OCONEE

February 2002 WRITTEN EXAM

UTILITY COMMENTS

WITH SUPPORTING DOCUMENTATION

1. 001G2.1.32 001/T2G1/T2G1//MEM 3.4/3.8/N/OC002301/C/CR
The following conditions exist:

- A reactor startup is in progress.
- Control rod groups 1 through 3 are fully withdrawn.
- Group 4 rod withdrawal is stopped at 48%
- Source range NI counts are 540 cps and slowly increasing on NI-1 and NI-2
- Start-up rate is 0.2 DPM and constant on NI-1 and NI-2
- All rod motion has been stopped

Which of the following states the appropriate actions for the conditions stated above?

A. Monitor the increasing count rate and verify power stabilizes below the point of adding heat before continuing rod withdrawal.

B. Insert group 4 control rods, verify a Shutdown Margin of more than 1% exists and inform the Reactor Engineer of plant conditions.

C. Insert groups 1 through 4 sequentially, request Chemistry to resample the RCS for boron concentration, and recalculate the ECP.

D. Trip the reactor and enter the EOP's and perform the Immediate manual Actions tab.

Reasons

A. The indications in the stem of this question show that the reactor has achieved criticality on Safety Rods. The crew is to immediately trip the reactor and enter the EOP's.

Continued power increase should not be permitted.

B. Insertion of all safety rods is required for these conditions. Insertion of only group 4 rods is not adequate.

C. The safety rods should be inserted by tripping the reactor, not sequential insertion.

D. Correct Answer: The indications in the stem of this question show that the reactor has achieved criticality on Safety Rods. The crew to immediately trip the reactor and enter the EOP's.

Reference: EP/1/A/1800/001, EOP Immediate manual Actions tab.
OP/1/A/1102/001, Controlling Procedure for Unit SU.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 3.4/3.8
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

QUESTIONS REPORT
for 2002-301 COMBINED UTILITY COMMENTS R1

1. 001G2.1.32 001

The following conditions exist:

- A reactor startup is in progress.
- Control rod groups 1 through 3 are fully withdrawn.
- Group 4 rod withdrawal is stopped at 48%
- Source range NI counts are 540 cps and slowly increasing on NI-1 and NI-2
- Start-up rate is 0.2 DPM and constant on NI-1 and NI-2
- All rod motion has been stopped for 20 seconds

Which of the following states the appropriate actions for the conditions stated above?

A. Monitor the increasing count rate and verify power stabilizes below the point of adding heat before continuing rod withdrawal.

B. Insert group 4 control rods, verify a Shutdown Margin of more than 1% exists and inform the Reactor Engineer of plant conditions.

C. Insert groups 1 through 4 to group 1 at 50% withdrawn, request Chemistry to resample the RCS for boron concentration, and calculate a SDM.

D. Trip the reactor and enter the EOP's, perform the Immediate Manual Actions tab, and transfer to Unanticipated Nuclear Power tab.

A) C

Reasons

A. The indications in the stem of this question show that the reactor has achieved criticality on Safety Rods. Continued power increase should not be permitted.

B. Insertion of all safety rods is required for these conditions. Insertion of only group 4 rods is not adequate.

C. Correct Answer: In accordance with PT/1103/15, Reactivity Balance Calculation.

D. Immediate tripping of reactor is not required. If reactor was tripped transfer to UNPP would not be performed.

Reference: EP/1/A/1800/001, EOP Immediate manual Actions tab.
OP/1/A/1102/001, Controlling Procedure for Unit SU.
PT/1103/15, Reactivity Balance Calculation

Added 20 seconds to stem to ensure reactor response not from apparent startup rate.

Changed "C" to be correct in accordance with approved procedure PT/1103/15, Reactivity Balance Calculation.

Changed "D" to be incorrect and added transfer to UNPP to add plausibility to distractor.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

2.11 If shutdown margin has been reduced with intent of going critical and Rx Startup is suspended: (This does NOT apply during ZPPT)

- Insert CRDs to Group 1 at 50%.
- Calculate shutdown margin per PT/1/A/1103/015 (Reactivity Balance Calculation).

2.12 Keff shall NOT be ≥ .99 unless CRD Safety Groups 1-4 are at their OUTLIMIT. This does NOT apply during ZPPT.

NOTE: This verifies Wide Range indication prior to reaching top of Source range indication.

2.13 NI overlap requirements may be verified by comparing Source and Wide range indications:

- Prior to exceeding 10^5 CPS on SR NIs, 2 of 4 WR NIs should be on scale by > 1.0 decade.

2.14 Do NOT exceed stable startup rate of 1 DPM.

NOTE:
- NIs are considered Non-conservative if Core Thermal Power (CTP) > NIs.
- Steady State Power Level is defined as being ± 2% of a steady power level for 4 hours.
- Power Maneuvering is defined as changing power level such that non-steady state conditions exist.

2.15 NI calibration should be checked as follows:

- Prior to initiating power changes > 5% power.
- Prior to initiating > 15% Rod Index change.
- > 15 minutes after reaching stable power level.

2.16 NIs shall be considered inoperable, if operating at steady state conditions > 15% power and NIs are ≥ 2% non-conservative for ≥ 2 hours.

- Reference- SR 3.3.1.2.

2. 001K507 001/T2G1/T2G1//C/A 3.3/4.0/N/OC002301/C/RFA
Which one of the following set of conditions will cause a regulating control rod group asymmetric runback?

Assume in all cases a 9" asymmetric fault also occurred.

A. If a group 5 rod drops, causing a group 5 in limit, and NI power is >60% or if a group 7 rod drops causing a group 6 in limit and group 6 rods are > 80% an asymmetric runback will occur.

B. If a group 6 rod drops, causing a group 6 in limit and the remainder of group 6 rods are > 80% withdrawn, an asymmetric runback will occur. The runback will stop when neutron demand and the 9" asymmetric fault clears before reaching 55%.

C. If a group 5 rod drops, causing a group 5 in limit, and NI power is >80% or if a group 6 rod drops, causing a group 6 in limit and group 6 rods are > 60% withdrawn, an asymmetric runback will occur.

D. If a group 7 rod drops causing a group 7 in limit and the remainder of group 7 rods are > 80% withdrawn, an asymmetric runback will occur. The runback will stop when neutron demand and the 9" asymmetric fault clears before reaching 55%.

A) a

Reference: Lesson Plans Vol VIII, OP-OC-IC-CRI , page 26 of 62.
EO - 9
K/A: 001K507 (3.3/4.0)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.3/4.0
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

2. 001K507 001
Which one of the following set of conditions will cause a regulating control rod group asymmetric runback?

Assume in all cases a 9" asymmetric fault also occurred.

A. If a group 5 rod drops, causing a group 5 in limit, and NI power is >60% or if a group 7 rod drops causing a group 7 in limit and group 6 rods are > 80% an asymmetric runback will occur.

B. If a group 6 rod drops, causing a group 6 in limit and the remainder of group 6 rods are > 80% withdrawn, an asymmetric runback will occur. The runback will continue to 55% even if the 9" asymmetric fault clears before reaching 55%.

C. If a group 5 rod drops, causing a group 5 in limit, and NI power is >80% or if a group 6 rod drops, causing a group 6 in limit and group 5 rods are > 60% withdrawn, an asymmetric runback will occur.

D. If a group 7 rod drops causing a group 7 in limit and the remainder of group 7 rods are > 80% withdrawn, an asymmetric runback will occur. The runback will continue to 55% even if the 9" asymmetric fault clears before reaching 55%.

A) a

Reference: Lesson Plans Vol VIII, OP-OC-IC-CRI , page 26 of 62.
EO - 9
K/A: 001K507 (3.3/4.0)
RO/SRO: BOTH
Level: C
Author: rfa

A. Initially incorrect due to wrong group in-limit. Changed group 6 inlimit to group 7 inlimit to meet logic requirements.
B. Initially correct. If group 6 rods were at 80% withdrawn, group 5 rods would be >80% and logic would be satisfied. Also, runback would stop if 9" asymmetric clears. Therefore to make this incorrect, the last sentence was changed to indicate the runback would continue.
C. Initially correct. If group 6 rods were at 60% withdrawn, group 5 rods would be >80% and logic would be satisfied. Changed to indicate group 5 rods >60% which does not meet the required rod position of >80%.
D. Initially correct for the same reasons as "B". Changed last sentence to match "B".

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.3/4.0
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

2) A "RATE SET" thumb wheel allows the Operator to set in any value from 0.0 to 9.9.

(a) If a RATE SET thumb wheel setting of less than 1% per minute is present at the time of the runback, then a minimum of 1% per minute is automatically selected by the ICS.

(b) The Operator can increase this up to 9.9% per minute but not lower than 1% per minute.

c) The Operator may stop the Asymmetric runback by selecting "HOLD" which will effectively input a "0.0" rate of change into the circuit.

d) An alternate method of interrupting the runback would be taking the Diamond to manual.

2. A Control Rod Out Inhibit is also established at 60% NI power, meaning that control rods will not withdraw in automatic if NI power is >60%.

- The NI power signal for the ICS may be selected from NI-5, 6, or 9.

a) Selecting "manual" on the Diamond will defeat the runback logic and the Out Inhibit will clear, therefore allowing manual rod withdrawal even if above 60% power.

b) Tech Specs states that when a control rod becomes inoperable (asymmetric rods apply) reactor thermal power shall be less than 60% of the maximum allowable power level for the existing reactor coolant pump combination.

1) If less than four RCPs are running, the corresponding thermal power will be above allowable Tech Spec limits on thermal power for the RCP combination.

2) The operator must reduce load manually to be less than 60% of the allowable thermal power for the existing RCP combination (for 3 RCPs this would be 60% of 75%, or about 45% thermal power.

3. Signal Generation

a) Asymmetric runback logic requires that ICS be in Auto

b) Safety Group Asymmetric runback.

1) If any Safety Group "In-limit" (green group light on the Diamond Panel) is received, a runback signal will be generated.

(a) This is fed from an API signal

(1) The lowest point of CRA travel is measured by a single reed switch for each rod in a group. The first rod to reach this last switch will cause the "in-limit" light for that group to illuminate.

(2) This would represent an actual CRA at the bottom limit of travel.

2) If any one of the four **Safety Groups** lose their group out limit on the Diamond panel **AND** an asymmetric FAULT is received, an asymmetric rod runback will occur.

(a) The Diamond outlimit (like the in-limit) is developed by the first rod in each group to reach its individual rod outlimit reed switch. This switch is located ABOVE the 100% light as indicated on the PI panel.

(b) In case the safety rod that gave the outlimit is not the rod that drops, a runback will be generated if the diamond "safety" inlimit is generated.

c) Regulating Group Asymmetric runback

1) If a group 5 rod drops, causing a group 5 in limit, and NI power > 60% along with a 9" asymmetric fault, an asymmetric runback will occur.

2) If a group 6 rod drops causing a group 6 in limit and group 5 rods are > 80% withdrawn along with a 9" asymmetric fault, an asymmetric runback will occur.

3) If a group 7 rod drops causing a group 7 in limit and group 6 rods are > 80% withdrawn along with a 9" asymmetric fault, an asymmetric runback will occur.

- The asymmetric rod runback will stop when neutron demand is 55% or if the 9" asymmetric fault clears before reaching 55% demand.

4. Runback Verification

a) Indications of proper runback due to an asymmetric rod:

1) 1SA-2 / A-11 (ICS Runback) alarm

2) Load control Panel (LCP) set indication approximately 55% CTPD Set (lower window) and CTP Demand (upper window) is decreasing to the new set.

(a) LCP is the indication that the Core Thermal Power Demand (CTPD) system of the ICS is generating proper control signal responsible for reducing the reactor, feedwater, and turbine.

3. 002K510 001/T2G2/T2G2//C/A 3.6/4.1/N/OC02301/C/CR

The initial power escalation following a refueling outage is being performed. The reactor power level is stabilized to perform testing. The following indications are available to the operator at the control board:

NI-5	26.0%
NI-6	29.0%
NI-7	26.0%
NI-8	29.0%

T-hot Loop A	588.5° F
T-hot Loop B	588.0° F
T-cold Loop A	570.0° F
T-cold Loop B	569.5° F
Tave	579.0° F

Which of the following is an accurate estimate of the thermal power level of the reactor at this point?

A. 372 MWt

B. 661 MWt

C. 738 MWt

D. 1070 MWt

A) D

Reasons:

A, B, C. Due to the change in Tcold on a power increase, the NIs will need calibrating at approximately 25% power increments. Using alternate indications, such as core delta-T is a more accurate indication of power level. A core delta-T of 18.5° F indicates a power level of approximately 42% with a corresponding thermal power level of approximately 1070 MWt.

A. If the student uses 100% power Megawatt Electric instead of Megawatt Thermal, this answer will be obtained.
(18.5° F X 1% power/.44° F X 885 MWe/% power = 372 MWe)

B. If the student uses the value of power displayed on NI 5 and NI 7, this answer will be obtained.
(.26 X 2544 MWt = 661 MWt)

C. If the student uses the highest value of power displayed on NI 6 and NI 8, this answer will be obtained.
(.29 X 2544 MWt = 738 MWt)

D. 18.5° / 44° dT = .42 x 2544 = 1069.63 = 1070

OC reference: OP/1/A/1102/001, Controlling procedure for unit SU.
OP/1/A/1102/004, Operation at power

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.6/4.1
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

3. 002K510 001

The initial power escalation following a refueling outage is being performed. The reactor power level is stabilized to perform testing. The following indications are available to the operator at the control board:

NI-5	26.0%
NI-6	29.0%
NI-7	26.0%
NI-8	29.0%

T-hot Loop A	588.5° F
T-hot Loop B	588.0° F
T-cold Loop A	570.0° F
T-cold Loop B	569.5° F
Tave	579.0° F

Generator output 320 MWe

Which of the following is an accurate estimate of the thermal power level of the reactor at this point?

SEE ATTACHMENT: Encl.13.12 (Loop deltaT vs. Rx Power)
Encl.13.13 (Gross Load vs. Rx Power)

A. 668 MWt

B. 745 MWt

C. 899 MWt

D. 1078 MWt

A) D

Reasons:

A, B, C. Due to the change in Tcold on a power increase, the NIs will need calibrating at approximately 25% power increments. Using alternate indications, such as core delta-T is a more accurate indication of power level. A core delta-T of 18.5° F indicates a power level of approximately 42% with a corresponding thermal power level of approximately 1070 MWt.

