7 is where power is normally fed to the 'F' bus but since all offsite power is lost this breaker must be open and student misapplies which Cook line supplies backfeed.
 - d. Plausible if student misapplies which Cook line supplies backfeed.
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Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000056 Loss of Off-site Power / 6

AA2.38 - Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Load sequencer status lights

Tier: 1 Group: 1 RO Imp: 3.7

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: TBCORE_CK05.0

References: E-17, sheet 4

Question:

Given the following with the Plant operating at full power:

- A Plant trip occurs due to a loss of all offsite power
- Both Diesel Generators start and sequence loads as designed

Which one of the following indicates that the appropriate sequencers have completed sequencing loads onto 2400 VAC Buses 1C and 1D?

- a. The in-service CRHVAC train Main Supply Fan, V-95/V-96, has started.
 - b. The in-service CRHVAC train Emergency Air Filter Unit Fan, V-26A/V-26B, has started.
 - c. All Containment Air Cooler 'A' Fans, V-1A, V-2A, V-3A, V-4A, have started.
 - d. All Charging Pumps, P-55A, P-55B, P-55C, have started.
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DISTRACTER ANALYSIS

- a. **CORRECT - V-95/V-96 sequence on last at 55 seconds.**
 - b. Plausible if the student believes that the DBA sequencer will be loading the EDG under these conditions, but the NSD sequencer will be.
 - c. Plausible because for these conditions containment cooling is not a high priority.
 - d. Plausible because for these conditions charging flow is not a high priority.
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Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000057 Loss of Vital AC Inst. Bus / 6

G2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs

Tier: 1 Group: 1 RO Imp: 3.8

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBAA_E05.01

References: Admin 4.06 Attachment 15 page 6

Question:

The Plant is manually tripped while operating at full power due to a loss of Y01, Instrument AC Bus. The Control Room team enters and begins performing EOP-1.0, "Standard Post-Trip Actions."

Which one of the following describes the earliest that the Control Room team can perform subsequent actions of ONP-24.5, "Loss of Instrument AC Bus Y01?" Assume the actions are not associated with personnel safety, plant safety, equipment protection or safety of the public.

- a. During EOP-1.0 Immediate Actions.
 - b. When directed by EOP-1.0 Operator Actions.
 - c. Immediately after EOP-1.0 Immediate Actions.
 - d. When directed by EOP-2.0, "Reactor Trip Recovery."
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DISTRACTER ANALYSIS

- a. Plausible if the student believes that Y-01 is required to monitor rod position but this action is not allowed per AP 4.02.
 - b. Plausible if the student believes Operator actions of EOP-1.0 contain actions to restore Y-01.
 - c. **CORRECT - ADMIN 4.06 specifies that other actions of procedures other than ONP immediate actions shall not be implemented during EOP immediate actions.**
 - d. Plausible if the student correctly assumes that EOP-2.0 contains actions to restore Y-01 but does not realize that it is not the earliest available time.
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Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000058 Loss of DC Power / 6

AK1.01 - Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation

Tier: 1 Group: 1 RO Imp: 2.8

Applicable 10CFR55 Section: 41.8

Palisades Learning Objective: IOTF_CK15.0

References: ONP-2.3, attachment 1

Question:

The Plant is operating at full power with Battery Chargers #1 and #2 in service when 72-10, #1 DC Bus Tie Breaker, trips open.

Which one of the following lists all loads that will be de-energized as a result?

- a. Preferred AC Bus Y30 only.
 - b. Preferred AC Bus Y10 only.
 - c. Preferred AC Bus Y30, DC Buses D11-1 and D11-2.
 - d. Preferred AC Bus Y10, DC Buses D11-1 and D11-2.
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DISTRACTER ANALYSIS

- a. **CORRECT** - when 72-10 trips, DC bus D10L de-energizes which de-energizes Inverter #3 and Y30 only.
 - b. Plausible if the student recalls incorrectly which inverter receives power from D10L.
 - c. Plausible if the student recalls incorrectly which buses the battery supplies directly.
 - d. Plausible for a combination of 'b' and 'c' above.
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Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000062 Loss of Nuclear Svc Water / 4

AA1.06 - Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): Control of flow rates to components cooled by the SWS

Tier: 1 Group: 1 RO Imp: 2.9

Applicable 10CFR55 Section: 41.8

Palisades Learning Objective: IOTF_CK16.0

References: ONP-6.1, attachment 2

Question:

Given the following with the Plant in MODE 3:

- The Control Room team has entered ONP-6.1, "Loss of Service Water," due to a loss of all three Service Water Pumps
- The Fire Protection System is supplying the Service Water System using all three Fire Water Pumps
- It has become necessary to lower flow to specific Service Water components to prevent run-out of the Fire Water Pumps

Which one of the following groups of loads, when isolated, will result in the largest rise in Fire Water Pump discharge pressure?

- a. Containment Air Coolers and Component Cooling Water HXs.
 - b. Containment Air Coolers and Safeguards Room Coolers.
 - c. Component Cooling Water HXs and Safeguards Room Coolers.
 - d. CRHVAC Condensers and Steam Generator Blowdown HX.
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DISTRACTER ANALYSIS

- a. **CORRECT - Containment air coolers and CCW HXs are the largest loads in service for the given conditions.**
 - b. Plausible because the safeguards room coolers are large loads but not as large as CCW HXs.
 - c. Plausible because the safeguards room coolers are large loads but not as large as the containment air coolers.
 - d. Plausible as these are large loads but the non-critical SW header must be isolated in order to supply the critical SW header with the fire water pumps.
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Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000065 Loss of Instrument Air / 8

AK3.08 - Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air:
Actions contained in EOP for loss of instrument air

Tier: 1 Group: 1 RO Imp: 3.7

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK02.0

References: EOP-3.0 Step 23; EOP Supplement 36

Question:

The Plant has experienced a reactor trip from full power and a concurrent station blackout. The Control Room team has implemented EOP-3.0, "Station Blackout Recovery." The CRS has directed you to perform EOP Supplement 36, "Control Valve Tracking Sheet."

Which one of the following requires repositioning a component Handswitch (HS) when completing EOP Supplement 36?

- a. The air failure position agrees with HS as-found position.
 - b. The air failure position does not agree with HS as-found position.
 - c. The loss of control power failure position agrees with HS as-found position.
 - d. The loss of control power failure position does not agree with HS as-found position.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student misapplies the reason for performing the supplement.
 - b. **CORRECT - The operator should match the HS position to the air failure position so that valves will not reposition when air is restored.**
 - c. Plausible if the student misapplies the reason for performing the supplement.
 - d. Plausible if the student misapplies the reason for performing the supplement.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000077 Generator Voltage and Electric Grid Disturbances / 6

AK2.07 - Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Turbine / generator control

Tier: 1 Group: 1 RO Imp: 3.6
Applicable 10CFR55 Section: 41.5

Palisades Learning Objective: MGEN_CK08.0

References: SOP-8, attachment 4; ARP-2, window 16

Question:

Given the following with the Plant operating at full power:

- Main Generator Load is 823 MW
- Main Generator Reactive load is zero (0) MVARs

A voltage disturbance occurs on the grid which causes Main Generator reactive load to change to 450 MVARs out. This is a concern because the Main Generator is now _____ (1) which leads to _____ (2).

- a. (1) Under-excited
(2) Excessive generator field current
- b. (1) Under-excited
(2) Rotor pole slippage
- c. (1) Over-excited
(2) Excessive generator field current
- d. (1) Over-excited
(2) Rotor pole slippage

DISTRACTER ANALYSIS

- a. Plausible if the student believes that the generator is under-excited.
- b. Plausible if the student believes that if the generator is under-excited, pole slippage can occur, but this applies mainly in motors.
- c. **CORRECT - VARS out is over-excited and over-excitation will cause excessive field current.**
- d. Plausible if the student believes that rotor pole slippage can occur if the generator is over-excited.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000001 Continuous Rod Withdrawal / 1

AK1.03 - Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: Relationship of reactivity and reactor power to rod movement

Tier: 1 Group: 2 RO Imp: 3.9
Applicable 10CFR55 Section: 41.1

Palisades Learning Objective: IOTF_CK01.0

References: TS 3.3.1 bases page 11, 12

Question:

Consider two separate Uncontrolled Control Rod Withdrawal Events. Event #1 occurs at approximately $1 \times 10^{-4}\%$ power and Event #2 occurs at approximately 5% power. Each event occurs in the middle of core life (MOL).

Which one of the following describes the difference in Startup Rate (SUR) for these two events? (Assume each event inserts reactivity at an equal rate.)

 (1) will have the lower SUR because (2) will minimize the rate of power rise.

- a. (1) Event #2
 (2) moderator temperature coefficient
- b. (1) Event #2
 (2) a rod withdrawal prohibit signal
- c. (1) Event #1
 (2) the Doppler coefficient
- d. (1) Event #1
 (2) the effect of delayed neutron precursors

DISTRACTER ANALYSIS

- a. **CORRECT** - for a rod withdrawal accident in the power range, moderator and fuel temperature coefficients will **slow the rate of power rise**.
- b. Plausible if the student correctly assumes that the rising power will cause a variable high power pre-trip alarm which would cause a rod withdrawal prohibit (RWP) but this is not the reason for the smaller power excursion and the RWP will not be reached until power reaches 28.5%.
- c. Plausible if the student believes that the Doppler coefficient is related to control rod operation at lower power levels, i.e., not in the power range. Doppler coefficient is related to fuel temperature changes which would not occur until the reactor is at the POAH.
- d. Plausible if the student correctly believes that delayed neutrons play a large role in reactivity changes but incorrectly believes that the event will have a smaller SUR.

Level of Knowledge: HIGH

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000003 Dropped Control Rod / 1

AK1.04 - Knowledge of the operational implications of the following concepts as they apply to the Dropped Control Rod: Effects of power level and control position on flux

Tier: 1 Group: 2 RO Imp: 3.1

Applicable 10CFR55 Section: 41.6

Palisades Learning Objective: IOTF2_E02.02

References: EM-04-17, attachment 5

Question:

With the Plant operating at full power Control Rod 35 (very center of the core) drops halfway (66 inches withdrawn).

Which one of the following correctly completes the following statement concerning the effect on Axial Shape Index (ASI) and Nuclear Instrument (NI) Power indication five minutes after Control Rod 35 drops? Assume no Operator actions occur.

ASI will be more (1) and NI Power indication will be (2) than actual power.

- a. (1) negative
(2) higher
- b. (1) negative
(2) lower
- c. (1) positive
(2) higher
- d. (1) positive
(2) lower

DISTRACTER ANALYSIS

- a. Plausible if the student misinterprets the definition of ASI and believes that as power is pushed toward the bottom of the core, ASI becomes more negative.
- b. Plausible if the student misinterprets the definition of ASI and believes that as power is pushed toward the bottom of the core, ASI becomes more negative and also misinterprets the effect of a control rod drop in the center of the core and incorrectly determines that NI power will be lower than actual.
- c. **CORRECT - Power will be suppressed in the top of the core; this results in ASI being positive. NI power will be higher than actual because the radial core power profile will have shifted toward the exterior.**
- d. Plausible if the student misinterprets the effect of a control rod drop in the center of the core and incorrectly determines that NI power will be lower than actual.

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000024 Emergency Boration / 1

AK3.01 - Knowledge of the reasons for the following responses as they apply to Emergency Boration: When emergency boration is required

Tier: 1 Group: 2 RO Imp: 4.1

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK01.0

References: EOP-4.0, step 22 note

Question:

During recovery from a Loss of Coolant Accident, which one of the following conditions will allow commencing a cooldown of the Primary Coolant System (PCS) before verifying SHUTDOWN MARGIN requirements?