A. If the student uses the value of power displayed on NI 5 and NI 7, this answer will be obtained.
(.26 X 2568 MWt = 668 MWt)

B. If the student uses the highest value of power displayed on NI 6 and NI 8, this answer will be obtained.
(.29 X 2568 MWt = 745 MWt)

C. If the student uses use enclouse 12.13, Gross Load vs Reator Power, 320 MWe = 35% reactor power.
Thermal, this answer will be obtained.
(35% power X 2568 MWt = 898.8 = 899 MWe)

D. 18.5° on 4 RCP curve - 42% power 42% x 2568 = 1078.56 = 1079 MWt

OC reference: OP/1/A/1102/001, Controlling procedure for unit SU.
OP/1/A/1102/004, Operation at power
PT/600/01, Periodic Instrument Surveillance

Question originally written using 2544 as MWth. Changed to 2568 per ONS 100% thermal rating.

ONS operators will utilize PT/600/001, Periodic Instrument Surveillance to verify reactor power.

Added attachments encl.13.12, Loop deltaT vs. Rx Power and encl.13.13, Gross Load vs. Rx Power. Added Mwe value of 320 to stem.

A. Changed value to match 26% of 2568. 668Mth.
B. Changed value to match 29% of 2568. 745Mth.
C. Changed value to match 35% of 2568 as determined from encl. 12.13, Gross Load vs. Rx Power curve at the given Mwe value of 320. 899 Mth.
D. Changed value to match an 18.5 degreeF delta T as determined from encl.12.12, Loop deltaT vs. Rx Power curve. 1079 Mth

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.6/4.1
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

E. Alternate method for determining (%) Reactor Power

$$\frac{\text{NI-5 + NI-6 + NI-7 + NI-8}}{4} = \text{\% Rx Power (Avg)}$$

F. Hand-Calculated Thermal Power Δ T using Enclosure "Loop ΔT Vs Reactor Power".

G. Thermal Power from Rx Engineering using PT/0/A/0205/002 (Thermal Power Calculation).

NOTE: If either step 1.2 or 1.3 is **NOT** satisfied, Duty Rx Engineer should perform verification of computer calculated TPB indication prior to calibrating NIs.

1.2 Verify Thermal Power Best (TPB) within ± 2.0% Rx Power of percent power from ΔT:

1.2.1 Refer to step 1.1 for priority of indications to determine percent power from ΔT,

OR

1.2.2 Average two RC Loop ΔTs from RC Loop ΔT gauge and using Enclosure "Loop ΔT Vs Reactor Power" determine percent power from ΔT.

1.3 Verify current Gross Load does **NOT** exceed value given by Enclosure "Gross Load Vs Reactor Power" for current Rx power level. Obtain Gross Load from O1P0963 **OR** Watt/Var meter if O1P0963 is **NOT** available.

2. Review Shift Turnover Sheet every 2 Hours.

2.1 Review Enclosure "Shift Turnover Sheet" to verify all turnover items updated and all required testing/surveillance items resulting from a degraded Mode per TS performed.

3. **IF** > 90% RTP and Steady State, **AND** fouling coefficient is less than 1.0, verify every 2 Hours O1P0576 (Core Thermal Power Primary (60 min avg)) does **NOT** exceed O1P0587 (Core Thermal Power Secondary (60 min avg)) by more than 0.2% RTP (i.e., O1P0576 < O1P0587 + 0.2).

3.1 **IF** fouling coefficient is less than 1.0, **AND IF** O1P0576 (Core Thermal Power Primary (60 min avg)) exceeds O1P0587 (Core Thermal Power Secondary (60 min avg)) by more than 0.2% RTP, contact Duty Rx Engineer.

1. Verify Core Thermal Power Indication (every 2 hours when Rx critical.)

   1.1 Priority of Power Indications to Use for Surveillance (A = highest priority, G = lowest priority):

   A. OAC Calculated Thermal Power Best.

   - O1P2037 (Core Thermal Power Best (60 min avg)) - Steady State Ops. (i.e., no transient in last 60 minutes)
   - O1P0588 (Core Thermal Power Best (10 min. avg.)) - Transient in last 60 minutes or O1P2037 unavailable.
   - O1P0889 (Core Thermal Power Best (snapshot)) - Transient in progress or O1P2037 and O1P0588 unavailable.

   B. OAC Calculated Thermal Power Secondary if above ≈ 25% power.

   - O1P0587 (Core Thermal Power Secondary (60 min. avg.)) - Steady State Ops. (i.e., no transient in last 60 minutes)
   - O1P0888 (Core Thermal Power Secondary (snapshot)) - Transient within last 60 minutes or O1P0587 unavailable.

   C. OAC Calculated Thermal Power Primary if below ≈ 25% power.

   - O1P0576 (Core Thermal Power Primary (60 min. avg.)) - Steady State Ops. (i.e., no transient in last 60 minutes)
   - O1P0887 (Core Thermal Power Primary (snapshot)) - Transient within last 60 minutes, or O1P0576 unavailable.

   D. OAC Calculated Thermal Power Delta T.

   - O1P0575 (Core Ther Pwr From Delta Temp (10 min. avg.)) - Steady State Ops. (i.e., no transient in last 10 minutes)
   - O1P0326 (Core Thermal Power From Delta T (snapshot)) - Transient within last 10 minutes or O1P0575 unavailable.

Enclosure 13.6
Subcritical Multiplication (1/M) Measurement

_____13.6.7 **DETERMINE AND PLOT 1/M's WHILE WITHDRAWING RODS:**

CAUTION: The 1/M plot should only be used as an operator aid for predicting premature criticality and should not be relied upon for predicting critical rod position or as a substitution for Control Room indications.

NOTE: The same NI(s) selected for C_0 must be used consistently for the entire withdrawal sequence 1/M measurement.

While withdrawing control rods per normal operating procedures, stop at the positions indicated on TABLE 2 on Page 4 of 5 of this Enclosure (additional intermediate stops may also be performed if desired). Perform the following steps after each withdrawal:

_____A Wait approximately one minute, **AND** record the average of three stable SR count rates (C) on TABLE 2 on Page 4 of 5, waiting approximately 30 seconds between each count.

_____B Calculate 1/M(=C_0/C) and record TABLE 2 on Page 4 of 5.

_____C Determine inserted Rod Worth at the current rod position from Enclosure 13.9 **AND** record on TABLE 2 on Page 4 of 5.

_____D Plot 1/M versus Inserted Control Rod Worth.

_____E Draw a line between the last two data points. **IF** this extrapolated line intersects zero (the x-axis) before the lower limit of criticality stop further rod withdrawals and evaluate.

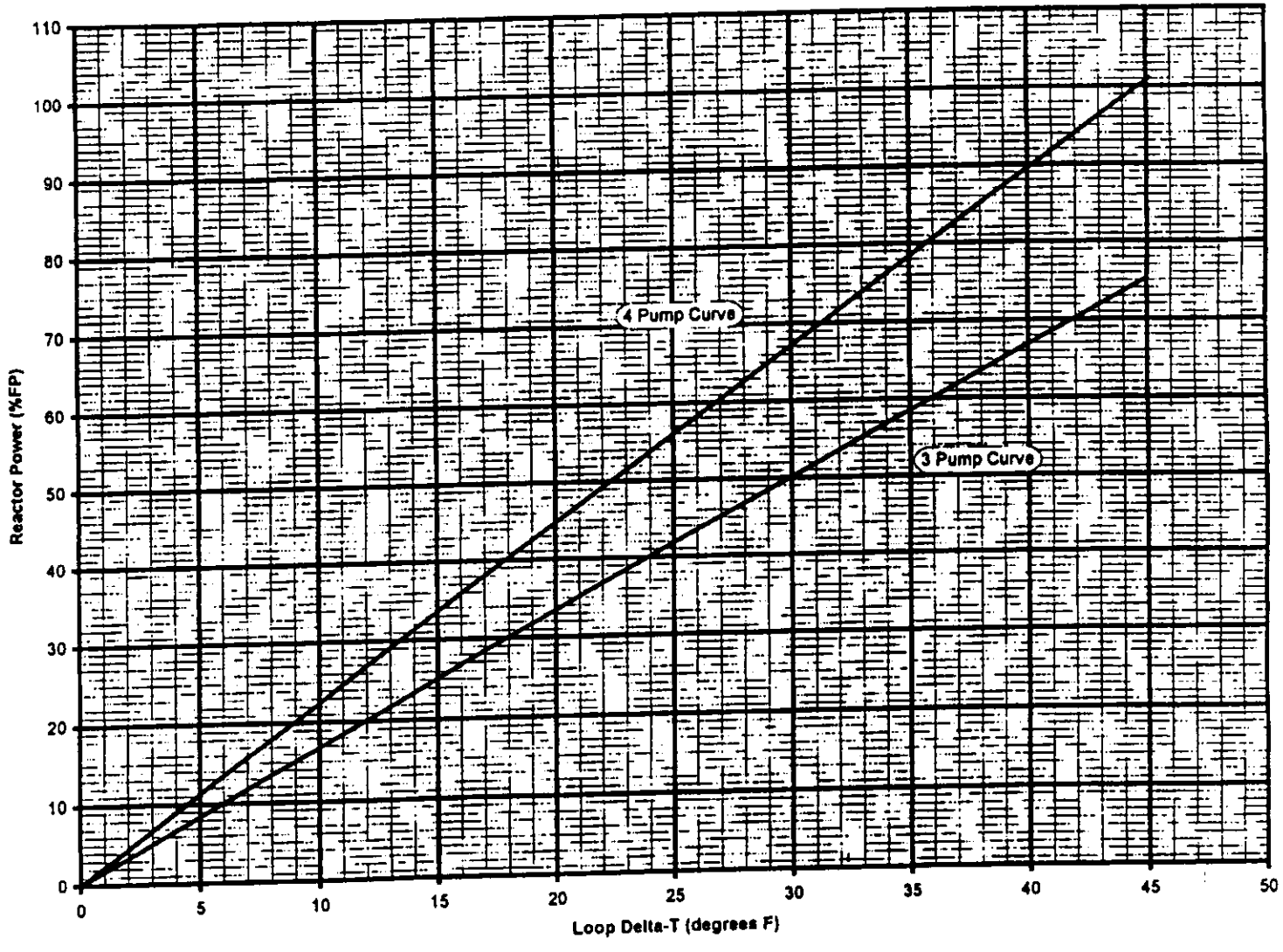
NOTE: The evaluation as required in 13.6.7.e may include further rod withdrawal to add positive reactivity equal to or less than one-half of the amount remaining to provide the predicted criticality.

_____F When any 1/M data point is plotted greater than the lower limit of criticality, the 1/M measurement may be stopped. (Note that criticality must be achieved within 0.75% ΔK/K of the ECP per Enclosure 13.3).

_____G **IF** criticality cannot be achieved within 0.75% ΔK/K of the ECP, notify the Operations Shift Manager, insert control rods to Group 1 at 50%w/d, request an immediate RCS Boron sample, **AND** notify Nuclear Engineering.

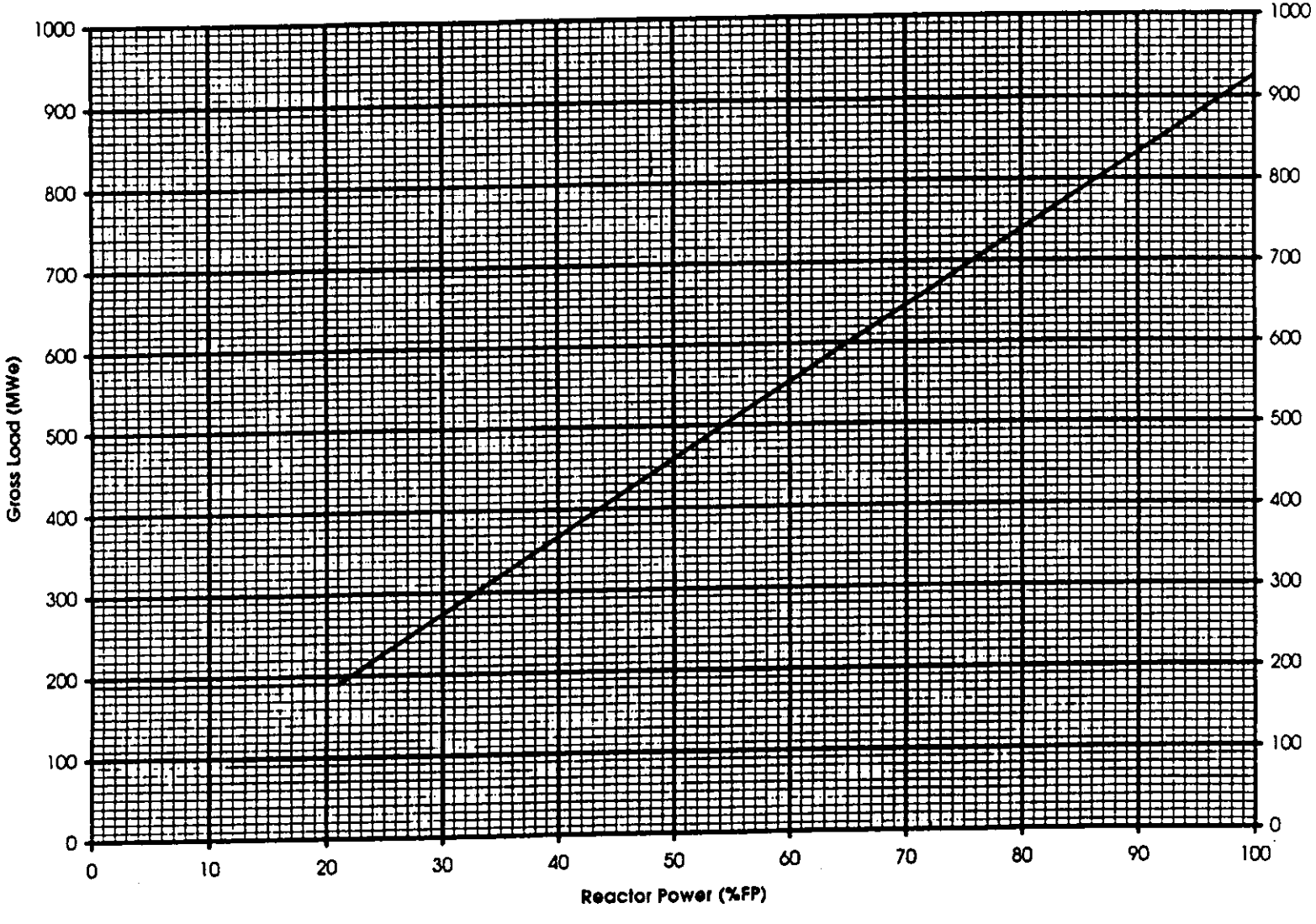
Enclosure 13.12

Unit 1 Cycle 20
Loop ΔT Vs. Reactor Power



Enclosure 13.13

Gross Load Vs. Reactor Power



4. 003AK113 001/T1G2/T1G1//C/A 3.2/3.6/N/OC002301/C/CR
Given the following plant conditions:

- Reactor is at 70% power.
- ICS Reactor Bailey and Diamond stations are in MANUAL.
- All other ICS stations are in AUTOMATIC.
- Group 5 rod 6 is dropped fully into the core.

Which of the following indicates the core power distribution concern, and the Tave parameter response?

ASSUME NO OPERATOR ACTIONS.

A. Negative Quadrant Power Tilt; Tave decreases and remains low.

B. Negative Quadrant Power Tilt; Tave decreases and returns to setpoint.

C. Positive Quadrant Power Tilt; Tave decreases and remains low.

D. Positive Quadrant Power Tilt; Tave decreases and returns to setpoint.

A/B/C. QPT will become more negative in the quadrant the rod is dropped into but the main operator limit concern is the flux shift and the positive QPT for the other 3 quadrants. Tave will return to setpoint as MFW has Tave control with the reactor in manual.

D. CORRECT; As the rod is fully dropped into the core, power distribution is changed between the quadrants. The quadrant that the rod is dropped into is poisoned and the flux decreases and shifts the flux to the other quadrants. The quadrant that contains the dropped rod will indicate a negative QPT value and the other quadrants will indicate positive. These positive quadrants are producing most of the power and is the operators main power distribution limit concern. Tave will return to setpoint as MFW has Tave control with the reactor in manual.

Reference: AOP Vol 1 of 2, AP/1/A/1700/015

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.2/3.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

4. 003AK113 001

Given the following plant conditions:

- Reactor is at 70% power.
- ICS Reactor Bailey and Diamond stations are in MANUAL.
- All other ICS stations are in AUTOMATIC.
- Group 5 rod 6 is dropped fully into the core.

Which of the following indicates the core power distribution **CONCERN**, and the Tave parameter response?

ASSUME NO OPERATOR ACTIONS

A. Negative Quadrant Power Tilt; Tave decreases and remains low.

B. Negative Quadrant Power Tilt; Tave decreases and returns to setpoint.

C. Positive Quadrant Power Tilt; Tave decreases and remains low.

D. Positive Quadrant Power Tilt; Tave decreases and returns to setpoint.

A/B/C. QPT will become more negative in the quadrant the rod is dropped into but the main operator limit concern is the flux shift and the positive QPT for the other 3 quadrants. Tave will return to setpoint as MFW has Tave control with the reactor in manual.

D. CORRECT; As the rod is fully dropped into the core, power distribution is changed between the quadrants. The quadrant that the rod is dropped into is poisoned and the flux decreases and shifts the flux to the other quadrants. The quadrant that contains the dropped rod will indicate a negative QPT value and the other quadrants will indicate positive. These positive quadrants are producing most of the power and is the operators main power distribution limit concern. Tave will return to setpoint as MFW has Tave control with the reactor in manual.

Reference: AOP Vol 1 of 2, AP/1/A/1700/015

Highlighted the word "concern". This ensures that "B" alternative is not a correct answer also. Tilt will be negative in the quadrant of the dropped rod but will not be the most restrictive tilt.

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.2/3.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

5. 004A404 001/T2G1/T2G1//C/A 3.2/3.6/N/OC002301/C/RFA
Which one of the following DW solutions is correct assuming the operator wants to lower the RCS from 1500 ppmb to 1300 ppm B. The RCS is hot and has a volume of 59860 gallons?

The operator had previously added 600 ppm B from BHUT and 500 ppm B from AHUT.

Assume DW added is at 0 ppm B.

A. 29930 gallons of DW

B. 15963 gallons of DW

C. 10884 gallons of DW

D. 9209 gallons of DW

A) d

Distractor Analysis:

V2 (DW) = V1(C1-Cf)/(Cf-C2)
If applicant adds the 600 and 500 ppm as Cf, or adds them as C2 he will arrive a,b or c.

a. 59860(1300-1100)/(1500 - 1100) = 29930
b. 59860(1500-1100)/(1500) = 15963
c. 59860(1300-1100)/(1100-0) = 10884
d. 59860(1500-1300)/(1300-0) = 9209

Reference: Lesson Plans Vol 2, OP-OC-CP-016, page 14 of 43.
EO - 5.1
K/A: 004A404 (3.2/3.6)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.2/3.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

5. 004A404 001
Which one of the following DW solutions is correct assuming the operator wants to lower the RCS from 1500 ppmb to 1300 ppm B. The RCS is hot and has a volume of 59860 gallons?

The operator has just added 500 gallons of "A" BHUT at 1700 ppmB

Assume DW added is at 0 ppmB

A. 8566 gallons of DW

B. 9209 gallons of DW

C. 9363 gallons of DW

D. 9863 gallons of DW

A) d

Distractor Analysis:

a. 8566 gal. (uses feed and bleed formula without consideration for „A" BHUT addition) - incorrect
b. 9209 gal. (uses wrong ppmB, 1300, for calculating „A" BHUT addition) - incorrect
c. 9363 gal. [(1500)(59860)+(1700)(500)+(0)(V3)=(1300)(59860+500+V3)] – correct answer
d. 9863 gal. (uses total make-up volume...without subtracting „A" BHUT volume) – incorrect

Reference: Lesson Plans Vol 2, OP-OC-CP-016, page 14 of 43.
EO - 5.1
K/A: 004A404 (3.2/3.6)
RO/SRO: Both
Level: C
Author: rfa

Not enough information to formulate answer. Either need volumes of BHUTs additions to RCS or perform as a feed & bleed calc.

Added volume and concentration of "A" Bleed.
New distractors to fit new numbers.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.2/3.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA/ONS

6. 004K105 001/T2G1/T2G1//C/A 2.7/3.2/B/OC002301/C/OC
Given the following:

1. Reactor power = 100%
2. All ICS stations in AUTOMATIC
3. RCS boron concentration = 1050 ppm
4. "1A" BHUT = 1245 ppmB
5. "1B" BHUT = <10 ppmB
6. Group 7 CRs @ 88% withdrawn
7. Group 7 CRs rod worth = -.0068%Δk/k/%
8. Differential Boron worth = -.0078%Δk/k/ppm

(ASSUME: RCS hot volume of 59860 gallons)

Which ONE of the following will be the Group 7 (% withdrawn) rod position that resulted from an addition of 1900 gallons from "1A" BHUT to the RCS?

A. 91%

B. 93%

C. 95%

D. 100%

Answer C

A. Incorrect: See calculation below
B. Incorrect: Reverses coefficient values for rods and boron.
C. Correct: (59860)(1050) + (1245)(1900) = (Cf)(61760)
RCS + A BHUT = (Cf) (RCS final volume)

Cf = 1056 ppmB
RCS boron increase from 1050 to 1056 = 6 ppmB increase

6 ppmB x .0078 = .0468%deltaK/K
.0468 / .0068 = 6.88 % rod motion (outward)

88% + 6.88% = 95%

D. Incorrect: Uses RCS final volume of 59860 in calculation.

K/A: 004K105 (2.7/3.2)
SRO - T2G1
Bank
Reference: Facility updated question bank 7 CP050105 CP050105
C/A

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 2.7/3.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

6. 004K105 001
Given the following:

- Reactor power = 100%
- All ICS stations in AUTOMATIC
- RCS boron concentration = 1050 ppm
- "1A" BHUT = 1245 ppmB
- "1B" BHUT = <10 ppmB
- Group 7 CRs @ 88% withdrawn
- Group 7 CRs rod worth = -.0068%Δk/k/%
- Differential Boron worth = -.0078%Δk/k/ppm

(ASSUME: RCS hot volume of 59860 gallons)

Which ONE of the following will be the Group 7 (% withdrawn) rod position that resulted from an addition of 1900 gallons from "1A" BHUT to the RCS?

A. 91%

B. 93%

C. 95%

D. 100%

Answer C

A. Incorrect: See calculation below
B. Incorrect: Reverses coefficient values for rods and boron.
C. Correct: (59860)(1050) + (1245)(1900) = (Cf)(61760)
RCS + A BHUT = (Cf) (RCS final volume)

Cf = 1056 ppmB
RCS boron increase from 1050 to 1056 = 6 ppmB increase

6 ppmB x .0078 = .0468%deltaK/K
.0468 / .0068 = 6.88 % rod motion (outward)

88% + 6.88% = 95%

D. Incorrect: Uses RCS final volume of 59860 in calculation.

K/A: 004K105 (2.7/3.2)
SRO - T2G1
Bank
Reference: Facility updated question bank 7 CP050105 CP050105
C/A

No changes

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 2.7/3.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

7. 005AA203 001/T1G1/T1G1//C/A 3.5/4.4/N/OC002301/C/RFA
Which one of the following group of action(s) is/are correct given the following plant conditions?

Control rod 3 in group 7 has dropped to the bottom and stuck.
Control rod 4 in group 4 has misaligned 8 inches and stuck.
ICS is in AUTO.
An ASYMM. FAULT caused the reactor to run back to 60% then it stopped.

A. Verify >/= one dropped rod and trip the reactor.

B. Verify the reactor is critical and if so then ensure all control rods are inserted to at least group 1 at 50% WD.

C. Initiate a power reduction to 55% FP.

D. Ensure ICS re-ratios feedwater to establish approximately 0 Delta Tc.

A) C

Distractor Analysis:

Distractor d is for abnormal RCP operation.
Distractors a and b are for a misaligned rod > 9 inches.

Reference: AP/1/A/1700/015, Unit 1, Vol 1 electronic ref - OX002RG , page 1 of 5.
EO - 8 and 9, LP Vol VIII, OP-OC-IC-CRI, page 8 of 62
EO - 8, LP Vol I, OP-OC-CP-018, page 3 of 22
K/A: 005AA203 (3.5.4.4)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.5/4.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

QUESTIONS REPORT
for 2002-301 COMBINED UTILITY COMMENTS R1

7

4. 005AA203 001

Which one of the following group of action(s) is/are correct given the following plant conditions?

- Control rod 3 in group 7 has dropped to the bottom and stuck.
- Control rod 4 in group 4 has misaligned 8 inches and stuck.
- ICS is in AUTO.
- An ASYMM. FAULT caused the reactor to run back to 60% then it stopped.

A. Verify greater than or equal to one dropped rod and trip the reactor.

B. Verify the reactor is critical and if so then ensure all control rods are inserted to at least group 1 at 50% WD.

C. Initiate a power reduction to 55% FP.

D. Ensure ICS re-ratios feedwater to establish approximately 0 Delta Tc.

A) C

Distractor Analysis:

Distractor d is for abnormal RCP operation.
Distractors a and b are for a misaligned rod > 9 inches.

Reference: AP/1/A/1700/015, Unit 1, Vol 1 electronic ref - OX002RG , page 1 of 5.
EO - 8 and 9, LP Vol VIII, OP-OC-IC-CRI, page 8 of 62
EO - 8, LP Vol I, OP-OC-CP-018, page 3 of 22
K/A: 005AA203 (3.5.4.4)
RO/SRO: Both
Level: C
Author: rfa

A. changed to greater than or equal to.

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.5/4.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

8. 009G2.4.24 001/T1G2/T1G2//C/A 3.3/3.7/N/OC002301/C/CR
Given the following conditions:

- Mode 2 Reactor startup in progress on Unit 2 at POAH.
- Instrument Air pressure indicates 80 psig.
- CC-8, reactor building Header Isolation for CC has failed closed causing multiple CRDs to come into alarm with temperatures above 180°F.
- The Reactor Building sump level is slowly increasing.

Which of the following is the appropriate control room operator actions.

A. Sample the Reactor Building sump to identify type of leakage.

B. Perform a controlled shutdown without exceeding maximum cooldown rates.

C. Trip the reactor coolant pumps, perform EOP Immediate manual Actions and perform a Natural Circulation Cooldown.

D. Trip the reactor and perform EOP Immediate manual Actions.

A. Sampling the sump would identify the source leakage, but the priority is the plant and the CRDM alarms.
B. Controlled S/D is time consuming and this requires a Reactor trip.
C. Tripping the RCPs would trip the reactor but this needs to be a trip and enter EOPs.
D. CORRECT:

Reference: EOPs, Immediate manual Actions tab
AP/1/A/1700/16, RCP Abnormal Procedure (Units 2 and 3 only)

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.3/3.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

8. 009G2.4.24 001
Given the following conditions:

- Mode 2 Reactor startup in progress on Unit 2 at POAH.
- Instrument Air pressure indicates 80 psig.
- CC-8, reactor building Header Isolation for CC has failed closed causing multiple CRDs to come into alarm with temperatures above 180°F.
- The Reactor Building sump level is slowly increasing.

Which of the following is the appropriate control room operator actions.

A. Sample the Reactor Building sump to identify type of leakage.

B. Perform a controlled shutdown without exceeding maximum cooldown rates.

C. Trip the reactor coolant pumps, perform EOP Immediate manual Actions and perform a Natural Circulation Cooldown.

D. Trip the reactor and perform EOP Immediate manual Actions.

A. Sampling the sump would identify the source leakage, but the priority is the plant and the CRDM alarms.
B. Controlled S/D is time consuming and this requires a Reactor trip.
C. Tripping the RCPs would trip the reactor but this needs to be a trip and enter EOPs.
D. CORRECT:

Reference: EOPs, Immediate manual Actions tab
AP/1/A/1700/16, RCP Abnormal Procedure (Units 2 and 3 only)
KA number. Should 009 (generic SB LOCA) be 008 (Component Cooling Water)?