- a. Safety Injection flow is within requirements.
 - b. Two (2) Primary Coolant Pumps are operating.
 - c. Emergency boration is in progress.
 - d. All control rods are fully inserted.
-
-

DISTRACTER ANALYSIS

- a. Plausible since HPSI flow comes from the SIRW tank which contains boron but the procedure specifically specifies the emergency boration flow path. Student may believe that the boron in the SIRW tank is sufficient to satisfy SDM.
 - b. Plausible since there are Shutdown Margin restrictions based on the number of Primary Coolant Pumps operating. Student may believe that the "trip two, leave two" strategy applies here.
 - c. **CORRECT - EOP-4.0 contains a note that cooldown may commence while shutdown margin is being calculated as long as emergency boration is in progress.**
 - d. Plausible since control rods are a key factor in Reactivity Control. Student may believe that if all control rods are in, this would be the most appropriate verification of SDM
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000028 Pressurizer Level Malfunction / 2

AA1.07 - Ability to operate and / or monitor the following as they apply to the Pressurizer Level Control Malfunctions: Charging pumps maintenance of PZR level (including manual backup)

Tier: 1 Group: 2 RO Imp: 3.3
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK04.0

References: SOP-2A, attachment 2; ARP-4, window 64

Question:

Given the following with the Plant in MODE 3:

- T_{AVE} is 532°F
- Pressurizer level is 42%
- LIC-0101B, Pressurizer Level Control Channel 'B', is in service in the 'AUTO' mode
- The 'AUTO' setpoint on LIC-0101B then rises to 52%

Based on the above conditions, _____ (1) _____.

The Backup Pressurizer level control program _____ (2) _____ function to control Pressurizer level.

- a. (1) CV-2003, Letdown Orifice Stop Valve, closes
(2) will not
- b. (1) CV-2003, Letdown Orifice Stop Valve, closes
(2) will
- c. (1) P-55B and P-55C, Charging Pumps, start
(2) will not
- d. (1) P-55B and P-55C, Charging Pumps, start
(2) will

DISTRACTER ANALYSIS

- a. Plausible this condition will cause minimum letdown flow but CV-2003 closes only from LIC-0101BL and the student believes that, since the AUTO setpoint rises that the backup level control program will not function.
- b. Plausible because minimum output on LIC-0101B will cause minimum letdown flow but CV-2003 closes only from LIC-0101BL.
- c. Plausible if the student believes that since the AUTO setpoint rises the backup level control program will not function..
- d. **CORRECT - Backup level control operates based on the difference between calculated setpoint and the level that is sensed. Since neither of these are affected in this situation, the backup program will function.**

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 000032 Loss of Source Range NI / 7

AA2.05 - Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Nature of abnormality, from rapid survey of control room data

Tier: 1 Group: 2 RO Imp: 2.9
Applicable 10CFR55 Section: 41.1

Palisades Learning Objective: RTA_E02.02

References: GOP-3, sections 5.2.1 and 5.2.2

Question:A Reactor startup is in progress with the following initial Nuclear Instrument readings:

<u>Instrument</u>	<u>Reading</u>
Source Range NI-1A	3.0×10^0 cps
Source Range NI-2A	3.3×10^0 cps
Wide Range NI-3A	1.2×10^{-7} % power
Wide Range NI-4A	1.0×10^{-7} % power

During performance of the 1/M plot during the Reactor startup per GOP-3, "MODE 3 \geq 525°F to MODE 2," the following Nuclear Instrument readings are observed:

<u>Instrument</u>	<u>Reading</u>
Source Range NI-1A	2.7×10^3 cps
Source Range NI-2A	4.2×10^2 cps
Wide Range NI-3A	1.1×10^{-5} % power
Wide Range NI-4A	9.6×10^{-6} % power

Based on the readings above, which one of the following Nuclear Instruments is not responding properly?

- Source Range NI-1A.
- Source Range NI-2A.
- Wide Range NI-3A.
- Wide Range NI-4A.

DISTRACTER ANALYSIS

- CORRECT** - it is reading a factor of approximately 1000 from the initial reading when it should only be a factor of approximately 100.
- Plausible since power is a power of 10 different from SR NI-1.
- Plausible since power is a power of 10 different from WR NI-4.
- Plausible since power is a power of 10 different from WR NI-3.

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - 2009 NRC RO Exam #20

K/A: 000036 (BW/A08) Fuel Handling Accident / 8

G2.4.21 - Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.

Tier: 1 Group: 2 RO Imp: 4.0
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: IOTF_CK01.0

References: E-17, sheet 7; ARP-7, window 26

Question:

Given the following with the Plant in MODE 6:

- Refueling operations are in progress
- Containment Refueling Monitors, RIA-2316 and RIA-2317, are in service

Which one of the following Control Room alarms, if any, will alert the Control Room team that RIA-2316 reached an alarm setpoint due to a fuel handling incident? (Assume that RIA-2317 has not reached an alarm setpoint)

- a. None, RIA-2316 and RIA-2317 are both required to reach an alarm setpoint before a Control Room alarm is received.
 - b. EK-1366, "PLANT MONITORING HI RADIATION."
 - c. EK-1363, "CONTAINMENT HI RADIATION."
 - d. EK-1126, "CIS INITIATED."
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DISTRACTER ANALYSIS

- a. Plausible if the student misapplies the logic for CIS from the Refueling Monitors and believes that it is 2/2.
 - b. Plausible because various ARM systems initiate this alarm, however, RIA-2316 does not.
 - c. Plausible because this for a CHR when the plant is on-line, this is the alarm that will be received in addition to EK-1126, however, this alarm is initiated by the Containment Radiation Monitors.
 - d. **CORRECT** - When RIA-2316 alarms a containment isolation signal is initiated which causes EK-1126 to annunciate.
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Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000051 Loss of Condenser Vacuum / 4

AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum:
Conditions requiring reactor and/or turbine tripTier: 1 Group: 2 RO Imp: 3.9
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: IOTF_CK05.0

References: ONP-14 trip criteria

Question:

Given the following with the Plant operating at 50% power:

- The Turbine Operator reports that Condenser vacuum is indicating 27.1" Hg and lowering
- ONP-14, "Loss of Condenser Vacuum," is entered with Step 2 "Main Condenser Air In-Leakage" applicable

Based on the above conditions, the Reactor must be tripped if ...

- a. P-39A or P-39B, Cooling Tower Pumps, trip.
 - b. Gland Seal Steam pressure lowers below 2.0 psig.
 - c. Condenser vacuum lowers below 21.5" Hg.
 - d. Condenser vacuum will not stabilize greater than 25" Hg.
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DISTRACTER ANALYSIS

- a. Plausible because if this occurs, the condenser will be experiencing air in-leakage and reduced cooling but there is no trip criteria for one cooling tower pump trip.
 - b. Plausible because the student may believe that with air in-leakage problems that this low of gland seal pressure will be unrecoverable.
 - c. **CORRECT - ONP-14 trip criteria state that if vacuum lowers to > 21.5" Hg the plant must be tripped.**
 - d. Plausible because trip criteria for this condition is not stabilizing above 24" Hg.
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Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 000074 (W/E06&E07) Inad. Core Cooling / 4

EK2.06 - Knowledge of the interrelations between the Inadequate Core Cooling and the following: Turbine bypass and atmospheric dump valves

Tier: 1 Group: 2 RO Imp: 3.5
Applicable 10CFR55 Section: 41.2

Palisades Learning Objective: TBCORE_CK02.0

References: EOP-8.0, step 19; EOP-8.0 step 30 bases

Question:

Given the following with the Plant operating at full power:

- A Reactor trip due to a loss of all offsite power occurs
- A cooldown using the Atmospheric Steam Dump Valves (ADV) has commenced
- HIC-0780A, Steam Dump Controller, output is set at 50%
- Natural circulation flow has been established

Which one of the following describes:

- (1) an indication that natural circulation flow has stopped and;
- (2) the action to be taken to restore natural circulation flow?

- a. (1) Reactor core ΔT is greater than 50°F.
(2) Throttle open the ADVs.
- b. (1) Reactor core ΔT is greater than 50°F.
(2) Throttle closed the ADVs.
- c. (1) PCS indicates less than 50°F subcooled.
(2) Throttle open the ADVs.
- d. (1) PCS indicates less than 50°F subcooled.
(2) Throttle closed the ADVs.

DISTRACTER ANALYSIS

- a. Plausible because opening the ADVs will cause a higher thermal gradient but with natural circ flow stagnated this will exacerbate the problem because T_H will have to rise more to cause natural circ flow.
- b. **CORRECT - If core differential temperature reaches 50°F or PCS indicates < 25°F subcooled, natural circulation has stopped and the ADVs need to be throttled closed. A 50% output on the ADV controller will achieve an excessive cooldown with no PCPs operating.**
- c. Plausible for combination of reasons in 'a' and 'd'.
- d. Plausible if the student confuses this requirement with EOP-3.0, Station Blackout, instructions to verify that the reactor will be shutdown if T_c were to lower by 50°F (Shutdown Margin requirements) but for natural circulation flow verification the requirement is 25°F subcooled.

Level of Knowledge: HIGH

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: CE/A16 Excess RCS Leakage / 2

AK3.3 - Knowledge of the reasons for the following responses as they apply to the (Excess RCS Leakage):
Manipulation of controls required to obtain desired operating results during abnormal, and emergency situationsTier: 1 Group: 2 RO Imp: 3.3
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK07.0

References: ONP-4.1, step 4.1

Question:

Given the following with the Plant operating at full power:

- A spurious Containment Isolation occurs due to a fault in the Containment High Radiation circuitry
- ONP-4.1, "Spurious Containment Isolation," is entered
- ONP-4.1 directs closing of CV-2003, CV-2004, and CV-2005, Letdown Orifice Stop Valves

The reason for closing the Letdown Orifice Stop Valves is because there is a ...

- a. potential for flashing at the outlet of the Letdown Orifices.
 - b. loss of cooling to E-58, Letdown Heat Exchanger.
 - c. loss of cooling to E-56, Regenerative Heat Exchanger.
 - d. loss of PCS inventory via RV-2006, Letdown HX Inlet Relief Valve
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-

DISTRACTER ANALYSIS

- a. Plausible if the student correctly assumes that CV-2009 will close but incorrectly surmises that it causes flashing at the outlet of the Letdown orifices.
 - b. Plausible if the student believes that since CCW containment isolation valves close on a CHP that they will also close on a containment high rad condition.
 - c. Plausible because the student may believe that charging to the containment isolates on CIS which could lead to a loss of RHX cooling.
 - d. **CORRECT** - When a containment isolation occurs, Letdown Containment Isolation valve, CV-2009 closes which causes pressure in the upstream letdown line to rise to the relief valve setpoint. Closing the Letdown Orifice Stop Valves will isolate the relief valve.
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Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: MODIFIED - Palisades

K/A: 003 Reactor Coolant Pump

A1.09 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: Seal flow and D/P

Tier: 2 Group: 1 RO Imp: 2.8
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: PCP_E03.01

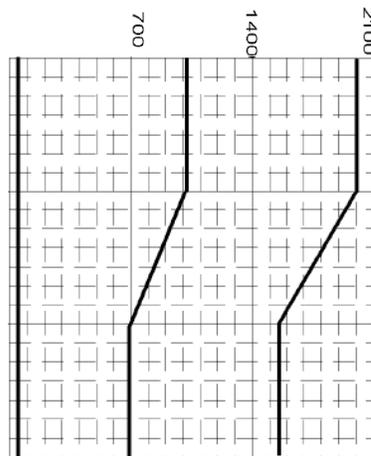
References: ARP-5, attachment 1

Question:

Given the following with the Plant in MODE 3:

- All Primary Coolant Pumps (PCPs) in service
- The Reactor Operator is in the process of adjusting PCP Controlled Bleedoff pressure
- Alarm EK-0951, "PRI COOLANT PUMP P-50C SEAL PRESS OFF NORMAL," annunciates

Based on the above conditions and the below drawing of PR-0140A, PCP, P-50C, Seal Pressure Recorder, which one of the following describes the seal stage that has failed and the expected Controlled Bleedoff flow?