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.3/3.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

9. 010K403 001/T2G2/T2G2//MEM3.8/4.1/N/OC002301/C/RFA
Which one of the following correctly list some of the 7 (seven) events which Oconee has made provisions to prevent a reactor vessel overpressurizarion at low temperatures?

A. HP-120 fails open, Temporary loss of DHR, All pressurizer heaters erroneously energized or failed on.

B. Inadvertent HPI initiation, Erroneous opening of a CFT discharge valve, Failure of one PORV only.

C. HP-120 fails open, Temporary loss of DHR, Failure of both PORVs.

D. Inadvertent HPI initiation, Erroneous opening of a CFT discharge valve, Both trains of LTOP are out of service.

A) A

Reference: Lesson Plans Vol 2, OP-OC-CP-017, page 8 of 28.
EO - 2
K/A: 010K403 (3.8/4.1)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM3.8/4.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

9. 010K403 001
Which one of the following correctly list some of the 7 (seven) events which Oconee has made provisions to prevent a reactor vessel overpressurizarion at low temperatures?

A. HP-120 fails open, Temporary loss of DHR, All pressurizer heaters erroneously energized or failed on.

B. Inadvertent HPI initiation, Erroneous opening of a CFT discharge valve, Failure of the PORV.

C. HP-120 fails open, Temporary loss of DHR, Failure of the PORV.

D. Inadvertent HPI initiation, Erroneous opening of a CFT discharge valve, Both trains of LTOP are out of service.

A) A

Reference: Lesson Plans Vol 2, OP-OC-CP-017, page 8 of 28.
EO - 2
K/A: 010K403 (3.8/4.1)
RO/SRO: Both
Level: M
Author: rfa

B. Changed alternative to indicate only one PORV at ONS.
C. Changed alternative to indicate only one PORV at ONS.

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM3.8/4.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

10. 011EA109 001/T1G2/T1G1//C/A 4.3/4.3/B/OC002301/C/OC
The following Core Flood Tank parameters exist:

"A" CFT
Pressure = 629 psig
Level = 13.04 ft.

"B" CFT
Pressure = 619 psig
Level = 12.06 ft.

Which ONE of the following describes the adverse effect of the CFT(s) during a large LOCA?

CFT "A" _____ / CFT "B" _____.

A. may inject nitrogen into the RCS / will dump an inadequate borated water volume.

B. will dump an inadequate volume of borated water / will dump at too low of an RCS pressure.

C. will dump borated water at too high of an RCS pressure / may inject nitrogen into the RCS.

D. will dump borated water at too low of an RCS pressure / will dump an inadequate amount of borated water.

Answer A

A. Correct - "A" CFT pressure is too high >625 psig and will cause the tank to dump too early and at a higher RCS pressure this will cause nitrogen intrusion into the RCS. "B" CFT level is too low which will cause inadequate borated volume to refill the hot spot of the core.

B. Incorrect - "A" CFT has adequate water volume at 13.04 ft. "B" CFT pressure is OK.

C. Incorrect - "A" CFT will dump at a high RCS pressure and will dump too soon due to the excessive pressure so this portion of the answer is correct. "B" CFT has adequate N2 pressure at 619 psig

D. Incorrect - "A" CFT will dump too soon and at too high of an RCS pressure not too low. "B" CFT will dump an inadequate amount because level is to low.

K/A: 011EA109 (4.3/4.3)
T1G2, T1G1
Bank
Reference: Facility updated question bank question 45 PNS051702 PNS051702

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.3/4.3
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

10. 011EA109 001

The following Core Flood Tank parameters exist:

"A" CFT
- Pressure = 629 psig
- Level = 13.04 ft.

"B" CFT
- Pressure = 619 psig
- Level = 12.06 ft.

Which ONE of the following describes the adverse effect of the CFT(s) during a large LOCA?

CFT "A" _____ / CFT "B" _____.

A. may inject nitrogen into the RCS / will dump an inadequate borated water volume.

B. will dump an inadequate volume of borated water / will dump at too low of an RCS pressure.

C. may inject nitrogen into the RCS / will dump borated water at too high of an RCS pressure

D. will dump borated water at too low of an RCS pressure / will dump an inadequate amount of borated water.

Answer A

A. Correct - "A" CFT pressure is too high >625 psig and will cause the tank to dump too early and at a higher RCS pressure this will cause nitrogen intrusion into the RCS. "B" CFT level is too low which will cause inadequate borated volume to refill the hot spot of the core.

B. Incorrect - "A" CFT has adequate water volume at 13.04 ft. "B" CFT pressure is OK.

C. Incorrect - First part is true, Second part incorrect because pressure is within procedural limit.

D. Incorrect - "A" CFT will dump too soon and at too high of an RCS pressure not too low. "B" CFT will dump an inadequate amount because level is to low.

K/A: 011EA109 (4.3/4.3)
T1G2, T1G1
Bank
Reference: Facility updated question bank question 45 PNS051702 PNS051702

C. Initially a correct answer based on CFT procedural pressure limits. Tank dumping at 629 is beyond procedural limits. Reversed parts of alternative. First part remains correct with second part being incorrect.

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.3/4.3
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each CFT isolation valve is fully open.	12 hours
SR 3.5.1.2	Verify borated water volume in each CFT is $\geq$ 1010 ft^3 and $\leq$ 1070 ft^3.	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each CFT is $\geq$ 575 psig and $\leq$ 625 psig.	12 hours
SR 3.5.1.4	Verify boron concentration in each CFT is within the limit specified in the COLR.	31 days AND ---------NOTE---------- Only required to be performed for affected CFT ---------- Once within 12 hours after each solution volume increase of $\geq$ 80 gallons that is not the result of addition from a borated water source that meets CFT boron concentration requirements.
SR 3.5.1.5	Verify power is removed from each CFT isolation valve operator.	31 days

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Core Flood Tanks (CFTs)

LCO 3.5.1 Two CFTs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with Reactor Coolant System (RCS) pressure > 800 psig.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CFT inoperable due to boron concentration not within limits.	A.1	Restore boron concentration to within limits.	72 hours
B. One CFT inoperable for reasons other than Condition A.	B.1	Restore CFT to OPERABLE status.	1 hour
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 AND C.2	Be in MODE 3. Reduce RCS pressure to ≤ 800 psig.	12 hours 18 hours
D. Two CFTs inoperable.	D.1	Enter LCO 3.0.3.	Immediately

11. 011EK202 001/T1G2/T1G1//MEM2.6/2.7/N/OC002301/C/RFA
In EP/1/A/1800/001, LOCA Cooldown, when MUST RB spray pumps be secured?

When any RB spray pump is operating...

A. **OR** RB pressure is < 3psig AND < 24 hours into the event.

B. **OR** RB pressure is < 3psig AND > 24 hours into the event.

C. **AND** RB pressure is < 3psig AND > 24 hours into the event.

D. **AND** RB pressure is < 3psig AND < 24 hours into the event.

A) D

Reference: EOPs, LOCA CD, Page 6 of 9

MEM

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM2.6/2.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

11. 011EK202 001

In EP/1/A/1800/001, LOCA Cooldown, when MUST RB spray pumps be secured?

When any RB spray pump is operating and ...

A. RB pressure is < 3psig OR < 24 hours into the event.

B. RB pressure is < 3psig OR > 24 hours into the event.

C. RB pressure is < 3psig AND > 24 hours into the event.

D. RB pressure is < 3psig AND < 24 hours into the event.

A) D

Reference: EOPs, LOCA CD, Page 6 of 9

MEM

Initially two correct answers. A & D

A. Moved "OR" between pressure and time
B. Moved "OR" between pressure and time
C. Moved "AND" to stem
D. Moved "AND" to stem

* Suggest move this to SRO only section. Not RO knowledge.

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM2.6/2.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. Dispatch an operator to SSF to perform the following: A. __ Close breaker for 1LP-103 (1XSF-F6D). B. __ Stand by in SSF Control Room for operating 1LP-103.	
21. __ **WHEN** breaker for 1LP-104 is closed, **THEN** open 1LP-104.	
22. __ Notify operator at SSF to open 1LP-103 (POST LOCA BORON DILUTE).	
23. __ **WHEN** one of the following conditions exists: __ 1LP-103 (POST LOCA BORON DILUTE) is open __ It is determined 1LP-103 **CANNOT** be opened, **THEN** verify flow through Post LOCA Boron Dilution valves by checking flow switch indication.	1. Dispatch an operator to the Equipment Room to perform the following: __ Close breaker for 1LP-105 (1XS1-F5D). __ Remove tag and close breaker for 1LP-2 (1XS1-F5C). __ Remove tag and close breaker for 1LP-1 (1XS1-F4D). 2. __ **WHEN** breakers for the following are closed: __ 1LP-105 __ 1LP-2 __ 1LP-1 **THEN** perform the following: A. __ Open 1LP-105. B. __ Open 1LP-2. C. __ Open 1LP-1.
24. __ **IAAT** <u>all</u> the following conditions exist: __ <u>Any</u> RB spray pump operating __ RB pressure < 3 psig, __ < 24 hours into event **THEN** stop <u>all</u> RB spray pumps.	

12. 012K201 001/T2G2/T2G2//C/A 3.3/3.7/N/OC002301/C/RFA
Which one of the following combinations will result in ALL CRD motors being de-energized?

A. Primary breaker "A", DC breaker D, and F contactors open. The "A" breaker de-energizes the "C" DC hold bus, and one set of SCR's to the regulating groups. The "D" breaker trip de-energizes the other set of regulating group SCRs by removing their gating POWER.

B. DC breaker, "D", and the "F" contactors open. This scheme de-energizes both DC hold buses, and both sets of regulation group SCRs by removing their gating POWER.

C. Primary breaker "B", DC breaker D, and F contactors open. The "A" breaker de-energizes the "C" DC hold bus, and one set of SCR's to the regulating groups. The "D" breaker trip de-energizes the other set of regulating group SCRs by removing their gating SUPPLIES.

D. DC breaker, "D", and the "F" contactors open. This scheme de-energizes both DC hold buses, and both sets of regulation group SCRs by removing their gating SUPPLIES.

A) A

REFERENCE REQUIRED: A one line diagram of the CRD groups power supplies.

Reference: Lesson Plans Vol VIII, OP-OC-IC-RPS , page 45 of 56.
EO - 20.2
K/A: 012K201 (3.3/3.7)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.3/3.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

12. 012K201 001
Which one of the following combinations will result in ALL CRD motors being de-energized?

SEE ATTACHMENT: CRD Power Supplies One Line Diagram

A. Primary breaker "A", DC breaker D, and F contactors open. The "A" breaker de-energizes the "C" DC hold bus, and one set of SCR's to the regulating groups. The "D" breaker trip de-energizes the other set of regulating group SCRs by removing their gating POWER.

B. DC breaker, "D", and the "F" contactors open. This scheme de-energizes both DC hold buses, and both sets of regulation group SCRs by removing their gating POWER.

C. Primary breaker "B", DC breaker D, and F contactors open. The "B" breaker de-energizes the "C" DC hold bus, and one set of SCR's to the regulating groups. The "D" breaker trip de-energizes the other set of regulating group SCRs by removing their gating SUPPLIES.

D. DC breaker, "D", and the "F" contactors open. This scheme de-energizes both DC hold buses, and both sets of regulation group SCRs by removing their gating SUPPLIES.

A) A

REFERENCE REQUIRED: A one line diagram of the CRD groups power supplies.

Reference: Lesson Plans Vol VIII, OP-OC-IC-RPS , page 45 of 56.
EO - 20.2
K/A: 012K201 (3.3/3.7)
RO/SRO: BOTH
Level: C
Author: rfa

C. Changed second sentence breaker identification from "A" to "B" to match the first part of the alternative.

Added reference to stem.

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.3/3.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

13. 012K604 001/T2G2/T2G2//MEM 3.3/3.6/N/OC02301/C/CR
Which one of the following is correct concerning the RPS "MANUAL BYPASS" interlock?

A. Takes both channels out of "MANUAL BYPASS" when the second RPS channel is placed in "MANUAL BYPASS".

B. The first RPS channel in "MANUAL BYPASS" will trip the second RPS channels Reactor Trip Module, if that channel is placed in "MANUAL BYPASS".

C. The first RPS channel in "MANUAL BYPASS" prevents placing any additional channels in "MANUAL BYPASS".

D. The reactor trips if a second RPS channel is placed in "MANUAL BYPASS".

A. Admin and electrical interlock prevent two channels in bypass at same time see (C.)
B. Admin and electrical interlock prevent two channels in bypass at same time see (C.)
C. CORRECT: this interlock will actuate a relay that will prevent any of the remaining three channels to be placed in bypass.
D. Admin and electrical interlock prevent two channels in bypass at same time see (C.)

Reference: Vol VIII, RPS

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.3/3.6
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

13. 012K604 001
Which one of the following is correct concerning the RPS "MANUAL BYPASS"?

A. Takes both channels out of "MANUAL BYPASS" when the second RPS channel is placed in "MANUAL BYPASS".

B. The first RPS channel in "MANUAL BYPASS" will trip the second RPS channels Reactor Trip Module, if that channel is placed in "MANUAL BYPASS".

C. The first RPS channel placed in "MANUAL BYPASS" administratively prevents placing any additional channels in "MANUAL BYPASS".

D. The reactor trips if a second RPS channel is placed in "MANUAL BYPASS".

A. Admin and electrical interlock prevent two channels in bypass at same time see (C.)
B. Admin and electrical interlock prevent two channels in bypass at same time see (C.)
C. CORRECT: this interlock will actuate a relay that will prevent any of the remaining three channels to be placed in bypass.
D. Admin and electrical interlock prevent two channels in bypass at same time see (C.)

Reference: Vol VIII, RPS
ONS does not have RPS Manual Bypass interlock
Question doesn't work for ONS.

Corrected "C" to make ONS correct. Took interlock out of stem.

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.3/3.6
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

h) By administrative procedure, the high flux trip set points are manually reset to approximately 4% when in S/D bypass. 4% is below the Tech Spec requirement of less than or equal to 5% when shutdown.

1) While the normal high flux trip of ≤105.5% power is not electrically bypassed it is basically nonfunctional because RPS will trip before the setpoint can be reached.

i) Resetting the high flux trip to this value prevents any significant power from being produced when performing zero power physics testing. Sufficient natural circulation flow would be available to remove up to 5% of rated power if no RCPs were operating.

2. Manual Bypass (Channel Trip Bypass)

a) A Manual Bypass key switch located in each RPS channel Cabinet (A2, B2, C2, and D2) on the Reactor Trip Module, bypasses all automatic trip functions associated with that channel. **(OC-IC-RPS-9)**

b) As will be discussed in a later section of this lesson plan, the RPS will initiate a reactor trip if two of the four RPS channels trip; this constitutes a two-out-of four logic. If the automatic trip functions of one channel are bypassed, two RPS channels are still required to actuate a reactor trip, but only three channels are left available. The trip logic with one channel in Manual Bypass becomes two-out-of three.

c) Manual Bypass is used, normally, for testing individual RPS channels while the plant is operating (so that the likelihood of inadvertent reactor trip is reduced); but it can also be used to bypass an inoperable channel due to a component failure in that channel.

d) When the Manual Bypass key switch is "OFF" the indicating light next to it will be dimly lit. If the key is turned to "Bypass", the light will turn to bright and an annunciator in the Control Room on SA-5 will sound "RP Channel A (B) (C) (D) Trip Bypass". Also, a red "Manual Bypass" light at the top of, and outside, the associated RPS cabinet will change to bright when the key switch is turned to "Bypass".

e) Only one RPS channel per unit may be legally placed in Bypass at a time; this prevents the trip logic from being reduced below a 2 out-of 3 logic:

f) Manual Bypass is administratively controlled; that is, there are no interlocks to prevent placing two channels of RPS on the same unit in Manual Bypass at the same time.

g) Only one key for all four channels is available in the Control Room for use on one unit. The Manual Bypass key switches for the Units are keyed differently.

3. Bistable - **(OC-IC-RPS-10)**

a) A bistable is an electronic device that converts two analog input signals into one digital output signal.

b) One of the two analog inputs is the parameter being monitored by the bistable, such as reactor power, RCS temperature, or RCS pressure.

c) Second analog input is the set point signal that will be compared to the first analog signal - set points, such as the 104.75% reactor power, 617°F RCS temp., and 1810 or 2345 psig RCS pressure, are thus compared with the actual values for these parameters.

d) The output of a bistable is a digital signal in the form of a voltage, generally +10v or 0 volts. In other words, the bistable acts like a switch, being either turned on or turned off.

e) Bistables are used in the RPS to:

1) Provide tripping action; that is, trip the associated RPS channel in which it is located for:

(a) High flux trip based on the number of RCPs on.

(b) High flux trip.

(c) SD Bypass High RCS Pressure trip.

(d) High RCS Press Trip.

(e) Low RCS Press Trip.

(f) Variable Low RCS Pressure Trip.

(g) High RCS Temperature Trip.

2) Bypass normal tripping functions in an RPS channel; that is, prevents a trip from occurring even though the normal trip parameter is active.

(a) Both Main FDW Pumps Tripped to Reactor Trip.

(b) Main Turbine Tripped to Reactor Trip.

f) The following indications and controls are located on the front of each bistable:

1) OUTPUT STATE light

(a) Indicates whether the bistable is tripped (turned off), or reset (turned on).

(b) If the bistable is tripped (output is 0 Volts) the OUTPUT STATE light will be bright.

14. 013A301 001/T2G1/T2G1//C/A 3.7/3.9/N/OC002301/C/RFA
Which one of the following correctly describes the operation of the LPI Trip Bistable?

A. It allows for manual bypassing when RC pressure is < 900 psig. Its output is fed through an "OR" gate to digital channels 3 & 4. Once tripped, it must be manually reset.

B. Its output is fed through an "OR" gate to digital channels 3 & 4. Once tripped, it must be manually reset. The bypass is automatically removed when RC pressure increases above 900 psig.

C. It allows for manual bypassing when RC pressure is < 550 psig. Its output is fed through an "OR" gate to digital channels 3 & 4. The bypass is automatically removed when RC pressure increases above 900 psig.

D. It will trip if RC pressure decreases below 550 psig unless bypassed. Its output is fed through an "OR" gate to digital channels 3 & 4. Once tripped, it must be manually reset.

A) D

Reference: Lesson Plans Vol VIII, OP-OC-IC-ES , page 15 of 33.
EO - 3.1
K/A: 013A301 (3.7/3.9)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.7/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

14. 013A301 001
Which one of the following correctly describes the operation of the LPI Trip Bistable?

A. It allows for manual bypassing when RC pressure is < 900 psig. Once tripped, it must be manually reset.

B. Once tripped, it must be manually reset. The bypass is automatically removed when RC pressure increases above 550 psig.

C. It allows for manual bypassing when RC pressure is < 550 psig. The bypass is automatically removed when RC pressure increases above 900 psig.

D. It will trip if RC pressure decreases below 550 psig unless bypassed. Once tripped, it must be manually reset.

A) D

Reference: Lesson Plans Vol VIII, OP-OC-IC-ES , page 15 of 33.
EO - 3.1
K/A: 013A301 (3.7/3.9)
RO/SRO: BOTH
Level: C
Author: rfa

Removed sentence concerning output to digital channels 3 & 4 because it is common to all alternatives.

B. Initially correct, the bypass will automatically reset at 900 psig. Changed pressure to 550 psig at which point the bypass bistable will not reset.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.7/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

c) LPI Trip Bistable

1) Receives input from WR RC pressure transmitter.
2) Will trip if RC pressure decreases below 550 psig unless bypassed.
3) Output is fed through an OR gate to digital channels 3 & 4.
4) Once tripped, must be manually reset.

d) LPI Inhibit Bistable

1) Allows manually bypassing the LPI trip bistable when RC pressure is < 900 psig.
2) Bypass is automatically removed when RC pressure increases above 900 psig.

e) RC Pressure Test Module

1) Used by I&E to check trip setpoints.
2) When placed in the TEST position all associated outputs go to the tripped state.

f) RB Pressure Trip Bistable

1) Receives input from RB pressure transmitter.
2) Will trip if RB pressure increases above 3 psig.
3) Output is fed to digital channels 5 & 6 and also to digitals 1, 2, 3 & 4 through OR gates.
4) Once tripped, must be manually reset.

g) RB Pressure Test Module

1) Used by I&E to check trip setpoints.
2) When placed in the TEST position all associated outputs go to the tripped state.

h) High RB Pressure Contact Buffers

NOTE: The contact Buffer Modules provide an isolating interface between input from the RB pressure switches and ESFAS.

1) Receive input from the RB pressure switches.
2) Will trip if RB pressure increases above 10 psig.
3) One provides output to digital channel 7 and the other provides output to digital channel 8.
4) Automatically reset when RB pressure decreases below 10 psig.

15. 013K101 001/T2G1/T2G1//MEM 4.2/4.2/B/OC002301/C/OC
From the group below, which ONE of the following lists of signals would **NOT** provide an initiating logic path to generate a Load Shed signal?

1. ES 1 actuation
2. MFB #1 undervoltage for 23 seconds
3. MFB #2 undervoltage for 22 seconds
4. Breakers N1 and E1 open
5. Startup and normal source undervoltage
6. STAR relay

A. 5 and 6

B. 2 and 3

C. 1, 2, and 4

D. 1, 3, and 6

Answer D

A. Incorrect - This path would satisfy the logic for load shed
B. Incorrect - This path would satisfy the logic for load shed via a MFBMP signal
C. Incorrect - This path would satisfy the logic for load shed
D. Correct - MFB #1 would be energized and the logic would not be completed.

Note:
#1 logic path - A, E
#2 logic path - A, B and D
#3 logic path - B and C

K/A: 013K101 (4.2/4.2)
T2G1, T2G1
Bank
Reference: Facility updated question bank 65 EL050501 EL050501

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 4.2/4.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

15. 013K101 001

From the group below, which ONE of the following lists of signals would **NOT** provide an initiating logic path to generate a Load Shed signal?

1. ES 1 actuation
2. MFB #1 undervoltage for 23 seconds
3. MFB #2 undervoltage for 22 seconds
4. Breakers N1 and E1 open
5. Startup and normal source undervoltage
6. STAR relay

A. 5 and 6

B. 2 and 3

C. 1, 2, and 4

D. 1, 3, and 6

Answer D

A. Incorrect - This path would satisfy the logic for load shed
B. Incorrect - This path would satisfy the logic for load shed via a MFBMP signal
C. Incorrect - This path would satisfy the logic for load shed
D. Correct - MFB #1 would be energized and the logic would not be completed.

Note:
#1 logic path - A, E
#2 logic path - A, B and D
#3 logic path - B and C

K/A: 013K101 (4.2/4.2)
T2G1, T2G1
Bank
Reference: Facility updated question bank 65 EL050501 EL050501

Question correct

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 4.2/4.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

16. 013K302 001/T2G1/T2G1//C/A 4.3/4.5/N/OC002301/C/CR
Given the following plant conditions:

The reactor is shutdown.
The "HPI BYPASS PERMIT" Stat Alarm is in.
At 1700 psig, the operator bypasses all three channels for both trains of HPI.
An RCP seal leak then develops, causing the operator to trip the affected RCP and increase the plant cooldown rate.
RCS pressure decreases to 900 psig.

Select the appropriate ES response:

A. HPI initiates on low RCS pressure due to the RCS leak.

B. The HPI "BISTABLE TRIPPED" lights are illuminated.

C. LPI initiates on low RCS pressure due to the RCS leak.

D. The LPI "BISTABLE TRIPPED" lights are illuminated.

A. HPI was bypassed and will not actuate.
B. CORRECT: The bistables will trip and light the lights, but will not actuate.
C. LPI setpoint is not actuated at this pressure
D. LPI bistables will not trip at this pressure.

Reference: Vol. VI, Bk 2of 2, RCP Abnormal Procedure

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 4.3/4.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

16. 013K302 001

Given the following plant conditions:

- The reactor is shutdown.
- The "HPI BYPASS PERMIT" Stat Alarm is in.
- At 1700 psig, the operator bypasses all three channels for both trains of HPI.
- An RCP seal leak then develops, causing the operator to trip the affected RCP and increase the plant cooldown rate.
- RCS pressure decreases to 900 psig.
- Reactor Building pressure increases to 3.4 psig

Select the appropriate ES response:

A. HPI initiates on low RCS pressure due to the RCS leak.

B. HPI initiates on high reactor building pressure.

C. LPI initiates on low RCS pressure due to the RCS leak.

D. RBS initiates on high reactor building pressure.

A. HPI was bypassed and will not actuate on RCS pressure.
B. CORRECT: HPI will actuate on high RB pressure even if bypassed.
C. LPI will actuate on high RB pressure. The low RCS pressure LPI setpoint is not actuated at this pressure
D. RBS will not trip at this pressure.

Reference: Lesson Plan, IC-ES: Page 14 and 15

KA tie in question?

ONS uses terminology "output state" for bistable light and the light is continuously lit...either dim(reset) or bright(tripped).

Added RB pressure of 3.4 psig to stem to allow changing alternatives to ES "actuation".

A. No change
B. Changed to HPI actuation on RB pressure which is correct.
C. No change
D. Changed to RB actuation to add plausibility.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 4.3/4.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

17. 014A201 001/T2G2/T2G1//MEM 2.8/3.3/N/OC002301/C/CR

Following a loss of off site power, what are the indications, if any, that Control Rod groups 1 through 7 are fully inserted?

A. The CRD panel is de-energized, there are no indications that CRD groups 1 through 7 are fully inserted.

B. All in-limit lights on the position indication panel and the diamond control panel are on.

C. Only the in-limit lights on the position indication panel are on.

D. Only the in-limit lights on the diamond control panel are on.

Reasons:

A. The CRD panel is backed up by the other unit.

B. The CRD system is de-energized, only the in-limit lights on the position indication panel would be on.

C. Correct, because only the in-limit lights on the position panel would be on.

D. The in-limit lights on the diamond control panel will be de-energized.

Reference: Vol V, OP/0/A/1105/009, Control Rod Drive System

RO Tier:	T2G2	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 2.8/3.3
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

17. 014A201 001

Following a loss of off site power, what are the indications, if any, that Control Rod groups 1 through 7 are fully inserted?

A. The CRD panel is de-energized, there are no indications that CRD groups 1 through 7 are fully inserted.

B. All in-limit lights on the position indication panel and the diamond control panel are on.

C. Only the in-limit lights on the position indication panel are on.

D. Only the in-limit lights on the diamond control panel are on.

Reasons:

B. Correct, All lights would be operable.

Reference: Vol V, OP/0/A/1105/009, Control Rod Drive System
Changed correct answer to "B".

RO Tier:	T2G2	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 2.8/3.3
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

18. 014K404 001/T2G2/T2G1//MEM2.6/2.9/N/OC002301/C/CR
Given the following plant conditions:

- A power increase is in progress.
- Group 7 rods are at 50% withdrawn
- Rod 7-4 is stuck at 47% withdrawn.
- PI panel indication is selected to RPI.

Which one of the following would indicate that rod 7-4 is NOT moving?

A. Individual control rod position indication on PI panel.

B. Individual control rod position indication on plant computer.

C. Group average indication on MCB or plant computer.

D. Individual control rod position on zone reference position panel.

Reason:

A. & B. With RPI selected neither the PI panel or plant computer will indicate actual rod position, only rod position as a function of field rotation.

C. The group average cannot determine which particular rod is not moving.

D. CORRECT: the zone reference would show all the other rods at the 50% zone reference point and rod 7-4 would not have reached the 50 % level.

Reference: Vol VIII, Control Rod Indication
AOP Vol 1, AP/1/A/1700/015
MEM

RO Tier:	T2G2	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM2.6/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

18. 014K404 001

Given the following plant conditions:

- A power increase is in progress.
- Group 7 rods are at 50% withdrawn
- Rod 7-4 is stuck at 47% withdrawn.
- PI panel indication is selected to RPI.

Which one of the following would indicate that rod 7-4 is NOT moving?