- 1st Stage Failure with 0.0 gpm Controlled bleedoff flow.
- 2nd Stage Failure with 0.0 gpm Controlled bleedoff flow.
- 1st Stage Failure with 1.0 gpm Controlled bleedoff flow.
- 2nd Stage Failure with 1.0 gpm Controlled bleedoff flow.

DISTRACTER ANALYSIS

- Plausible if the student believes that a failed seal will cause CBO flow to cease.
- Plausible if the student believes that the second stage has failed and that a failed seal will cause CBO flow to cease.
- CORRECT - the first stage has failed because the pressure at the inlet of the second stage is reading PCS pressure and the remaining two stages are splitting the pressure drop. CBO flow will not go to zero gpm unless the vapor seal fails (4th stage).**
- Plausible if the student believes that the second stage has failed.

WRITTEN QUESTION DATA SHEET

Source of Question: MODIFIED - Palisades 2009 NRC SRO Exam #16

K/A: 004 Chemical and Volume Control

A2.16 - Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: T-ave and T-ref deviations

Tier: 2 Group: 1 RO Imp: 3.2
 Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK04.0

References: SOP-1A Attachment 10; ARP-4 window 61; ONP-13, step 4.1

Question:

Given the following with the Plant operating at full power:

- LIC-0101A, Pressurizer Level Control Channel 'A', is in service in Cascade mode
- SS-TAVE, Avg Temperature Display Selector Switch, on Panel C-02 is in the "LOOP 1" position
- The following alarms annunciate:
 - EK-0761, "PRESSURIZER LEVEL HI-LO"
 - EK-0967, "LOOP 1/LOOP 2 T_{AVE} DEVIATION"
 - EK-0968, "LOOP 1 T_{AVE}/T_{REF} GROSS DEVIATION"
- The setpoint meter (blue pointer) on LIC-0101A indicates 51%
- The process meter (red pointer) on LIC-0101A indicates 57%
- TI-0110, T_{AVE} Digital Temperature Indicator, on Panel C-02 indicates 549°F

Which one of the following describes the impact on the Charging System and the correct action?

- a. Charging Pumps P-55B and P-55C start.
Swap to LIC-0101B, 'B' Pressurizer Level Controller in Cascade.
- b. Charging Pump P-55A goes to minimum speed.
Swap to the LOOP 2 T_{AVE} Controller.
- c. Charging Pump P-55A goes to minimum speed.
Swap to LIC-0101B, 'B' Pressurizer Level Controller in Cascade.
- d. Charging Pumps P-55B and P-55C start.
Swap to the LOOP 2 T_{AVE} Controller.

DISTRACTER ANALYSIS

- a. Plausible if the student misapplies the meaning of the readings of the setpoint and process meters which will cause the student to think that P-55B/C will start and that swapping controllers will alleviate the problem.
- b. **CORRECT - This will occur if the loop 1 Tc associated with Tave fails low with the loop 1 Tave controller in service. The only remedy is to place the other Tave controller in service.**
- c. Plausible if the student believes that swapping controllers will alleviate the problem.
- d. Plausible if the student misapplies the meaning of the readings of the setpoint and process meters which will cause the student to think that P-55B/C will start.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 005 Residual Heat Removal

G2.2.37 - Ability to determine operability and/or availability of safety related equipment

Tier: 2 Group: 1 RO Imp: 3.6

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: SIS_CK07.0

References: E-5, sheet 1

Question:

Given the following with the Plant in MODE 5:

- The Shutdown Cooling System is in service
- A loss of power to 2400 VAC Bus 1C occurs
- The CRS directs you to throttle LPSI Loop Injection Valves

Which one of the following lists the LPSI Loop Injection Valves that can be throttled from the Control Room for these conditions?

- a. MO-3008, LPSI to Reactor Coolant Loop 1A.
MO-3010, LPSI to Reactor Coolant Loop 1B.
 - b. MO-3010, LPSI to Reactor Coolant Loop 1B.
MO-3014, LPSI to Reactor Coolant Loop 2B.
 - c. MO-3012, LPSI to Reactor Coolant Loop 2A.
MO-3014, LPSI to Reactor Coolant Loop 2B.
 - d. MO-3008, LPSI to Reactor Coolant Loop 1A.
MO-3012, LPSI to Reactor Coolant Loop 2A.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes both of these are powered from Bus 1C.
 - b. Plausible if the student believes MO-3010 is powered from Bus 1C.
 - c. **CORRECT - Both of these valves are powered from Bus 1D.**
 - d. Plausible if the student believes MO-3008 is powered from Bus 1C.
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Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 005 Residual Heat Removal

A4.02 - Ability to manually operate and/or monitor in the control room: Heat exchanger bypass flow control

Tier: 2 Group: 1 RO Imp: 3.4

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: SDC_CK08.0

References: Operator Aid 116

Question:

During normal Shutdown Cooling (SDC) operation with the Plant in MODE 5, the Control Room Supervisor directs the Reactor Operator to adjust total SDC flow from 3250 gpm to 2850 gpm while maintaining Primary Coolant temperature constant.

To perform this evolution, HIC-3025A, Shutdown Cooling HX Outlet Flow Control, will be operated in the ____ (1) ____ mode and FIC-0306, Shutdown Cooling HX Bypass Flow Control, will be operated in the ____ (2) ____ mode.

- a. (1) manual
(2) auto
 - b. (1) auto
(2) manual
 - c. (1) manual
(2) manual
 - d. (1) auto
(2) auto
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student confuses the operation of the key switch, which is just below FIC-0306, because this switch is in the AUTO position for SDC operation. This response is also plausible because FIC-0306 has flow rates on the controller that correspond to the setpoint meter which could cause the student to believe that a flow rate could be set in AUTO mode.
 - b. Plausible if the student confuses operation of HIC-3025A, which is in the control room, with HIC-3025B, which is at the redundant Safety Injection panel. HIC-3025B is normally in the AUTO mode.
 - c. **CORRECT - Both of these controllers are operated in the manual mode during Shutdown Cooling operations.**
 - d. Plausible for combination of 'a' and 'b'.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 006 Emergency Core Cooling

A3.03 - Ability to monitor automatic operation of the ECCS, including: ESFAS-operated valves

Tier: 2 Group: 1 RO Imp: 4.1

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBAB_E01.03

References: EOP-1.0, step

Question:

Given the following:

- The Plant has been tripped in response to a Steam Line Rupture inside Containment
- Safety Injection has actuated
- Containment pressure is 1.5 psig
- EOP-1.0, "Standard Post-Trip Actions," immediate actions are in progress

Which one of the following Safety Injection actuated valves, if found closed, require an operator to take a contingency action during the performance of EOP-1.0 immediate actions?

- a. MO-2169, Boric Acid Storage Tank, T-53A, Gravity Feed Isolation.
- b. CV-0861, Containment Air Cooler, VHX-1, High Capacity Outlet Valve.
- c. CV-0938, Shutdown Cooling HX, E-60A/B, Component Cooling Inlet Valve.
- d. CV-0944A, Component Cooling to SFP HX, Radwaste Evaps, C-50s/54 & NSSS.

DISTRACTER ANALYSIS

- a. Plausible because this valve should have opened on a safety injection signal but it is not allowed to be manipulated until after immediate actions are complete.
- b. **CORRECT - This is a contingency action in EOP-1.0 if Containment Pressure is > 0.85 psig.**
- c. Plausible because this valve should have opened on a safety injection signal but it is not allowed to be manipulated until after immediate actions are complete.
- d. Plausible if the student believes that restoring CCW flow to the spent fuel pool HX is necessary during EOP-1.0 immediate actions but it is not allowed to be manipulated until after immediate actions are completed..

Level of Knowledge: HIGH**Difficulty: 3**

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 006 Emergency Core Cooling

K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the ECCS and the following systems: RCS

Tier: 2 Group: 1 RO Imp: 4.2
Applicable 10CFR55 Section: 41.3

Palisades Learning Objective: SIS_CK02.0

References: M-203 sheet A; M-204 sheet A

Question:

Given the following:

- P-66A, HPSI Pump, is out of service for maintenance
- P-67B, LPSI Pump, is out of service for maintenance
- A Loss of Coolant Accident occurs which causes Primary Coolant System (PCS) pressure to lower to 100 psia
- All available Safety Injection equipment functions as designed

For these conditions P-66B, HPSI Pump, will be injecting into (1) PCS cold leg loops and P-67A, LPSI Pump, will be injecting into (2) PCS cold leg loops.

- a. (1) four (4)
(2) four (4)
- b. (1) four (4)
(2) two (2)
- c. (1) two (2)
(2) four (4)
- d. (1) two (2)
(2) two (2)

DISTRACTER ANALYSIS

- a. **CORRECT** - Although there are 2 LPSI injection valves for the right train, P-67A will be injecting into all 4 loops as will P-66B.
- b. Plausible if the student has an incorrect mental model of the LPSI system since there are 2 loop injection valves on each train of SIS. The student believes that these are associated with the pump only.
- c. Plausible because the student could correctly assume that each LPSI pump will inject into all 4 cold leg loops but each HPSI pump only injects into 2 cold leg loops because there are 2 trains of HPSI.
- d. Plausible for a combination of 'b' and 'c' above.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 008 Component Cooling Water

K4.02 - Knowledge of CCW design feature(s) and/or interlock(s) which provide for the following: Operation of the surge tank, including the associated valves and controls

Tier: 2 Group: 1 RO Imp: 2.9

Applicable 10CFR55 Section: 41.8

Palisades Learning Objective: CCW_CK13.0

References: ARP-7, window 72

Question:

Given the following with the Plant operating at full power:

- T-3, Component Cooling Water (CCW) Surge Tank, level is 57%
- A small leak develops in the CCW System that is within the capacity of the surge tank makeup system

Which one of the following describes the indications that would be observed in the Control Room for T-3 due the above conditions?

- a. Low level alarm is received and CV-0918, T-3 Fill, opens when T-3 reaches 47%.
 - b. Only CV-0918, T-3 Fill, opens when T-3 reaches 35%.
 - c. Only CV-0918, T-3 Fill, opens when T-3 reaches 47%.
 - d. Low level alarm is received and CV-0918, T-3 Fill, opens when T-3 reaches 35%.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student correctly determines the auto refill setpoint but also believes that the low level alarm will occur simultaneously. It is plausible for the student to believe that the low level alarm initiates when the auto refill valve opens to warn operators of a potential leak.
 - b. Plausible if the student correctly determines that only the auto refill will open but incorrectly recalls the setpoint. The student confuses it with the low alarm setpoint.
 - c. **CORRECT - Auto refill initiates at 47% surge tank level and the low level alarm is received at 35% level, however, the low level alarm will not be received since the leak is within the surge tank makeup capacity.**
 - d. Plausible for a combination of reasons 'a' and 'b' above.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - PALISADES 2008 NRC RO Exam #34

K/A: 007 Pressurizer Relief/Quench Tank

A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank water level within limits

Tier: 2 Group: 1 RO Imp: 2.9
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK08.0

References: ARP-4, window 33

Question:

Given the following with the Plant operating at full power:

- EK-0733, "QUENCH TANK HI-LO LEVEL," alarm annunciates
- EK-0732, "QUENCH TANK HI PRESS," alarm annunciates
- T-73. Quench Tank, level indicates 81% with pressure indicating 12 psig
- The Control Room team has diagnosed that RV-1039, Pressurizer Relief Valve, is leaking
- ONP-23.1, "Primary Coolant Leak," has been implemented

Which one of the following actions will the Control Room team perform to prevent RUD-0162, T-73 Rupture Disc, from actuating?