A. Individual control rod position indication on PI panel.

B. Individual control rod position indication on plant computer.

C. Control rod group average indication on plant computer.

D. Individual control rod position on zone reference indication.

Reason:

A. & B. With RPI selected neither the PI panel or plant computer will indicate actual rod position, only rod position as a function of field rotation.

C. The group average cannot determine which particular rod is not moving.

D. CORRECT: the zone reference would show all the other rods at the 50% zone reference point and rod 7-4 would not have reached the 50 % level.

Reference: Vol VIII, Control Rod Indication
AOP Vol 1, AP/1/A/1700/015
MEM

C. Deleted reference to MCB (not ONS) Added "control rod" to lengthen alternative.
D. Changed "position panel" to ONS nomenclature of "indication".

RO Tier:	T2G2	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 2.6/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

19. 015AK105 001/T1G1/T1G1//MEM 2.7/3.3/B/OC002301/C/OC
Unit 2 conditions:

INITIAL CONDITIONS:

1. Reactor power = 45%

CURRENT CONDITIONS:

1. Reactor power = 45%
2. 2B2 RCP experiences an 9% impeller degradation (instantaneously)

Which ONE of the following is the correct signal the ICS will receive for Tave input?

A. Loop A Tave

B. Loop B Tave

C. Tave is blocked to the ICS

D. An average of Loop A and B Tave

Answer D

K/A: 015AK105 (2.7/3.3)
T1G1, T1G1
Bank
Reference: Facility updated question bank question 53 IC083202 IC083202 ASYMMETRIC ROD RUNBACK LOGIC OP-OC-CRI-5.

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 2.7/3.3
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

19. 015AK105 001

Unit 2 conditions:

INITIAL CONDITIONS:
- Reactor power = 45%

CURRENT CONDITIONS:
- Reactor power = 45%
- 2B2 RCP experiences a 9% impeller degradation (instantaneously)

Which ONE of the following is the correct signal the ICS will receive for Tave input?

A. Loop A Tave

B. Loop B Tave

C. Tave is blocked to the ICS

D. An average of Loop A and B Tave

Answer D

K/A: 015AK105 (2.7/3.3)
T1G1, T1G1
Bank
Reference: Facility updated question bank question 53 IC083202 IC083202 ASYMMETRIC ROD RUNBACK LOGIC OP-OC-CRI-5.

No changes

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 2.7/3.3
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

20. 016A301 001/T2G2/T2G2//C/A 2.9/2.9/N/OC002301/C/RFA
Which one of the following statements is correct concerning the Smart Automatic Signal Selector (SASS)?

A. If PZR level #1 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #3. If level #2 is selected then the second SASS input defults to level #1. If level #3 is selected and #3 fails, SASS will automatically select PZR level 2, and the operator will have the ability to manually select PZR level #1.

B. If PZR level #3 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #1. If level #3 is selected then the second SASS input defults to level #1. If level #1 is selected and #1 fails, SASS will automatically select PZR level 3, and the operator will have the ability to manually select PZR level #2.

C. If PZR level #1 or 2 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #3. If level #2 is selected then the second SASS input defults to level #1. If level #1 is selected and #1 fails, SASS will automatically select PZR level 2.

D. If PZR level #1 or 2 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #3. If level #3 is selected then the second SASS input defults to level #1. If level #3 is selected and #3 fails, SASS will automatically select PZR level 1.

A) D

Reference: Lesson Plans Vol VIII, OP-OC-IC-RIC , page 20 of 62.
EO - 3
K/A: 016A301 (2.9/2.9)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 2.9/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

20. 016A301 001

Which one of the following statements is correct concerning the Smart Automatic Signal Selector (SASS)?

A. If PZR level #1 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #3. If level #2 is selected then the second SASS input defaults to level #1. If level #3 is selected and #3 fails, SASS will automatically select PZR level 2, and the operator will have the ability to manually select PZR level #1.

B. If PZR level #3 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #1. If level #2 is selected then the second SASS input defaults to level #1. If level #1 is selected and #1 fails, SASS will automatically select PZR level 3, and the operator will have the ability to manually select PZR level #2.

C. If PZR level #1 or 2 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #3. If level #2 is selected then the second SASS input defaults to level #1. If level #1 is selected and #1 fails, SASS will automatically select PZR level 2.

D. If PZR level #1 or 2 is selected then the SASS input will be from that selected level channel and the second SASS input will be from level #3. If level #3 is selected then the second SASS input defaults to level #1. If level #3 is selected and #3 fails, SASS will automatically select PZR level 1.

A) D

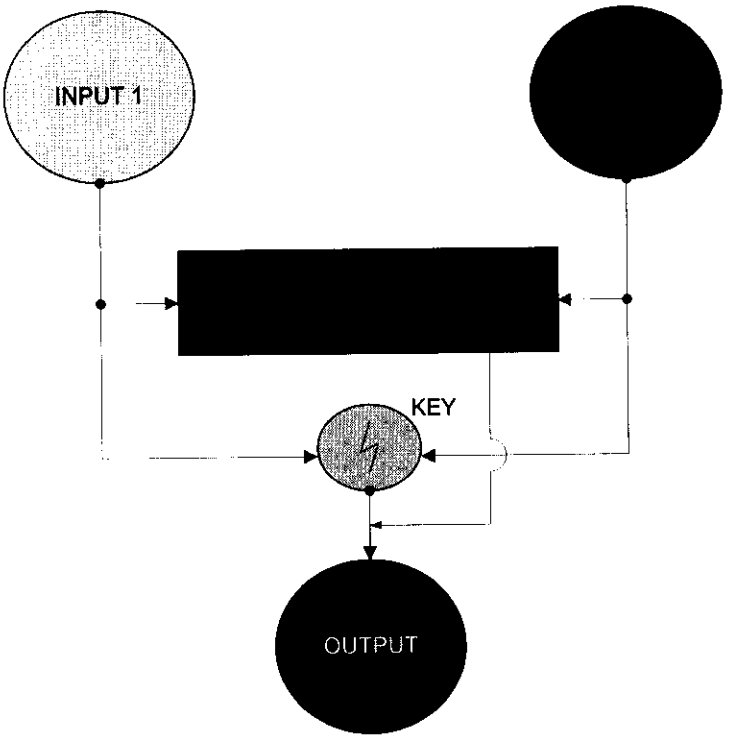
Reference: Lesson Plans Vol VIII, OP-OC-IC-RCI , page 20 of 62.
EO - 3
K/A: 016A301 (2.9/2.9)
RO/SRO: BOTH
Level: C
Author: rfa

B. Initially "A" correct answer.

Changed second sentence level from #3 to #2 to make Incorrect.

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 2.9/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

B. SASS



SMART AUTOMATIC SIGNAL SELECTOR (SASS), provides protection for selected plant parameters against instrument failure by detecting the failure then automatically selecting an operable alternate instrument. If the operator has the operable instrument selected, SASS will not select the failed instrument. The OAC provides signal mismatch alarms that will alert the operator to controlling signal problems.

1. Signals monitored by SASS
   a) OTSG A Operating Range Level channel 1 and 2
      1) Key selectable (UB1)
   b) OTSG B Operating Range Level channel 1 and 2
      1) Key selectable (UB1)
   c) Pressurizer Level 1or 2* and 3**
      1) Push-button controlled (VB1)

* If the operator has PZR level #1 or 2 selected then SASS input will be from that selected level channel and the second SASS input from level #3. If the operator has level #3 selected then the second SASS input **defaults** to level #1. Level #3 is always the second SASS input.

**If the operator has Level #3 selected and #3 fails, SASS will automatically select PZR Level #1, and the operator will have the ability to manually select PZR Level #2.

21. 022AA101 001/T1G2/T1G2//C/A3.4/3.3/M/OC002301/C/OC
The following conditions exist on Unit #1:

1. Rx Power = 100%
2. PZR level = 220"
3. LDST level = 70"
4. LDST pressure = 35 psig

Which ONE of the following MINIMUM actions should be taken?

SEE ATTACHMENT (LDST Pressure vs. Level & TS's) .

A. Declare both trains of HPI inoperable and be in mode 3 within 12 hours.

B. Declare both trains of HPI inoperable and restore at least 1 train within 72 hours.

C. Declare both trains of HPI inoperable and be in mode 3 within 12 hours AND decrease RCS pressure to < 800 psig.

D. No actions required.

Answer A

A. Correct - P/T is above and to left of curve in 1108/01. Per same encl. in 1108/01, both trains of HPI should be declared inoperable and TS 3.5.2 (BB3.5.2-6 applies)

K/A: 022AA101(3.4/3.3)
T1G2, T1G2
Bank/Modified
Reference: Facility updated question bank 4 PNS113501 PNS113501
TS 3.5.1, 3.5.2 (B3.5.2-6).

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A3.4/3.3
Source:	M	Exam:	OC002301
Test:	C	Misc:	OC

21. 022AA101 001

The following conditions exist on Unit #1:

- Rx Power = 100%
- PZR level = 220"
- LDST level = 70"
- LDST Pressure = 35 psig

Which ONE of the following MIMIMUM actions should be taken?

SEE ATTACHMENT: (LDST Pressure vs. Level & TS's)

A. Declare both trains of HPI inoperable and be in mode 3 within 12 hours.

B. Declare both trains of HPI inoperable and restore at least 1 train within 72 hours.

C. Declare both trains of HPI inoperable and be in mode 3 within 12 hours AND decrease RCS pressure to < 800 psig.

D. No actions required.

Answer A

A. Correct - P/T is above and to left of curve in 1108/01. Per same encl. in 1108/01, both trains of HPI should be declared inoperable and TS 3.5.2 (BB3.5.2-6 applies)

K/A: 022AA101(3.4/3.3)
T1G2, T1G2
Bank/Modified
Reference: Facility updated question bank 4 PNS113501 PNS113501 TS 3.5.1, 3.5.2 (B3.5.2-6).

Suggest attachments T.S. 3.0, LCO Applicability and 3.1.5, HPI

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A3.4/3.3
Source:	M	Exam:	OC002301
Test:	C	Misc:	OC

22. 022K201 001/T2G1/T2G1//C/A 3.0/3.1/N/OC02301/C/CR
An electrical fault has resulted in TC 4160 switch gear being de-energized.

Which of the following components will be unavailable as a result of this malfunction?

A. Reactor Building Cooling Unit "A"

B. CC Water Pumps "B" and "C"

C. Inverter KVID

D. The Turning Gear Oil Pump

Reasons:

A. Correct Answer: Reactor Building Cooling Unit "A" is powered from TC 4160 SG and would be lost if this component is de-energized.

B. CCW Pumps "B" and "C" are 4160V loads not powered from TC

C. Inverter KVID is not dependent on a single power supply and does not receive power from TC.

D. The Turning Gear Oil Pump is not powered from TC.

OC Reference: LP Book I of II, Vol 2, OP-OC-STG-CCW

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.0/3.1
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

22. 022K201 001
An electrical fault has resulted in 1TC 4160 switch gear being de-energized.

Which of the following components will be unavailable as a result of this malfunction?

A. Reactor Building Cooling Unit "1A"

B. 1A1 Reactor Coolant Pump

C. Inverter 1KVID

D. The unit 1 Turning Gear Oil Pump

Reasons:

A. Correct Answer: Reactor Building Cooling Unit "A" is powered from TC 4160 SG and would be lost if this component is de-energized.

B. 1A1 RCP is not powered from containment cooling fan power suppies.

C. Inverter KVID is not dependent on a single power supply and does not receive power from TC.

D. The Turning Gear Oil Pump is not powered from TC.

OC Reference: LP Book I of II, Vol 2, OP-OC-STG-CCW

Revised question to be unit specific. Added Unit 1 designation to stem and all alternatives. Suggest changing cognitive level rating to 1 (knowledge)

B. No ONS equipment labeled "CC water pump". Changed to "1A1 Reactor Coolant Pump". Updated answer explanation.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.0/3.1
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

23. 025AK301 001/T1G2/T1G2//MEM 3.1/3.4/N/OC002301/C/RFA
Which one of the following is the correct purpose/purposes for installing the LP-19 flange for RCS drainage on Unit 1?

A. Must be done only for a refueling outage; The flange is NOT required to be on prior to draining < 100 inches.

B. Must be done for every drain down prior to draining < 100 inches; Provides for a backup decay heat drop line.

C. Must be done only for a refueling outage; Provides for a backup decay heat drop line.

D. It is only required for refueling outages since other outages are considered "short term."

A) b

Reference: Lesson Plans Vol 2, OP-OC-CP-RCD, page 20 of 39.
EO - 12
K/A: 025AK301 (3.1/3.4)
G2.2.27 (2.6/3.5)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 3.1/3.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

23. 025AK301 001
Which one of the following is the correct purpose/purposes for installing the LP-19 flange for RCS drain down on Unit 1?

A. Must be done ONLY for a refueling outage; The flange is NOT required to be on prior to draining < 100 inches.

B. Must be done for every drain down prior to draining < 100 inches; Provides for a backup decay heat drop line.

C. Must be done ONLY for a refueling outage; Provides for a backup decay heat drop line.

D. It is ONLY required for refueling outages since other outages are considered "short term."

A) b

Reference: Lesson Plans Vol 2, OP-OC-CP-RCD, page 20 of 39.
EO - 12
K/A: 025AK301 (3.1/3.4)
G2.2.27 (2.6/3.5)
RO/SRO: Both
Level: M
Author: rfa

Changed stem word from "drainage" to "drain down"
Bolded and capitalized the word "only" in A, B, & D alternatives

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 3.1/3.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

24. 026G2.1.7 001/T1G1/T1G1//C/A 3.7/4.4/B/OC002301/C/OC
Unit 1 conditions:

1. Reactor power = 100%

2. IA/AIA system pressure = 90 psig and slowly decreasing

3. RED OPEN light ON for 1CC-8 on ES RZ module

4. Statalarms actuated:
   1SA-9/B1 CC CRD RETURN FLOW LOW
   1SA-9/C1 CC COMP COOLING RETURN FLOW LOW

5. CC Pump status:
   1A CC Pump switch ON - RED light OFF/GREEN light illuminated
   1B CC Pump switch AUTO - RED light OFF/GREEN light illuminated

Which ONE of the following describes the correct operator action to restore operation of the CC system at this time, if possible?