- a. Drain the Quench Tank to T-80, Equipment Drain Tank.
 - b. Drain the Quench Tank to T-74, Primary System Drain Tank.
 - c. Vent the Quench Tank to the Containment.
 - d. Vent the Quench Tank to the Vent Gas Collection Header (VGCH).
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes that the Quench tank is drained to the Equipment Drain Tank.
 - b. **CORRECT - this is the correct action to take per ARP-4 window 33.**
 - c. Plausible if the student believes that the correct action is to vent the tank; however, venting the tank will only provide a temporary reprieve. As long as the relief valve is still lifting, the level will rise and the pressure will rise. This is also the wrong location to vent the Quench tank.
 - d. Plausible if the student believes that the correct action is to vent the tank.
-
-

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 008 Component Cooling Water

K2.02 - Knowledge of bus power supplies to the following: CCW pump, including emergency backup

Tier: 2 Group: 1 RO Imp: 3.0

Applicable 10CFR55 Section: 41.8

Palisades Learning Objective: CCW_CK07.0

References: E-1, sheet 1; DBD-1.01, page 25

Question:

Given the following with the Plant operating at full power:

- A loss of offsite power occurs
- Diesel Generator 1-1 starts and sequences loads as designed
- Diesel Generator 1-2 will not start

Five minutes later, a leak develops in the Component Cooling Water (CCW) System which causes CCW pressure to lower from 105 psig to 77 psig

For the above conditions, which one of the following describes which CCW Pumps will be operating?

- a. P-52B only.
 - b. P-52A only.
 - c. P-52B and P-52C.
 - d. P-52A and P-52C.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes that P-52B is powered from 1C bus.
 - b. **CORRECT - P-52A is powered from 1C bus which is supplied by the 1-1 Diesel Generator. P-52C is also powered from 1C bus but will not start unless pressure is less than 80 psig at the time it is to be sequenced onto the bus.**
 - c. Plausible if the student believes that P-52B is powered from 1C bus and that P-52C will start since pressure lowered to < 80 psig.
 - d. Plausible if the student believes that P-52C will start since pressure is < 80 psig.
-
-

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 010 Pressurizer Pressure Control

K5.02 - Knowledge of the operational implications of the following concepts as they apply to the PZR PCS:
Constant enthalpy expansion through a valve

Tier: 2 Group: 1 RO Imp: 2.6

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: GFAD lesson plan objective #21

References: Steam Tables (PROVIDE); GFES lesson plan - Thermodynamic Processes

Question:

Given the following during a Plant cooldown:

- A bubble exists in the Pressurizer
- Pressurizer pressure is 1200 psia
- Quench Tank, T-73, pressure is 5 psig
- Low Temperature Overpressure Protection (LTOP) System is in service
- Then, Power Operated Relief Valve, PRV-1042B, lifts
- The Control Room team isolates PRV-1042B by closing MO-1042A, PRV-1042B isolation

Which one of the following is the approximate temperature downstream of PRV-1042B immediately after closure of MO-1042A?

- a. 212°F.
- b. 230°F.
- c. 282°F.
- d. 332°F.

DISTRACTER ANALYSIS

- a. Plausible if the student believes that the rupture disk will actuate causing quench tank pressure to lower to 0 psig.
 - b. Plausible if the student misinterprets the mollier diagram and takes the point back to the saturation curve.
 - c. **CORRECT - per Mollier diagram for constant enthalpy process.**
 - d. Plausible if the student believes that quench tank pressure will immediately rise to the rupture disc setpoint (100 psig) and then remain 100 psig.
-
-

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 012 Reactor Protection

K6.04 - Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Bypass-block circuits

Tier: 2 Group: 1 RO Imp: 3.3
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: RPS_E02.05

References: DBD-2.05, page 30; ARP-21, window D1

Question:

The Plant is performing startup physics testing following a refueling outage with the following conditions:

- Zero Power Mode (ZPM) Bypass has been placed in operation per SOP-36, "Reactor Protective System and Anticipate Transient Without Scram (ATWS) System"
- Reactor power is currently 1×10^{-5} % and stable
- Then, NI-03A, Wide Range Nuclear Instrument (NI), fails high

ZPM Bypass for the Reactor Protective System ____ (1) ____ be removed because
____ (2) ____.

- a. (1) will
(2) Wide Range NI power will exceed 10^{-4} % on at least one channel
- b. (1) will not
(2) Power Range NI power will not exceed 15% on at least one channel
- c. (1) will
(2) Wide Range NI SUR will rise above 1.5 dpm on at least one channel
- d. (1) will not
(2) Wide Range NI power will not exceed 10^{-4} % on at least three channels

DISTRACTER ANALYSIS

- a. **CORRECT** - ZPM bypass is automatically removed if any wide range NI exceed 10^{-4} % power.
- b. Plausible because this is the setpoint for bypassing the High SUR trip and enabling the loss of load trip.
- c. Plausible if the student confuses the high SUR pre-trip with the logic for removing the bypass for ZPM.
- d. Plausible if the student believes that power must be above the setpoint for removing the bypass on 3/4 channels.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 013 Engineered Safety Features Actuation

A1.07 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ESFAS controls including: Containment radiation

Tier: 2 Group: 1 RO Imp: 3.6

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBAB_E01.03

References: EOP-1.0, step 9.b

Question:

Given the following:

- A manual Plant trip has occurred due to a Loss of Coolant Accident
- EOP-1.0, "Standard Post-Trip Actions," are in progress
- Containment Isolation Radiation Monitors (RIA-1805, RIA-1806, RIA-1807, RIA-1808) are rising

EOP-1.0 immediate actions direct the operator to verify EK-1126, Containment Isolation Signal initiated (CIS INITIATED), is in alarm or push left and right HIGH RADIATION INITIATE pushbuttons on Panel C-13 when (1) Containment Isolation Radiation Monitor(s) reach the alarm setpoint and to (2).

- a. (1) at least two
(2) ensure all Containment Isolation Valves are closed
- b. (1) at least two
(2) corroborate with Containment High Range Gamma monitors, RIA-2321 and RIA-2322, readings
- c. (1) any
(2) ensure all Containment Isolation Valves are closed
- d. (1) any
(2) corroborate with Containment High Range Gamma monitors, RIA-2321 and RIA-2322, readings

DISTRACTER ANALYSIS

- a. Plausible because the normal logic for Containment high rad is two out of four and the student confuses the actions for high containment rad with high containment pressure which requires the operator to verify isolation valves are closed.
- b. Plausible because the normal logic for Containment high rad is two out of four.
- c. Plausible if the student confuses the actions for high containment rad with high containment pressure which requires the operator to verify isolation valves are closed.
- d. **CORRECT** - Contingency action in EOP-1.0 states that the HIGH RAD pushbuttons can be pushed in any containment radiation monitor alarms and the reading must be corroborated with RIA-2321 and 2322.

Level of Knowledge: LOW

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 013 Engineered Safety Features Actuation

A2.06 - Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Inadvertent ESFAS actuation

Tier: 2 Group: 1 RO Imp: 3.7
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK04.0

References: E-17, sheet 3, 6; ONP-4.1, step 4.2

Question:

Given the following during a Plant cooldown in MODE 3:

- Pressurizer pressure is 1500 psia
- Safety Injection has been blocked
- I&C Maintenance has inadvertently caused a Containment High Pressure (CHP) signal to be generated for the right channel (2/4 CHP pressure switches reach their setpoint)

Which one of the following describes the impact on P-54A, Containment Spray Pump, and CV-3002, Containment Spray Valve, and the required action?

- a. P-54A will start; CV-3002 will open. Reset CHP signal on Panel C-13.
 - b. P-54A will not start; CV-3002 will open. Reset CHP signal on Panel C-13.
 - c. P-54A will not start; CV-3002 will open. Close CV-3002.
 - d. P-54A will start; CV-3002 will open. Stop P-54A and close CV-3002.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes that resetting the CHP signal will stop the pump.
 - b. Plausible if the student believes that SIS is blocked from a CHP signal and that resetting the CHP signal will stop the pump. This is plausible because for the spray pump to auto start, SIS must arm it first.
 - c. Plausible if the student believes that SIS is blocked from a CHP signal. This is plausible because for the spray pump to auto start, SIS must arm it first.
 - d. **CORRECT - Spray pump will start because SIS 'arm' signal will occur because the SIS block circuit only blocks SIS on low pressurizer pressure not CHP. CV-3002 will open because a CHP signal is received. Correct action is to secure P-54A close CV-3002 per ONP-4.1. Resetting the CHP signal will not affect the status of P-54A and CV-3002.**
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-

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 022 Containment Cooling

A3.01 - Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation

Tier: 2 Group: 1 RO Imp: 4.1

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: CAIR_CK13.0

References: M-208, sheet 1B; M-218, sheet 2

Question:

Given the following with the Plant operating at full power:

- A manual Plant trip is initiated in response to a Steam Line break from the 'A' Steam Generator
- Containment pressure reaches 6 psig

Which one of the following describes the expected configuration due to the above conditions for the components listed below?

- V-4A, Containment Air Cooling (CAC) Recirc Fan
- CV-0869, VHX-4 Containment Air Cooler Inlet Valve
- CV-0867, VHX-4 Containment Air Cooler Outlet Valve

	<u>V-4A</u>	<u>CV-0869 (Inlet)</u>	<u>CV-0867 (Outlet)</u>
a.	ON	CLOSED	OPEN
b.	OFF	OPEN	CLOSED
c.	ON	OPEN	CLOSED
d.	ON	OPEN	OPEN

DISTRACTER ANALYSIS

- CORRECT - The fan stays in service, the inlet valve closes and the outlet valve opens on SIS. Containment pressure of 4 psig causes an SIS to occur.**
- Plausible if the student believes that V-4A trips since it does not have cooling water.
- Plausible if the student believes that the outlet valve closes on SIS, the outlet valve actually receives an open signal on SIS.
- Plausible if the student believes that V-4A and associated valves are not affected due to a Containment High Pressure condition. This is a correct determination but a CHP causes Safety Injection to occur.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 026 Containment Spray

A4.01 - Ability to manually operate and/or monitor in the control room: CSS controls

Tier: 2 Group: 1 RO Imp: 4.5

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: CSS_CK09.0

References: E-1, sheet 1; EOP supplement 42, 2.0.1.k

Question:

Given the following with the Plant operating at full power:

- A Plant trip due to a Loss of Coolant Accident occurs
- 2400 VAC Bus 1C trips on overcurrent and de-energizes
- A Recirculation Actuation Signal (RAS) is received

Which one of the following alignments will provide the maximum allowable Containment Spray flow and HPSI Subcooling flow for the above conditions?

- a. One Containment Spray Valve open and;
One HPSI Subcooling Valve open.
 - b. One Containment Spray Valve open and;
Both HPSI Subcooling Valves open.
 - c. Both Containment Spray Valves open and;
One HPSI Subcooling Valve open.
 - d. Both Containment Spray Valves open and;
Both HPSI Subcooling Valves open.
-
-

DISTRACTER ANALYSIS

- a. **CORRECT** - for these conditions only one spray pump is available. Each spray pump can supply two loads; any combination of spray valves and subcooling valves.
 - b. Plausible if the student believes that both HPSI pumps are available.
 - c. Plausible if the student believes that two spray pumps are available and one HPSI pump is available.
 - d. Plausible if the student believes that both HPSI pumps are available and two spray pumps are available.
-
-

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 039 Main and Reheat Steam

G2.1.28 - Knowledge of the purpose and function of major system components and controls

Tier: 2 Group: 1 RO Imp: 4.1

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: MSS_CK09.0

References: DBD-1.09, page 43

Question:

Which one of the following describes the design of the Main Steam Isolation Valves automatic closure logic for a Main Steam line break inside Containment?

- a. Either Steam Generator pressure lowers to 500 psia and Containment pressure rises to 4 psig.
 - b. Both Steam Generator pressures lower to 500 psia and Containment pressure rises to 4 psig.
 - c. Both Steam Generator pressures lower to 500 psia or Containment pressure rises to 4 psig.
 - d. Either Steam Generator pressure lowers to 500 psia or Containment pressure rises to 4 psig.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes that both S/G pressure and containment pressure must rise above the setpoint to cause MSIV closure.
 - b. Plausible for the same reason as 'a'. Additionally, the student may believe that each MSIV is closed by its respective pressure channels reaching 500 psia on 2/4.
 - c. Plausible if the student believes that each MSIV is closed by its respective pressure channels reaching 500 psia on 2/4.
 - d. **CORRECT** - **Either S/G pressure lowering to 500 psia or containment pressure reaching 4.0 psig will close both MSIVs.**
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 039 Main and Reheat Steam

K1.08 - Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: MFW

Tier: 2 Group: 1 RO Imp: 2.7

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK02.0

References: EOP-1.0 basis, operator actions, step 8

Question:

EOP-1.0, "Standard Post-Trip Actions," direct the Control Room team to ensure tripped both Main Feed Pumps (MFPs) if the Main Steam Isolation Valves (MSIVs) are closed.

What is the reason for this action?

- a. Ensures the MFP Aux Oil Pump will automatically start.
 - b. Prevents air in-leakage to the Condenser from the steam line traps.
 - c. Prevents MFP Turbine overspeed if steam is re-initiated.
 - d. Prevents Low Pressure steam from pressurizing the Main Steam lines.
-
-

DISTRACTER ANALYSIS

- a. Plausible as the Aux Oil Pump will Auto start when control oil pressure is low - student may believe that tripping is part of the logic.
 - b. Plausible as the steam header is depressurized and the turbine governor valves will be full open.
 - c. **CORRECT - when the turbine slows down on a trip, the governor valves go full open. If steam is re-initiated with these valves full open, the turbine will overspeed.**
 - d. Plausible because the MFP receives low pressure steam as well as high pressure steam - the student believes that there could be a flow path available for this to occur because the MSRs may have steam remaining in them.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 059 Main Feedwater

K3.04 - Knowledge of the effect that a loss or malfunction of the MFW system will have on the following: RCS

Tier: 2 Group: 1 RO Imp: 3.6

Applicable 10CFR55 Section: 41.5

Palisades Learning Objective: IOTF_CK04.0

References: ARP-5, window 61

Question:With the Plant at full power, which one of the following will cause T_{AVE} to initially rise?

- a. LIA-0702, 'A' Steam Generator (S/G) Level Indicator Alarm (C-12), fails high.
 - b. LIC-0701, 'A' S/G Level Indicating Controller (C-01), level indication fails low.
 - c. FT-0701, 'A' S/G Feed Flow Transmitter Indicator (C-01), fails low.
 - d. FT-0702, 'A' S/G Steam Flow Transmitter Indicator (C-01), fails high.
-
-

DISTRACTER ANALYSIS

- a. **CORRECT** - This indication initiates S/G high level override which will close 'A' S/G feed reg valve, which causes T_{AVE} to rise.
 - b. Plausible but if the level indication fails low, the feed reg valve will open, which causes T_{AVE} to lower.
 - c. Plausible but if the feed flow input to the S/G level controller fails low, the feed reg valve will open, which will cause T_{AVE} to lower.
 - d. Plausible but if the steam flow input to the S/G level controller fails high, the feed reg valve will open, which will cause T_{AVE} to lower.
-
-

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 061 Auxiliary/Emergency Feedwater

K2.02 - Knowledge of bus power supplies to the following: AFW electric driven pumps

Tier: 2 Group: 1 RO Imp: 3.7

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: ISIE_CK07.0

References: E-1, sheet 1; E-17, sheet 21, 21A

Question:

Given the following with the Plant operating at full power:

- A loss of all offsite power occurs
- Diesel Generator 1-1 will not start automatically or manually

Which Auxiliary Feedwater (AFW) Pump(s) will be operating one-minute after an Auxiliary Feedwater Actuation Signal occurs? (Assume no Operator actions occur.)

- a. Only AFW Pump P-8A.
 - b. Only AFW Pump P-8C.
 - c. AFW Pumps P-8B and P-8C.
 - d. Only AFW Pump P-8B.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes that P-8A is powered from D/G 1-2.
 - b. **CORRECT - P-8A does not have power available and P-8C will start after 30 seconds after the AFAS. P-8B will not start until 112 seconds after the AFAS only if there is not flow. Since P-8C starts there will be flow.**
 - c. Plausible if the student believes P-8B will start second and P-8C starts in addition to P-8B.
 - d. Plausible if the student believes that P-8B will start second in the sequence of AFAS.
-
-

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 062 AC Electrical Distribution

K4.02 - Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: Circuit breaker automatic trips

Tier: 2 Group: 1 RO Imp: 2.5
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: SPS_CK09.0

References: ARP-3, window 27

Question:

Given the following with the Plant operating at full power:

- All 4160V and 2400 VAC Buses are being supplied from the normal source
- No equipment is out of service

A fault then occurs on Startup Transformer 1-2. One of the alarms that annunciates is:

EK-0527, START-UP TRANSFORMER NO. 1-2 SUDDEN PRESS

Due to the fault, the Plant (1) and Switchyard Rear Bus (2).

- a. (1) will trip
(2) will de-energize
- b. (1) will trip
(2) will not de-energize
- c. (1) will not trip
(2) will de-energize
- d. (1) will not trip
(2) will not de-energize

DISTRACTER ANALYSIS

- a. Plausible if the student correctly assumes S/U 1-2 XFMR supplies 2400V buses and the fast transfer capability is currently bypassed, but incorrectly assumes that S/U 1-2 XFMR is currently supplying power.
- b. Plausible because of 'a' above and the student believes that the S/U 1-2 XFMR has an isolation between the XFMR and the Rear Bus.
- c. **CORRECT - 2400V buses are being supplied by the safeguards transformer so the plan will not trip. However, there are no breakers between the Startup Transformers and the Rear Bus, so it will trip to isolate the fault.**
- d. Plausible if the student believes that the S/U 1-2 XFMR has an isolation between the XFMR and the Rear Bus.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: MODIFIED - Palisades

K/A: 063 DC Electrical Distribution

A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Grounds

Tier: 2 Group: 1 RO Imp: 2.5
 Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: IOTF_CK05.0

References: ONP-2.3 reactor trip criteria

Question:

The Plant has just been synchronized to the grid with power at 10% when a DC Bus ground occurs causing the 250 amp fuses supplying D21-2, 125 VDC Distribution Panel, to actuate and de-energize D21-2.

Which one of the following describes (1) the expected Plant response to this failure and (2) the required action?

- a. (1) CV-1359, Non-critical Service Water Isolation, closes.
 (2) Trip the Reactor.
- b. (1) CV-1359, Non-critical Service Water Isolation, closes.
 (2) Trip the Turbine.
- c. (1) CV-2099, PCP Controlled Bleedoff Containment Isolation, closes.
 (2) Trip the Reactor and all Primary Coolant Pumps.
- d. (1) CV-2099, PCP Controlled Bleedoff Containment Isolation, closes.
 (2) Verify Controlled Bleedoff pressure is < 140 psig.

DISTRACTER ANALYSIS

- a. **CORRECT - CV-1359 is a fail safe on loss of power valve and it receives power from D-21-2 and ONP-6.1 trip criteria state to trip the reactor if CV-1359 closes.**
- b. Plausible because for most off-normal events when plant power is <15%, only a turbine trip is required, however, for a loss of service water, a reactor trip is required.
- c. Plausible because this is the plant response if DC panel D21-1 is lost.
- d. Plausible because this is the plant response if DC panel D21-1 is lost.

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 063 DC Electrical Distribution

A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls including: Battery capacity as it is affected by discharge rate

Tier: 2 Group: 1 RO Imp: 2.5

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK02.0

References: DBD 4.01, 3.3.1.4

Question:

The Plant has tripped from full power due to a loss of all offsite power. Neither Diesel Generator will start. For these conditions, which one of the following describes the importance of performing EOP Supplements 7 and 8, "Station Battery Load Stripping?"

Station Battery Load Stripping is designed to ...

- a. extend battery capacity from 30 minutes to two hours while maintaining DC bus voltage at greater than 105 volts.
 - b. ensure that the emergency loads are supplied by DC voltage at greater than 125 volts for a minimum of two hours.
 - c. prevent generating an explosive mixture of Hydrogen and Oxygen by limiting output current to less than 150 amps.
 - d. extend battery capacity from two hours to four hours while maintaining DC bus voltage at greater than 105 volts.
-
-

DISTRACTER ANALYSIS

- a. Plausible because the student correctly assumes the reason is to extend battery capacity but incorrectly recalls the amount of time.
 - b. Plausible because this is the nominal DC bus voltage that is required to be maintained during normal operation.
 - c. Plausible because this is a concern for battery operation but this is not the purpose of load stripping.
 - d. **CORRECT - Battery capacity is extended from two to four hours by isolating select DC loads.**
-
-

Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 064 Emergency Diesel Generator

K6.07 - Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers

Tier: 2 Group: 1 RO Imp: 2.7
Applicable 10CFR55 Section: 41.8

Palisades Learning Objective: EDG_CK16.0

References: SOP-22, section 4.2

Question:

Given the following Diesel Generator (D/G) conditions with the Plant in MODE 1:

	<u>D/G 1-1 (operating)</u>	<u>D/G 1-2 (standby)</u>
Hot Jacket Water Temperature	155°F	120°F
Hot Lube Oil Temperature	160°F	106°F
Starting Air <u>Train</u> Pressure	150 psig	145 psig
Starting Air <u>Tank</u> Pressure	150 psig	145 psig
Parallel/Unit Selector Switch	PARALLEL	UNIT

Which one of the following describes the D/G(s); if any that is (are) INOPERABLE due to the above conditions?

- Only D/G 1-1.
- Only D/G 1-2.
- Both D/G 1-1 and D/G 1-2.
- Neither D/G 1-1 nor D/G 1-2.

DISTRACTER ANALYSIS

- Plausible if the student believes that air tank pressure for D/G 1-2 is in spec.
- Plausible if the student believes that having the D/G in parallel mode does not make it inoperable and that D/G 1-1 air tank pressure is in spec.
- CORRECT - D/G 1-1 selector switch is in parallel and air tank pressure is too low, D/G 1-2 air tank pressure is too low.**
- Plausible if the student believes that all parameters are in spec.

Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades 2009 RO NRC Exam #50

K/A: 073 Process Radiation Monitoring

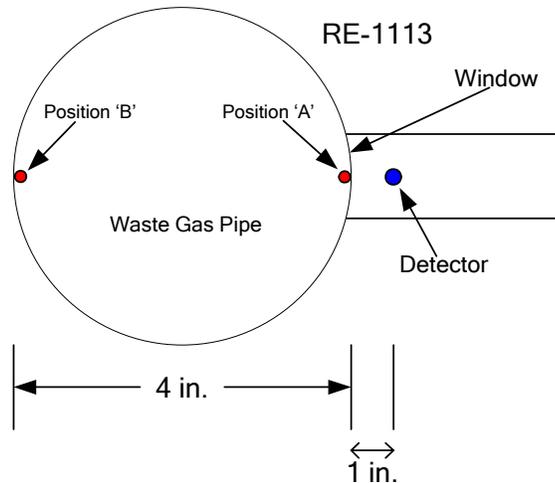
K5.02 - Knowledge of the operational implications as they apply to concepts as they apply to the PRM system:
Radiation intensity changes with source distanceTier: 2 Group: 1 RO Imp: 2.5
Applicable 10CFR55 Section: 41.12

Palisades Learning Objective: None

References: DOE-HDBK-1130-2008

Question:

RE-1113, Waste Gas Process Monitor radiation element, consists of a detector mounted on one side of the Waste Gas discharge pipe with a window through the pipe wall, with the pipe four inches in diameter (see below). The detector is a point detector located one-inch from the inner diameter of the pipe.



Compare the differences in radiation readings for a hot particle that passes along the side of the pipe closest to the detector (Position 'A' above) to the same hot particle that passes along the side of the pipe farthest away from the detector (Position 'B' above).

The reading for Position 'A' will be _____ times greater than the reading for Position 'B'.

- 4
- 5
- 16
- 25

DISTRACTER ANALYSIS

- Plausible if the student uses linear proportionality and does not account for the inch.
- Plausible if the student uses linear proportionality.
- Plausible if the student uses correct proportionality (squared) but does not account for the inch.
- CORRECT - Dose is proportional to the square of the distance. A count rate of 25 dpm at 1 inch would be equivalent of a count rate of 1 dpm at 5 inches.**

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 076 Service Water

A3.02 - Ability to monitor automatic operation of the SWS, including: Emergency heat loads

Tier: 2 Group: 1 RO Imp: 3.7

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: SWS_CK24.0

References: M-208, sheet 1A; M-209, sheet 1, 3; M-213

Question:

With the Plant operating at full power, which one of the following valves does not re-position if a Containment High Pressure (CHP) signal actuation occurs?

- a. CV-1359, Non-critical Service Water Header Isolation Valve.
 - b. CV-0823, CCW Heat Exchanger E-54A High Capacity SW Outlet Valve.
 - c. CV-0977B, CCW Return from Rad Waste Evaps and C-54, Waste Gas Compressor.
 - d. CV-0911, CCW from Containment Isolation Valve.
-
-

DISTRACTER ANALYSIS

- a. Plausible because this valve repositions on a SIS signal but a CHP causes a SIS.
 - b. **CORRECT - CV-0823 opens on a Recirc Actuation Signal only.**
 - c. Plausible because this valve repositions on a SIS signal but a CHP causes a SIS.
 - d. Plausible if the student believes that this valve is manually closed only during EOP supplement 6, Checksheet For Containment Isolation And CCW Restoration.
-
-

Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 078 Instrument Air

A4.01 - Ability to manually operate and/or monitor in the control room: Pressure gauges

Tier: 2 Group: 1 RO Imp: 3.1

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: CAS_CK08.0

References: SOP-19, section 7.1.1.d note; DBD-1.05, 3.2.3

Question:

Given the following:

- Instrument Air Compressor, C-2A, is in operation in HAND
- Instrument Air Compressor, C-2C, is in AUTO
- Instrument Air Compressor, C-2B, is removed from service for maintenance
- An air leak develops on the discharge of C-2A causing air pressure to lower to 85 psig
- C-2A subsequently trips
- The air leak is then isolated by closing the discharge of C-2A

How will C-2C respond to this instrument air pressure transient?

C-2C will ...

- a. auto start but will not load unless air pressure lowers to 80 psig.
 - b. auto-start and load. Will unload when pressure reaches 105 psig, will load again if pressure lowers to 85 psig.
 - c. auto-start and load. Will unload when pressure reaches 105 psig, will load again if pressure lowers to 95 psig.
 - d. auto-start and load. Will run fully loaded regardless of air pressure until placed in OFF and returned to AUTO.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student misapplies the auto start feature of the standby air compressor.
 - b. Plausible if the student confuses the setpoint for auto closure of service air automatic isolation with the standby compressor loading setpoint.
 - c. **CORRECT - C-2C will auto start since it is in standby and will unload and load at 105 and 95 psig, respectively.**
 - d. Plausible if the student believes that the air compressor does not load/unload when in standby.
-
-

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 103 Containment

G2.4.9 - Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.

Tier: 2 Group: 1 RO Imp: 3.8

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: IOTF_CK07.0

References: ONP-17, 4.8

Question:

Given the following with the Plant in MODE 5:

- The Shutdown Cooling System is in service
- The Equipment Hatch is open
- Then, a loss of Shutdown Cooling occurs
- The Control Room team enters ONP-17, "Loss of Shutdown Cooling"

Which one of the following describes the strategy for closing the Equipment Hatch in accordance with ONP-17?

The Equipment Hatch shall be closed within ...

- a. ONE hour only.
- b. FOUR hours only.
- c. the approximate time for PCS temperature to reach 200°F only.
- d. the approximate time for PCS temperature to reach 200°F or FOUR hours, whichever occurs first.

DISTRACTER ANALYSIS

- a. Plausible if the student believes that this is associated with a \leq one hour TS action statement.
 - b. Plausible if the student believes that PCS temperature is not a factor in determining the amount of time to close the equipment hatch
 - c. Plausible if the student believes that amount of time is not a factor in determining when the equipment hatch is required to be closed.
 - d. **CORRECT** - ONP-17 requires the hatch to be closed when PCS temperature reaches 200°F because the plant will not be in MODE 5 and LCO 3.9.4 and 3.9.5 require the hatch to be closed within 4 hours.
-
-

Level of Knowledge: LOW

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 103 Containment

K1.02 - Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: Containment isolation/containment integrity

Tier: 2 Group: 1 RO Imp: 3.9

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBAB_E01.03

References: EOP-1.0, immediate action step 9.b

Question:

Which one of the following combinations of Containment conditions will require the Control Room team to perform a contingency action for the Containment Isolation safety function during the performance of EOP-1.0, "Standard Post-Trip Actions," immediate actions?

	<u>Temperature</u>	<u>Pressure</u>	<u>Radiation</u>
a.	175°F	0.4 psig	0.6×10^1 R/Hr
b.	135°F	0.9 psig	0.8×10^1 R/Hr
c.	120°F	3.1 psig	0.6×10^1 R/Hr
d.	120°F	0.4 psig	1.1×10^1 R/Hr

DISTRACTER ANALYSIS

- Plausible because temperature is above the limit for meeting containment atmosphere safety function but is not included in containment isolation safety function and the student confuses this value for temperature at which degraded containment operating curves would be used.
- Plausible because the student recognizes that pressure is above the limit for meeting the containment isolation safety function and temperature is above the limit for Containment atmosphere safety function and the student believes that both must be above the limit for a contingency action to be taken.
- Plausible because the student recognizes that pressure is above the limit for meeting the containment isolation safety function but this value does not require a contingency action and the student confuses the value associated with a contingency action with the pressure at which degraded containment operating curves would be used.
- CORRECT - A Containment rad monitor reading of 10R/hour requires that the control room perform contingency action 9.b.1.**

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 002 Reactor Coolant

A3.03 - Ability to monitor automatic operation of the RCS, including: Pressure, temperatures, and flows

Tier: 2 Group: 2 RO Imp: 4.4

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: PPCS_CK13.0

References: M-201, sheet 1

Question:

The Plant is at full power when a loss of Instrument Air occurs. As a result, Pressurizer pressure will ...

- a. rise because the Spray valves fail closed.
 - b. lower because the Spray valves fail open.
 - c. remain steady because the Spray valves fail as-is.
 - d. remain steady because the Spray valves have backup Nitrogen.
-
-

DISTRACTER ANALYSIS

- a. **CORRECT - Spray valves are air to open so they fail closed.**
 - b. Plausible if the student believes that the spray valves fail open on loss of air.
 - c. Plausible if the student believes that the design of the spray valves is similar to the feed reg valves and they fail as-is.
 - d. Plausible because many safety related valves in the plant such as ADVs, AFW control valves, etc., have nitrogen backup.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 011 Pressurizer Level Control

K2.01 - Knowledge of bus power supplies to the following: Charging pumps

Tier: 2 Group: 2 RO Imp: 3.1

Applicable 10CFR55 Section: 41.8

Palisades Learning Objective: CVCS_CK07.0

References: E-4, sheet 1

Question:

With the Plant at full power, Load Control Center 11 (LCC-11) de-energizes due to a ground over-current fault. Which one of the following describes available Charging Pumps (P-55A, P-55B, and P-55C) that can be operated from the Control Room for the above condition? (Assume no Operator action is taken.)

- a. P-55C only.
 - b. P-55A and P-55B.
 - c. P-55A and P-55C.
 - d. P-55B only.
-
-

DISTRACTER ANALYSIS

- a. Plausible - student incorrectly recalls power supplies.
 - b. **CORRECT - LCC-11 powers P-55C only.**
 - c. Plausible - student incorrectly recalls power supplies.
 - d. Plausible - student incorrectly recalls power supplies.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 014 Rod Position Indication

G2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions

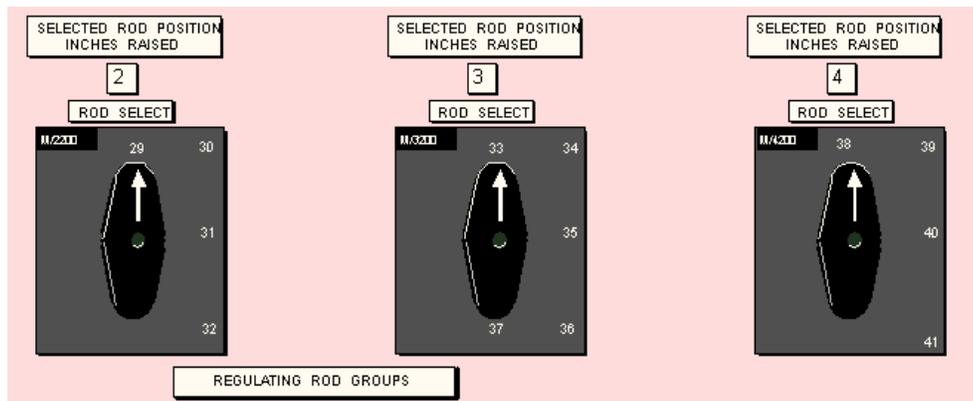
Tier: 2 Group: 2 RO Imp: 4.2
Applicable 10CFR55 Section: 41.6

Palisades Learning Objective: CRD_CK09.0

References: ARP-5, windows 11, 12, 16, and 41

Question:

A rapid power reduction is commenced from full power per ONP-26, "Rapid Power Reduction." While control rods are being inserted, Control Rod #38 becomes mechanically bound at 80 inches and does not move with the rest of the group. If this condition were to go unnoticed by the Control Room team, which one of the following describes the sequence of alarms to warn of this condition? (Assume switch positions are as shown below.)



- EK-0916, "CONTROL RODS OUT OF SEQUENCE," then EK-0911, "ROD POSITION 4 INCHES DEVIATION."
- EK-0911, "ROD POSITION 4 INCHES DEVIATION," then EK-0916, "CONTROL RODS OUT OF SEQUENCE."
- EK-0911, "ROD POSITION 4 INCHES DEVIATION," then EK-0912, "ROD POSITION 8 INCHES DEVIATION."
- EK-0911, "ROD POSITION 4 INCHES DEVIATION," then EK-0941, "GROUP 4 PREPWR DEPENDENT INSERTION LIMIT."