A. Dispatch an NLO to manually open 1CC-8.

B. Reopen 1CC-8 from the ES Channel 6 RZ Module.

C. Manually start the 1B CC Pump by placing the switch to ON.

D. CC cannot be restored, manually trip the reactor and all RC Pumps.

Answer C

A - Incorrect - CC-8 closes < 80 psig IA pressure. The valve is open pe rthe ES RZ module indication.
B. Incorrect - CC-8 is normally operated from the ES Channel 6 RZ Module but the valve should be open at IA pressure of 90 psig.
C. Correct - IA pressure is not low enough (>80 psig) to fail CC-8 closed so the automatic start circuitry has failed and requires the operator to manually start the standby CC pump.
D. Incorrect - This would be correct if CC-8 was failed shut and could not be manually reopened locally by an NLO and a loss of HPI seal injection occurred.

K/A: 026G2.1.7 (3.7/4.4)
T1G1, T1G1
Bank
Reference: Facility updated question bank 37 PNS021702 PNS021702

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.7/4.4
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

24. 026G2.1.7 001

Unit 1 conditions:

- Reactor power = 100%

– IA/AIA system pressure = 90 psig and slowly decreasing

– RED OPEN light ON for 1CC-8 on ES RZ module

– Statalarms actuated:
1SA-9/B1 CC CRD RETURN FLOW LOW
1SA-9/C1 CC COMP COOLING RETURN FLOW LOW

– CC Pump status:
1A CC Pump switch ON - RED light OFF/GREEN light illuminated
1B CC Pump switch AUTO - RED light OFF/GREEN light illuminated

Which ONE of the following describes the correct operator action to restore operation of the CC system at this time, if possible?

A. Dispatch an NLO to manually open 1CC-8.

B. Reopen 1CC-8 from the ES Channel 6 RZ Module.

C. Manually start the 1B CC Pump by placing the switch to ON.

D. CC cannot be restored, manually trip the reactor and all RC Pumps.

Answer C

A - Incorrect - CC-8 closes < 80 psig IA pressure. The valve is open pe rthe ES RZ module indication.
B. Incorrect - CC-8 is normally operated from the ES Channel 6 RZ Module but the valve should be open at IA pressure of 90 psig.
C. Correct - IA pressure is not low enough (>80 psig) to fail CC-8 closed so the automatic start circuitry has failed and requires the operator to manually start the standby CC pump.
D. Incorrect - This would be correct if CC-8 was failed shut and could not be manually reopened locally by an NLO and a loss of HPI seal injection occurred.

K/A: 026G2.1.7 (3.7/4.4)
T1G1, T1G1
Bank
Reference: Facility updated question bank 37 PNS021702 PNS021702

No changes

QUESTIONS REPORT

for 2002-301 COMBINED UTILITY COMMENTS R1

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.7/4.4
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

25. 027AA201 001/T1G1/T1G2//C/A 3.4/3.8/B/OC002301/C/OC
Unit 1 plant conditions:

INITIAL CONDITIONS:

1. Reactor Power = 100%
2. SASS is DEENERGIZED
3. PZR LEVEL #2 selected on UB1

CURRENT CONDITIONS:

1. PZR TEMPERATURE "A" indicates 120°F
2. PZR TEMPERATURE "B" indicates 645°F

Which ONE of the following describes the effects on the RCS makeup system and RCS volume?

	MAKEUP FLOW	ACTUAL PZR LEVEL
A.	Increases	Increases
B.	Decreases	Increases
C.	Increases	Decreases
D.	Decreases	Decreases

Answer A

A. Correct - PZR Level #2 fed by Temp compensation RTD "A" As PZR temperature compensation fails low this decreases indicated PZR level. As indicated PZR level decreases an error between indicated controlling level vs. setpoint on HP-120 controller is developed causing HP-120 to open and try
to raise level to setpoint. As HP-120 opens MAKEUP FLOW will increase causing actual PZR LEVEL RCS inventory to increase.
B. Incorrect
C. Incorrect
D. Incorrect

K/A: 027AA201 (3.4/3.8)
T1G1, T1G2
Bank
Reference: Facility updated question bank 10 IC051 IC051
NRC DB95 (IC-RCI p21-23) Objective 10,11, and 13

RO Tier:	T1G1	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

25. 027AA201 001

Unit 1 plant conditions:

INITIAL CONDITIONS:

- Reactor Power = 100%
- SASS is DEENERGIZED
- PZR LEVEL #2 selected on UB1

CURRENT CONDITIONS:

- PZR TEMPERATURE "A" indicates 120°F
- PZR TEMPERATURE "B" indicates 645°F

Which ONE of the following describes the effects on the RCS makeup system and RCS volume?

	MAKEUP FLOW	ACTUAL PZR LEVEL
A.	Increases	Increases
B.	Decreases	Increases
C.	Increases	Decreases
D.	Decreases	Decreases

Answer A

A. Correct - PZR Level #2 fed by Temp compensation RTD "A" As PZR temperature compensation fails low this decreases indicated PZR level. As indicated PZR level decreases an error between indicated controlling level vs. setpoint on HP-120 controller is developed causing HP-120 to open and try
to raise level to setpoint. As HP-120 opens MAKEUP FLOW will increase causing actual PZR LEVEL RCS inventory to increase.
B. Incorrect
C. Incorrect
D. Incorrect

K/A: 027AA201 (3.4/3.8)
T1G1, T1G2
Bank
Reference: Facility updated question bank 10 IC051 IC051
NRC DB95 (IC-RCI p21-23) Objective 10,11, and 13

No changes

QUESTIONS REPORT

for 2002-301 COMBINED UTILITY COMMENTS R1

RO Tier:	T1G1	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

26. 027AK203 001/T1G1/T1G2//C/A 2.6/2.8/B/OC002301/C/OC
Unit 3 Conditons:

1. Reactor power = 100%
2. Pressurizer (PZR) Level Instrument #1 selected for control.
3. 3HP-120 (RC Volume Control) in AUTOMATIC.
4. SASS in MANUAL

Which ONE of the following describes the Pressurizer level indication response and 3HP-120 (RC Volume Control) response following an internal failure of ICCM Train "3A"?

A. PZR level indication fails low, 3HP-120 fully opens and both PZR level High/Low statalarms actuate.

B. PZR level indication fails as is, 3HP-120 controls level as demanded by the failed instrument and the PZR level Emergency High/Low statalarm is inoperable.

C. PZR level indication swaps to Instrument #2, 3HP-120 controls level at setpoint and the PZR level Emergency High/Low statalarm remains operable.

D. PZR level indication swaps to Instrument #3, 3HP-120 controls level at setpoint and the PZR level Emergency High/Low statalarm remains operable.

Answer B

A. Incorrect - would be correct for power failure to ICCM train with SASS in automatic.

B. Correct - SASS will not detect failure as output from ICCM train has not changed

C. Incorrect - SASS selects operable Pzr level signal in opposite ICCM train.

D. Incorrect - SASS will not detect failure and will not select PZR level #3 following a ICCM Train A internal failure.

K/A: 027AK203 (2.6/2.8)
T1G1, T1G2
Bank
Reference: Facility updated question bank 32 PNS143501 PNS143501

RO Tier:	T1G1	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 2.6/2.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

26. 027AK203 001
Unit 3 Conditons:

- Reactor power = 100%
- Pressurizer (PZR) Level Instrument #1 selected for control.
- 3HP-120 (RC Volume Control) in AUTOMATIC.
- SASS in MANUAL

Which ONE of the following describes the Pressurizer level indication response and 3HP-120 (RC Volume Control) response following an internal failure of ICCM Train "3A"?

A. PZR level indication fails low, 3HP-120 fully opens and both PZR level High/Low statalarms actuate.

B. PZR level indication fails as is, 3HP-120 controls level as demanded by the failed instrument and the PZR level Emergency High/Low statalarm is inoperable.

C. PZR level indication swaps to Instrument #2, 3HP-120 controls level at setpoint and the PZR level Emergency High/Low statalarm remains operable.

D. PZR level indication swaps to Instrument #3, 3HP-120 controls level at setpoint and the PZR level Emergency High/Low statalarm remains operable.

Answer B

A. Incorrect - would be correct for power failure to ICCM train with SASS in automatic.

B. Correct - SASS will not detect failure as output from ICCM train has not changed

C. Incorrect - SASS selects operable Pzr level signal in opposite ICCM train.

D. Incorrect - SASS will not detect failure and will not select PZR level #3 following a ICCM Train A internal failure.

K/A: 027AK203 (2.6/2.8)
T1G1, T1G2
Bank
Reference: Facility updated question bank 32 PNS143501 PNS143501

No changes

RO Tier:	T1G1	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 2.6/2.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

27. 029EA207 001/T1G2/T1G1//MEM 4.2/4.3/B/OC002301/C/OC
Given the following plant conditions:

100% power

The following events occur:

Both MFW pumps trip

The following alarms are actuated:

EFW actuated
DSS channel trip
Main turbine trip
AMSAC trip

Control rod groups 5, 6, and 7 rods indicate fully inserted.

NO OPERATOR ACTIONS HAVE OCCURRED!

Which of the following describes the status of the CRD Diamond panel trip confirm light, and the breaker trip lights on the RPS cabinets?

A. Trip confirm : LIT
Breaker trip lights : DIM

B. Trip confirm : OFF
Breaker trip lights : BRIGHT

C. Trip confirm : LIT
Breaker trip lights : BRIGHT

D. Trip confirm : OFF
Breaker trip lights : DIM

A. RPS failed, no trip confirm because CRD breakers did not open, DSS tripped the groups 5,6,7 rods. NO operator actions means no manual trip

B. RPS failed, no trip confirm because CRD breakers did not open, DSS tripped the groups 5,6,7 rods. NO operator actions means no manual trip

C. RPS failed, no trip confirm because CRD breakers did not open, DSS tripped the groups 5,6,7 rods. NO operator actions means no manual trip

D. CORRECT: RPS failed therefore no breakers tripped and no trip confirm, DSS tripped the rods however, the reactor did not trip from RPS.

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.2/4.3
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

27. 029EA207 001

Given the following plant conditions:

- 100% power

The following events occur:

- Both MFW pumps trip

The following alarms are actuated:

- EFW actuated
- DSS channel trip
- Main turbine trip
- AMSAC trip

Control rod groups 5, 6, and 7 rods indicate fully inserted.

NO OPERATOR ACTIONS HAVE OCCURRED

Which of the following describes the status of the CRD Diamond panel trip confirm light, and the breaker trip lights on the RPS cabinets?

A. Trip confirm : LIT
Breaker trip lights : DIM

B. Trip confirm : OFF
Breaker trip lights : BRIGHT

C. Trip confirm : LIT
Breaker trip lights : BRIGHT

D. Trip confirm : OFF
Breaker trip lights : DIM

A. RPS failed, no trip confirm because CRD breakers did not open, DSS tripped the groups 5,6,7 rods. NO operator actions means no manual trip

B. RPS failed, no trip confirm because CRD breakers did not open, DSS tripped the groups 5,6,7 rods. NO operator actions means no manual trip

C. RPS failed, no trip confirm because CRD breakers did not open, DSS tripped the groups 5,6,7 rods. NO operator actions means no manual trip

D. CORRECT: RPS failed therefore no breakers tripped and no trip confirm, DSS tripped the rods however, the reactor did not trip from RPS.
No changes
Suggest cognitive level above knowledge
Not ONS bank?

QUESTIONS REPORT

for 2002-301 COMBINED UTILITY COMMENTS R1

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.2/4.3
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

28. 029EK312 001/T1G2/T1G1//MEM 4.4/4.7/N/OC02301/C/RFA

Which one of the following is correct if SCMs are lost during an Unanticipated Nuclear Power Production (UNPP) event?

RCPs should not be tripped until power is < or = to:

A. 5% to provide flow through the core for heat removal.

B. 5% to provide pressure control through the spray valve.

C. 1% to provide flow through the core for heat removal.

D. 1% to provide pressure control through the spray valve.

A) C

Reference: Book II of II, Vol 6, OP-OC-EAP-UNPP, page 7 of 19.
EO-4
K/A: 029EK312 (4.4/4.7)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.4/4.7
Source:	N	Exam:	OC02301
Test:	C	Misc:	RFA

28. 029EK312 001
Which one of the following is correct if SCMs equal 0°F during an ATWS event?

RCPs should not be tripped during an ATWS until power is less than or equal to:

A. 5% to provide flow through the core for heat removal.

B. 5% to provide pressure control through the spray valve.

C. 1% to provide flow through the core for heat removal.

D. 1% to provide pressure control through the spray valve.

A) C

Reference: Book II of II, Vol 6, OP-OC-EAP-UNPP, page 7 of 19.
EO-4
K/A: 029EK312 (4.4/4.7)
RO/SRO: Both
Level: M
Author: rfa
Changed stem to indicate value for SCM (=0 degrees).
Changed stem wording for "UNPP" to state "ATWS event".
Added ATWS to lower part of stem also and spelled out less than or equal to.

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.4/4.7
Source:	N	Exam:	OC02301
Test:	C	Misc:	RFA

29. 034A402 001/T2G3/T2G2//MEM 3.5/3.9/N/OC002301/C/CR

Refueling is in progress with eight (8) fuel assemblies in the core. As the ninth assembly is being placed in the core the following NI readings are observed:

- NI-1 increases from a base count of 203 to 430 cps.
- NI-4 increases from a base count of 250 to 480 cps.
- NI-2 and NI-3 are out-of-service.

Which one of the following actions, if any, should be taken by the refueling supervisor?

A. No action is required, this is an expected NI response.

B. Once the assembly is placed in the core, reactor engineering should be contacted to perform a subcritical multiplication.

C. Cease insertion of the fuel assembly and submit a sample request for boron concentration of the reactor coolant system.

D. Withdraw the fuel assembly and stop any other core alterations in progress.

Reasons:

A. An action is required, count rate has increased by more than 1.5 times. The required action for an NI increase of this type is to withdraw the fuel assembly in question, immediately cease all other core alterations, (perform a subcritical multiplication and obtain a boron analysis of the RCS).

B. The assembly should not be placed into the core.

C. The fuel assembly being inserted should be removed, not just cease insertion.

D. Correct, the fuel assembly should be removed, core alterations suspended and an engineering evaluation performed.

Reference: OP/1/A/1502/007, Step 2.13, page 4 of 6.