DISTRACTER ANALYSIS

- Plausible because the student may believe that sequencing is still operable, however since rod 38 is the stuck rod, only group 4 rods will continue moving.
- Plausible for the same reason as 'a' above and the student misapplies the setpoint for a control rod out of sequence.
- CORRECT - Only rods 39, 40, and 41 will continue moving in since the stuck rod is also the target rod for sequencing and PPDIL/PDIL calculations.**
- Plausible if the student correctly assumes that the 4 inch deviation will occur first, however, the PPDIL alarm will not come in since this is an input from the stuck rod (PIP).

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 016 Non-nuclear Instrumentation

K1.02 - Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: PZR LCS

Tier: 2 Group: 2 RO Imp: 3.4
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: PLCS_CK13.0

References: ARP-4, window 61; LT-0101B cal sheet

Question:

Given the following with the Plant operating at full power:

- LIC-0101B, Pressurizer Level Control Channel 'B', is in service in CASCADE mode
- LT-0101B, Level Input to LIC-0101B, diaphragm ruptures causing pressure on both sides to equalize

Due to this failure, LIC-0101B will indicate (1) which will cause (2) .

- a. (1) HIGH
(2) P-55A, Charging Pump, speed to be minimum
- b. (1) LOW
(2) P-55B and P-55C, Charging Pumps to start
- c. (1) HIGH
(2) P-55A, Charging Pump, to trip
- d. (1) LOW
(2) Pressurizer Heaters to trip

DISTRACTER ANALYSIS

- a. **CORRECT - PZR level works via a differential pressure cell with one reference leg that is maintained full and a variable leg that is connected to the bottom of the PZR. When PZR level rises, dp lowers so indicated level will rise. If the diaphragm ruptures, the dp is minimum, so level will indicate high which will then call for maximum letdown and minimum charging, therefore P-55A goes to minimum speed.**
- b. Plausible if the student believes that the diaphragm rupture will cause indication to be low.
- c. Plausible if the student correctly assumes level will fail high but that also P-55A will trip from LIC-0101B.
- d. Plausible if the student believes that the diaphragm rupture will cause indication to be low and that LIC-0101B controls Pressurizer Heaters. LIA-0102 controls Pressurizer Heaters.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 017 In-core Temperature Monitor

A4.01 - Ability to manually operate and/or monitor in the control room: Actual in-core temperatures

Tier: 2 Group: 2 RO Imp: 3.8

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBCORE_CK02.0

References: EOP-4.0 basis step 23

Question:

For accident conditions with no Primary Coolant Pumps operating, which one of the following is the preferred instrument for monitoring temperature in the Reactor core and why?

- a. Core Exit Thermocouples because they do not rely on forced flow.
 - b. Hot Leg Temperatures because they are more accurate at higher temperatures.
 - c. Core Exit Thermocouples because they are more accurate at higher temperatures.
 - d. Hot Leg Temperatures because the detectors are located directly in the flow of natural circulation.
-
-

DISTRACTER ANALYSIS

- a. **CORRECT** - since CETs are in the core they will be representative of core temperature even without forced flow.
 - b. Plausible if the student believes that hot leg temperature RTDs are closer to the core than CETs.
 - c. Plausible if the student correctly assumes CETs are the correct method for monitoring but believes that it is because they are more accurate.
 - d. Plausible if the student believes that since natural circulation is the method for heat removal that hot leg temperatures are preferred to monitor.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 033 Spent Fuel Pool Cooling

K3.03 - Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: Spent fuel temperature

Tier: 2 Group: 2 RO Imp: 3.0

Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: SFP_CK11.0

References: SOP-27, 4.1

Question:

Given the following:

- A leak develops in E-53A/B, Spent Fuel Pool Cooling Heat Exchanger
- The leak in E-53A/B is isolated
- ONP-23.4, "Loss of Spent Fuel Pool Cooling," is entered
- The Spent Fuel Pool is heating up at 3°F per hour
- Initial Spent Fuel Pool Temperature is 94°F

Assuming Spent Fuel Pool cooling is not restored, approximately how long will it take to reach the maximum allowable Spent Fuel Pool temperature per SOP-27, "Fuel Pool System?" Do not consider instrument inaccuracies or operating margin.

- a. 5 hours.
- b. 10 hours.
- c. 19 hours.
- d. 35 hours.

DISTRACTER ANALYSIS

- a. Plausible because this is the time that is calculated using the eSOMS administrative limit (110°F).
 - b. Plausible because this is the time that is calculated using the HI alarm (125°F).
 - c. **CORRECT - The max allowable temperature is 150°F. 150°F - 94°F is 56 then divide by 3°F per hour which yields approximately 18.7 hours.**
 - d. Plausible as this is the time that is arrived at by using the temperature that is used in the calculation in the ONP for loss of SFP cooling, ONP-23.4 (200°F).
-
-

Level of Knowledge: HIGH

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 041 Steam Dump/Turbine Bypass Control

K5.02 - Knowledge of the operational implications of the following concepts as they apply to the SDS: Use of steam tables for saturation temperature and pressure

Tier: 2 Group: 2 RO Imp: 2.5
Applicable 10CFR55 Section: 41.5

Palisades Learning Objective: MSS_CK11.0

References: Steam Tables (PROVIDE); DBD-1.09, 3.3.2; M-207, sheet 1

Question:

Given the following:

- The Plant tripped from full power ten minutes ago
- 386/AST, Turbine Trip Lockout Relay, did not actuate when the turbine tripped
- Both Main Steam Isolation Valves are closed
- All other equipment functioned as designed

Assuming no other Operator actions, what is the approximate PCS cold leg temperature for the above event?

- a. 535°F.
 - b. 540°F.
 - c. 545°F.
 - d. 550°F.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student believes that the Turbine Bypass valve will be controlling for this event, however, with the MSIVs closed, this is not possible.
 - b. Plausible if the student believes that the Steam Dump valves will be controlling for this event, however, since 386/AST did not actuate, this is not possible.
 - c. **CORRECT - The first set of 8 Main Steam Safety Valves will open at 1000 psia to maintain temperature in the PCS. Using steam tables this corresponds to 545°F in the S/G. PCS cold leg temperature will be approximately the same as S/G temperature.**
 - d. Plausible if the student believes that the second set of 8 Steam Relief valves will open, however, since each relief can pass ~ 4% of full steam flow, decay heat would need to be greater than 32% for these to open.
-
-

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 045 Main Turbine Generator

K4.27 - Knowledge of MT/G system design feature(s) and/or interlock(s) which provide for the following:
Calibrations of the nuclear instrumentation as flux shifts during T/G load increase (permissives and administrative holds)

Tier: 2 Group: 2 RO Imp: 2.6
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: APCO_E18.04

References: TS bases 3.3.1 pages 18, 30

Question:

During a Plant startup, GOP-5, "Power Escalation in MODE 1," requires that Reactor power be maintained between 15% and 28.5% to perform a heat balance calculation and corresponding instrument adjustments (NIs and ΔT power).

Performing the heat balance calculation above 15% power ensures _____ (1) _____ and performing the heat balance calculation below 28.5% power ensures _____ (2) _____.

- a. (1) the heat balance calculation is accurate.
(2) ASI and AXIAL OFFSET track within 1.5% at higher powers.
- b. (1) the heat balance calculation is accurate.
(2) the VHPT function meets the requirements of the safety analysis at higher powers.
- c. (1) the Thermal Margin Monitor bias is within the required adjustment range.
(2) ASI and AXIAL OFFSET track within 1.5% at higher powers.
- d. (1) the Thermal Margin Monitor bias is within the required adjustment range.
(2) the VHPT function meets the requirements of the safety analysis at higher powers.

DISTRACTER ANALYSIS

- a. Plausible because ASI is required to be operable above 25% power and proper operation of the ex-cores would ensure this.
- b. **CORRECT - performing the heat balance below 15% power will not be accurate and ensuring power is < 28.5% ensures that indicated power and heat balance power are tracking sufficiently to each other as assumed in the safety analysis.**
- c. Plausible for a combination of 'a' and 'd'.
- d. Plausible because bias data is recorded during the performance of the heat balance

Level of Knowledge: LOW

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: 072 Area Radiation Monitoring

A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ARM system controls including: Radiation levels

Tier: 2 Group: 2 RO Imp: 3.4

Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: PVT_CK09.0

References: ARP-8, window 66

Question:

Which one of the following Area Radiation Monitors will cause an automatic equipment actuation due to a valid high radiation condition?

- a. RIA-2300, Engineered Safeguards Room Monitor.
 - b. RIA-2314, Air Room Monitor.
 - c. RIA-5709, Spent Fuel Pool Criticality Monitor.
 - d. RIA-5710, Penetration and Fan Room Monitor.
-
-

DISTRACTER ANALYSIS

- a. Plausible because the ventilation to the safeguards rooms is isolated on a high rad condition but the signal comes from RIA-1810 and RIA-1811.
 - b. Plausible because there is recirculation fan associated with the air room, the student believes that a high rad alarm on RIA-2314 shuts down this fan.
 - c. Plausible because there are two ventilation systems that are associated with the SFP area and they shutdown on a high radiation condition but not from this monitor.
 - d. **CORRECT - This area monitor trips ventilation fans V-78 and V-79 upon an alarm.**
-
-

Level of Knowledge: LOW

Difficulty: 4

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: 079 Station Air

A2.01 - 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: Cross-connection with IAS

Tier: 2 Group: 2 RO Imp: 2.9
 Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: CAS_CK13.0

References: ARP-7, window 3; ONP-7.1, step 4.1.b

Question:

Given the following with the Plant operating at full power:

- C-2C, Instrument Air Compressor, is in HAND
- C-2A, Instrument Air Compressor, is in AUTO
- C-2B, Instrument Air Compressor, is out of service for maintenance
- 480 VAC Bus 11 (LCC-11) de-energizes due an overcurrent condition
- The following alarms annunciate:
 - EK-1101, "CONTAINMENT INSTR AIR LO PRESS"
 - EK-1102, "INSTRUMENT AIR LO PRESS"
 - EK-1103, "SERVICE AIR LO PRESS"

Which one of the following describes the impact on the Plant and the action that will restore Instrument Air pressure?

- a. Track Alley Sprinkler System actuates.
Manually start C-2A, Instrument Air Compressor.
- b. Track Alley Sprinkler System actuates.
Open CV-1221, Plant Air Cross-tie from Feedwater Purity Air.
- c. Cooling Tower Deluge System actuates.
Manually start C-2A, Instrument Air Compressor.
- d. Cooling Tower Deluge System actuates.
Open CV-1221, Plant Air Cross-tie from Feedwater Purity Air.

DISTRACTER ANALYSIS

- a. Plausible if the student correctly assumes the impact but believes that C-2A is powered from LCC-12.
- b. **CORRECT - Service air supplies the track alley sprinkler system and opening CV-1221 is the only option for restoring air pressure because there are no available compressors to start.**
- c. Plausible if the student believes that the Cooling Tower deluge system receives air from station air (it is bottled nitrogen) and that C-2A is powered from LCC-12.
- d. Plausible if the student believes that the Cooling Tower deluge system receives air from station air (it is bottled nitrogen).

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.1.20 - Ability to interpret and execute procedure steps

Tier: 3 Group: RO Imp: 4.6
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: TBAM_CK08.0

References: ONP-25.2

Question:

ONP-25.2, "Alternate Safe Shutdown Procedure," contains the following step:

16. **VERIFY** Bus 1C OR Bus 1D is energized.



The symbol "☀" indicates this step:

- must be performed in the Control Room.
 - must be performed locally.
 - is continuously applicable.
 - has emergency lighting provided.
-
-

DISTRACTER ANALYSIS

- Plausible distracter.
 - Plausible distracter.
 - Plausible distracter.
 - CORRECT**
-
-

Level of Knowledge: LOW**Difficulty: 2**

WRITTEN QUESTION DATA SHEET

Source of Question: MODIFIED - Palisades

K/A: G2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc.

Tier: 3 Group: RO Imp: 3.9
Applicable 10CFR55 Section: 41.4

Palisades Learning Objective: AFW_E04.01

References: SOP-12, attachment 16 (PROVIDE page 2 only)

Question:

Given the following with the Plant operating at full power:

- T-2, Condensate Storage Tank, temperature is 100°F
- T-81, Primary System Makeup Storage Tank, temperature is 80°F
- Auxiliary Feedwater (AFW) flow will be initiated to the 'B' Steam Generator only at the programmed value for an Auxiliary Feedwater Actuation Signal (AFAS)

Prior to initiation of AFW flow, Heat Balance power must be lowered to a maximum of ...

- a. 99.5%.
- b. 99.4%.
- c. 99.3%.
- d. 99.1%.

DISTRACTER ANALYSIS

- a. **CORRECT - using 100°F as AFW temperature and 165 gpm as flow rate.**
- b. Plausible if the student correctly arrives at 165 gpm but believes that power must be less than the number obtained on the graph.
- c. Plausible if the student uses 330 gpm and 100°F as AFW temperature.
- d. Plausible if the student uses 330 gpm and 80°F as AFW temperature.

Level of Knowledge: HIGH**Difficulty: 3**

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.1.45 - Ability to identify and interpret diverse indications to validate the response of another indication

Tier: 3 Group: RO Imp: 4.3
Applicable 10CFR55 Section: 41.7

Palisades Learning Objective: NI_CK13.0

References: ARP-21, window C1, A6, C4, A1

Question:

With the Plant operating at full power, NI-5, Power Range Nuclear Instrument, subchannel 'A' fails low due to a faulty amplifier (see picture below showing C-06, Reactor Protective System Panel, indications).



Which one of the following alarms is not expected for this condition?

- EK-0601A, "VARIABLE HIGH POWER LEVEL CHANNEL TRIP."
- EK-0606A, "HIGH POWER RATE CHANNEL PRE-TRIP/ASI."
- EK-0604C, "CHANNEL DEVIATION LEVEL 2 - 10%."
- EK-0601C, "TM/LO PRESSURE CHANNEL TRIP."

DISTRACTER ANALYSIS

- CORRECT** - This alarm is not expected for this condition because the summation of the two detectors will be much lower than the VHPT setpoint. The student may believe that this alarm is expected if they believe that the VHPT is calculated by adding 15% to the lower of ΔT power or NI power but the VHPT is calculated by adding 15% to the higher of the two.
- Plausible but the lower NI reading of '0' will cause the ASI calculation to alarm.
- Plausible but when NI-5 lowers it will meet the threshold for this alarm because it will be > 10% different than all the other PRNIs.
- Plausible but the ASI calculation due to the lower NI reading '0' causes the Thermal Margin Monitor to trip for the 'A' channel.

Level of Knowledge: HIGH

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: G2.2.13 - Knowledge of tagging and clearance procedures

Tier: 3 Group: RO Imp: 4.1
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: FLP-OPS-ESOMS-EN02

References: EN-OP-102, 5.2.3

Question:

Which one of the following is an example of a work activity that does not require protective tagging in accordance with EN-OP-102, "Protective and Caution Tagging?"

- a. Alignment of motors, generators, or pumps that are electrically disconnected from their remote power source.
 - b. Lifting of electrical leads that can be performed safely while energized.
 - c. Opening a fluid system that has a working pressure of 25 psig or less.
 - d. Working inside a tank that has been drained and the atmosphere deemed safe for occupancy.
-
-

DISTRACTER ANALYSIS

- a. Plausible because it seems like it may be safe but it requires tagging.
 - b. **CORRECT - this is an example from EN-OP-102 that does not require tagging.**
 - c. Plausible because it seems like it may be safe but it requires tagging.
 - d. Plausible because it seems like it may be safe but it requires tagging.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications

Tier: 3 Group: RO Imp: 3.9
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: PCS_CK20.0

References: LCO 3.4.1; LCO 3.4.9; LCO 3.1.6; Core Operating Limits Report

Question:

The Plant experiences a loss of load event from full power. The Control Room team then stabilizes power at 90%. The following parameters are observed:

- Pressurizer level is 61%
- Pressurizer pressure is 2115 psia
- All Control Rods are full out
- T_C is 541°F (all cold legs)

Which one of the following LCOs is not met due to the above conditions?

- a. LCO 3.4.9 for Pressurizer Level.
 - b. LCO 3.4.1 for PCS Cold Leg Temperature.
 - c. LCO 3.1.6 for Rod Insertion Limits.
 - d. LCO 3.4.1 for PCS Pressure.
-

DISTRACTER ANALYSIS

- a. Plausible because this is close to the PZR Level TS limit of 62.8%.
 - b. Plausible because this is close to the Cold leg TS limit of 544°F.
 - c. Plausible because student may believe that there is a SDM issue with this configuration but the rods must be inserted past a certain point to exceed this TS limit. The student misapplies this concept.
 - d. **CORRECT - LCO requires PCS pressure to be 2010 - 2100 psia.**
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions

Tier: 3 Group: RO Imp: 4.2
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: EHC_E04.01

References: SOP-8, 7.1.3.f.8

Question:

Given the following during preparations to synchronize the Turbine Generator with the Grid:

- T_{AVE} is 538°F and stable
- Reactor power is 11% and stable
- PIC-0511, Turbine Bypass Valve Controller, output is 55% and stable

Which one of the following actions must be taken to meet the requirements for synchronizing the Turbine Generator with the Grid per SOP-8, "Main Turbine and Generator Systems?"

- a. Place PIC-0511 in "MANUAL" and raise output.
- b. Place PIC-0511 in "MANUAL" and lower output.
- c. Insert Control Rods to lower T_{AVE} .
- d. Withdraw Control Rods to raise PIC-0511 output.

DISTRACTER ANALYSIS

- a. Plausible because the output must be > 60% but the TBV must be in AUTO.
- b. Plausible if the student believes that PIC-0511 output is too high.
- c. Plausible if the student believes that T_{AVE} is too high.
- d. **CORRECT - PIC-0511 must be > 60%.**

Level of Knowledge: LOW**Difficulty: 2**

WRITTEN QUESTION DATA SHEET

Source of Question: NEW

K/A: G2.3.7 - Ability to comply with radiation work permit requirements during normal or abnormal conditions

Tier: 3 Group: RO Imp: 3.5
Applicable 10CFR55 Section: 41.12

Palisades Learning Objective: RWT60

References: EN-RP-205, 3.0.15

Question:

The Plant is being cooled down in MODE 4 following a Steam Generator Tube Rupture event. An RP Technician performing a survey in the Component Cooling Water room measures a dose rate of 120 mrem/hr one-foot away from the 'B' Steam Generator Main Steam line. Which one of the following postings is required for this dose rate at this location?

- a. Radiation Area.
 - b. High Radiation Area.
 - c. Very High Radiation Area.
 - d. Locked High Radiation Area.
-
-

DISTRACTER ANALYSIS

- a. Plausible that the student believes that this meets the threshold for a radiation area 5 - 100 mr/hr.
 - b. **CORRECT - areas that are > 100 mr/hour but < 1000 mr/hour are high radiation areas.**
 - c. Plausible that the student believes this is a very high radiation area but this is > 500 rem/hr.
 - d. Plausible that the student believes that this meets the threshold for a locked high radiation area > 1 rem/hr.
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.3.13 - Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

Tier: 3 Group: RO Imp: 3.4
 Applicable 10CFR55 Section: 41.12

Palisades Learning Objective: RWT51, RWT28, RWT18

References: EN-RP-201, 5.3[3]

Question:

An Operator has been assigned to work on the Reactor head assisting the fuel handling team in preparation for refueling operations. Given the following radiation exposure history for the Operator:

- No undocumented quarters for the current year
- Lifetime exposure to date is 2.712 rem
- Annual exposure to date is 890 mrem

The Operator will not be wearing respiratory protection. The dose rate on the head is 250 mrem/hr and 20 DAC (Derived Air Concentration). How long must the Operator work on the head until reaching the Entergy routine annual administrative exposure limit?

- a. 3.7 hours.
- b. 4.1 hours.
- c. 5.4 hours.
- d. 7.0 hours.

DISTRACTER ANALYSIS

- a. **CORRECT** - 1 DAC is 2.5 mr/hour which is 50 mr/hour. Admin dose limit is 2000 which leaves 1110 mr left. $1110\text{mr}/(250 + 50)\text{mr/hr}$ is 3.7 hours.
- b. Plausible if the student correlates 1 mr/hr for each DAC which would be $1110\text{mr}/270\text{mr/hr} = 4.1$ hours.
- c. Plausible if the student uses 2500 mr as the admin limit which would be $1610\text{mr}/300\text{mr/hr} = 5.4$ hours.
- d. Plausible if the student uses 3000 mr as the admin limit which would be $2110\text{mr}/300\text{mr/hr} = 7.0$ hours.

Level of Knowledge: HIGH

Difficulty: 3

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.4.3 - Ability to identify post-accident instrumentation

Tier: 3 Group: RO Imp: 3.7

Applicable 10CFR55 Section: 41.6

Palisades Learning Objective: TBCORE_CK05.0

References: FSAR Appendix 7C

Question:

During an accident the instruments most likely to be representative of actual Plant conditions have labels with a background color of ...

- a. black.
 - b. white.
 - c. brown.
 - d. blue.
-
-

DISTRACTER ANALYSIS

- a. Plausible because there are instrument and component labels in the control room with this background color.
 - b. Plausible because there are instrument and component labels in the control room with this background color.
 - c. Plausible because there are instrument and component labels in the control room with this background color.
 - d. **CORRECT - Post accident instrumentation have labels that are blue.**
-
-

Level of Knowledge: LOW

Difficulty: 2

WRITTEN QUESTION DATA SHEET

Source of Question: BANK - Palisades

K/A: G2.4.20 - Knowledge of the operational implications of EOP warnings, cautions, and notes

Tier: 3 Group: RO Imp: 3.8
Applicable 10CFR55 Section: 41.10

Palisades Learning Objective: EDG_CK09.0

References: EOP-1.0 operator actions, caution prior to step 2

Question:

Given the following during a Loss of Offsite power event:

- EOP-1.0, "Standard Post-Trip Actions," are in progress
- Diesel Generator (D/G) 1-1 is supplying 2400 VAC Bus 1C loads
- D/G 1-1 load is 2790 kW

Which one of the following is the least amount of load that must be removed from D/G 1-1 to be below the continuous operational load limit?

- a. 100 kW.
 - b. 200 kW.
 - c. 300 kW.
 - d. 400 kW.
-
-

DISTRACTER ANALYSIS

- a. Plausible if the student confuses the continuous load limit with the two hour load limit of 2750 kW.
 - b. Plausible if the student confuses the continuous load limit with the DBA load testing minimum of 2625 kW.
 - c. **CORRECT - Continuous load limit is 2500kW. 2790-300 is 2490.**
 - d. Plausible if the student confuses the continuous load limit with the nominal full load test value of 2400 kW.
-
-

Level of Knowledge: HIGH

Difficulty: 2