RO Tier:	T2G3	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.5/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

29. 034A402 001

Refueling is in progress with eight (8) fuel assemblies in the core. As the ninth assembly is being placed in the core the following NI readings are observed:

- NI-1 increases from a base count of 203 to 430 cps.
- NI-4 increases from a base count of 250 to 480 cps.
- NI-2 and NI-3 are out-of-service.

Which one of the following actions, if any, should be taken?

A. No action is required, this is an expected NI response.

B. Continue inserting assembly, reactor engineering should be contacted to perform a subcritical multiplication.

C. Cease insertion of the fuel assembly and notify the Refueling SRO to perform an evaluation.

D. Withdraw the fuel assembly, reactor engineering should be contacted to perform a subcritical multiplication.

Reasons:

A. An action is required, count rate has increased by more than 1.5 times. This is an unexpected change of Netron Flus countrate. The correct response is to suspend refueling and perform an evaluation.

B. The assembly should not be placed into the core. Refuel ing should stop.

C. Correct, The fuel movement should stop and an evaluation performed.

D. The fuel movement should stop and an evaluation performed.

Reference: OP/1/A/1502/007, Step 2.13, page 4 of 6.
No correct answer.

Removed refueling supervisor from stem to facilitate common question status
Made changes to alternatives to provide correct answer "C".
Revised answer explanations to match changes.

B. Changed first part to read "continue inserting assembly".
C. Changed to be correct answer per procedure.
D. Changed second part of alternative to match second part of "B" alternative to balance question.

RO Tier:	T2G3	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.5/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

2.9 The reactor coolant water temperature will be maintained 70°F-140°F at the LPI Pump suction. The temperature shall be recorded on Enclosure "Water Sample Data Sheet".

2.10 Maintain SF Pool level and temperature as follows: {2}

2.10.1 Maximum level < +.7 feet, to prevent flooding of electrical outlets in Fuel Transfer Canal.

Minimum level > -1.0 feet, to maintain adequate shielding for fuel movement. **IF** minimum level is **NOT** met, notify fuel handlers to suspend all fuel handling operations and lower any raised fuel assemblies into a suitable storage location. Fuel movement cannot resume until reason for level decrease has been determined and level is returned to > -1.0 feet in SFP.

2.11 Fuel Transfer Canal level should be maintained ≥ 21.34 feet per placard on FTC wall during core alterations **OR** movement of irradiated fuel assemblies inside containment per TS 3.9.6.

2.12 Fuel Transfer Canal, Spent Fuel Pool, and Low Pressure Injection System boron concentration shall be maintained per TS 3.9.1 as follows:

2.12.1 Boron concentration within the range of 2250-2950 ppm. Water sampling shall be in accordance with the guidelines of Enclosure "Water Sample Data Sheet". **IF** boron concentration goes outside the specified range of 2250-2950 ppm, then refer to TS 3.9.1 **AND** take actions per OP/1&2/A/1104/006 (Spent Fuel Cooling System) to return to the required range. After initiating boron concentration correction, determine and correct the cause of boron variation.

2.12.2 **IF** SFP boron concentration goes outside the range of 2250-2950 ppm, all fuel handling operations shall be suspended as follows: {4}

- Any fuel or component handling operations in progress shall be terminated by lowering the fuel assembly or component in a safe location within the Spent Fuel Pool, per Nuclear Engineering instructions,

AND

- No fuel operations should be started which involve fuel or fuel component movement.

2.13 **IF** an unexpected increase or decrease in count rate occurs on the Neutron Flux Monitors, refueling will be suspended until the cause has been determined, a satisfactory evaluation made, and appropriate action taken.

30. 035K501 001/T2G2/T2G2//MEM 3.4/3.9/N/OC02301/C/CR
Which one of the following states when the potential reactivity effects of a steam line break, with the ICS in manual are most severe and why?

A. Beginning of core life because this results in the maximum negative reactivity addition.

B. Beginning of core life because this results in the maximum positive reactivity addition.

C. End of core life because this results in the maximum negative reactivity addition.

D. End of core life because this results in the maximum positive reactivity addition.

A) D

Reasons:

As the core ages MTC becomes increasingly more negative. A steam line break results in a cooldown of the RCS and MTC adds positive reactivity as this occurs. Because MTC has a larger negative value as the core ages, the effect of the steam line break gets greater also.

Reference: Vol VII, Plant Transient Response
Vol III, Bk 2 of 2, OTSG

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.4/3.9
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

30. 035K501 001
Which one of the following states when the potential reactivity effects of a steam line break, with the ICS in manual are most severe and why?

A. Beginning of core life because this results in the maximum negative reactivity addition.

B. Beginning of core life because this results in the maximum positive reactivity addition.

C. End of core life because this results in the maximum negative reactivity addition.

D. End of core life because this results in the maximum positive reactivity addition.

A) D

Reasons:

As the core ages MTC becomes increasingly more negative. A steam line break results in a cooldown of the RCS and MTC adds positive reactivity as this occurs. Because MTC has a larger negative value as the core ages, the effect of the steam line break gets greater also.

Reference: Vol VII, Plant Transient Response
Vol III, Bk 2 of 2, OTSG

No changes

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.4/3.9
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

31. 039A302 001/T2G2/T2G2//C/A3.1/3.5/N/OC002301/C/RFA
Which one of the following set of consequences will happen if the Moore controllers for MS-112/173, Second Stage Reheater (SSRH) Control, lose power?

A. MS-112/173 will go to the closed position and upon regaining of power will re-open if power is >/= 75%. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal but will not open until power is >/= to 75%. MS-77, 78, 80, 81 will close if in automatic and power is </= to 1% when power is restored to MS-112/173.

B. MS-112/173 will go to the closed position. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal AND will open in automatic if turbine load is >/= to 1%. MS-77, 78, 80, 81 will remain open if power is >/= to 75% when power is restored to MS-112/173.

C. MS-112/173 will go to the closed position AND remain closed even if power is restored. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal AND will open in automatic if turbine load is >/= to 75%. MS-77, 78, 80, 81 will remain open if power is >/= to 75% when power is restored to MS-112/173.

D. MS-112/173 will go to the closed position and upon regaining of power will re-open if power is >/= 1%. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal AND will open in automatic if turbine load is >/= to 1%. MS-77, 78, 80, 81 will remain open if power is >/= to 75% when power is restored to MS-112/173.

A) b

Reference: Lesson Plans Book II of II, Vol III, OP-OC-STG-MSR , page 17 of 33.
EO - 10
K/A: 039A302 (3.1/3.5)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A3.1/3.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

31. 039A302 001

Which one of the following set of consequences will happen if the Moore controllers for MS-112/173, Second Stage Reheater (SSRH) Control, lose power?

A. MS-112/173 will go to the closed position and upon regaining of power will re-open if power is ³ 75%. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal but will not open until power is ³ 75%. MS-77, 78, 80, 81 will close if in automatic and power is £ 1% when power is restored to MS-112/173.

B. MS-112/173 will go to the closed position. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal AND will open in automatic if turbine load is ³ 1%. MS-77, 78, 80, 81 will remain open if power is ³ 75% when power is restored to MS-112/173.

C. MS-112/173 will go to the closed position AND remain closed even if power is restored. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal AND will open in automatic if turbine load is ³ 75%. MS-77, 78, 80, 81 will remain open if power is < 75% when power is restored to MS-112/173.

D. MS-112/173 will go to the closed position and upon regaining of power will re-open if power is ³ 1%. MS-77, 78, 80, 81 (MS to MSRH) will receive an open signal AND will open in automatic if turbine load is ³ 1%. MS-77, 78, 80, 81 will remain open if power is < 75% when power is restored to MS-112/173.

A) b

Reference: Lesson Plans Book II of II, Vol III, OP-OC-STG-MSR , page 17 of 33.
EO - 10
K/A: 039A302 (3.1/3.5)
RO/SRO: BOTH
Level: C
Author: rfa

B & C are correct

Added < 75% to "C" to make "C" incorrect.
Added < 75% to "D" for balance.

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A3.1/3.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

039#302

B. **MS-77,78,80,81 (MS to MSRH) controls**

1. When the turbine hot reheat pressure reaches ≈117#, the second stage pressure based on Ramp control of MS-112,173 (SSRH Control) should be at 900#. This typically occurs at ≈ 72% full load. Above this load MS-112,173 are not capable of passing sufficient flow to maintain SSRH pressure. When the setpoint signal to MS-112,173 (SSRH Control) from their Moore controllers gets to ≥ 920 psig, a relay is de-energized from the Moore controller circuit that opens MS-77,78,80,81 (MS to MSRH) if they are in automatic to provide an additional flow path around MS-112,173 (SSRH Control) of steam to meet the requirements to continue to 100% load.
2. The Moore controllers are programmed to have a dead band such that these valves will not start cycling if the unit is maintained at the same load where MS-77,78,80,81 (MS to MSRH) opened.

C. **Loss of power to Moore Controllers**:

1. Upon loss of power to the Moore controllers for MS-112/173 (SSRH Control), the following will happen:
   a) MS-112/173 (SSRH Control) will go to the 'closed' position and upon regaining of power will remain 'closed' in manual.
   b) MS-77,78,80,81 (MS to MSRH) will:
      1) Receive an 'open' signal upon loss of power to MS-112/173 (SSRH Control) controllers and will 'open' if the switches are in automatic and turbine load is ≥1% power.
      2) Upon regaining of power to MS-112/173 (SSRH Control), controllers MS-77,78,80,81 (MS to MSRH) will:
         (a) If power is <75%, these valves will go 'closed' if in automatic.
         (b) If power is ≥75%, then these valves will 'open' or remain 'open'.

D. **First Stage Reheater Drain Systems**

1. Each pair of moisture separator/reheaters drains into an identical first stage reheater drain system. These drain systems are similar in general principles to the moisture separator drain systems in that two FSRHs share one drain tank.
2. The first stage reheater drains leave via a single nozzle on the reheater drain header.

32. 040AK302 001/T1G1/T1G1//C/A 4.4/4.4/N/OC002301/C/RFA
Which one of the following will result if the MSLB isolation circuit is disabled.

A. Will allow the TDEFDWP to start if in AUTO "AND" an auto start signal exist.

B. Will allow the TDEFDWP to start if in AUTO provided both main feedwater flowpaths are isolated with main feed pumps off "AND" an auto start signal exist.

C. Will prevent operaton of the TDEFDWP, unless operating in AUTO.

D. Will allow the TDEFDWP to start if in AUTO provided both main feedwater flowpaths are isolated with main feed pumps off "OR" an auto start signal exist.

A) A

Reference: Book II of II, Vol 6, OP-OC-EAP-HPICD, page 13 of 36.
EO-4
K/A: 040AK302 (4.4/4.4) [assuming AFW initiation is synonymous with ESFAS initiation]
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.4/4.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

32. 040AK302 001
Unit 2 plant conditions:

- ONE train of MSLB isolation circuit is disabled
- 2A Main Steam line break occurs

Which one of the following is correct?

A. The TDEFDWP will start if in AUTO.

B. The FDW Control Valves will close if in MANUAL.

C. The FDW Control Valves will fail "as is".

D. MSLB circuitry will NOT trip the Main FDW Pumps.

A) B

Reference: Book II of II, Vol 6, OP-OC-EAP-HPICD, page 13 of 36.
EO-4
K/A: 040AK302 (4.4/4.4) [assuming AFW initiation is synonymous with ESFAS initiation]
RO/SRO: Both
Level: C
Author: rfa

Initially A,B, & D correct

Reworded question to make only "B" correct.

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.4/4.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

FF. At ~70% CTP, start third HWP.

2.8 ES Functions

A. Main Feedwater serves no direct ES function, but does penetrate Reactor Bldg. Containment.

1. Both Main FDW lines penetrate containment in the East Penetration Room. These penetrations are isolated in the event of FDW line rupture by check valves (FDW-37 and 46) located in the East Penetration Room. FDW-37 and 46 serve as containment isolation valves.

2. FDW lines that penetrate the containment for purposes of SG wet layup recirc and/or SG water sampling are isolated on ES actuation by ES Channels 1 and 2 (FDW-103, 104, 105, 106, 107, and 108).

2.9 CBP Feed - Though no ES functions are served, FDW is important in the initial phases of plant cooldown and heatup until SG pressure is below 550 psig. (At this point CBP's are able to supply the SGs because of the lower discharge head required).

2.10 High Energy Lines - Feedwater lines located in confined spaces (i.e., penetration rooms) are isolated from normally occupied working spaces by high energy line doors due to high energies capable of being released should a FDW line rupture occur in one of these confined areas.

2.11 Main Steam Line Break Detection/Isolation System

A. Purpose: In the event of a Main Steam line (FDW line) rupture, limit RCS overcooling and prevent the RB design pressure (59 psig) from being exceeded. Recent analysis determined that without operator action, RB design pressure would be exceeded for a MSLB inside containment. Based on this analysis, the MSLB Detection/Isolation System was implemented to reduce operator burden in responding to a MSLB.

B. A recent modification was installed to add a safety related detection and isolation circuitry that upon detecting a Main Steam Line Break (MSLB) will complete the following:

1. Trip <u>both</u> Main FDWP's.

2. Inhibit auto-start or initiate an auto-stop (trip) of the TDEFWP (if switch is in AUTO).

3. Close the FDW Main and Startup Block valves.

a) FDW-31, 33, 40, and 42

b) The valves must be in AUTO for system to operate.

4. Close the FDW Main and Startup Control valves.
   a) FDW-32, 35, 41, and 44
   b) The valves can be in AUTO or MANUAL for system to operate.
      1) The FDW Control valves are pneumatically controlled valves and will close as long as control air is supplied to the valves.
      2) If Instrument Air is lost the FDW Control valves will fail "as is", this is acceptable for two reasons:
         (a) The FDW Block valves, Main and Startup, can CLOSE to isolate the SG's.
         (b) Unit operation cannot be maintained if the control function is lost to the Main FDW system, this requires an operator manual reactor trip.
         (c) If the FDW Block valves, Main and Startup, are closed the RB design pressure will not be exceeded.

C. The MSLB Detection and Isolation system is designed with two (2) independent trains that use a 2 out of 3 logic (one for each steam header) for system actuation. Either train that is actuated will isolate all Feedwater sources (excluding the MDEFDWP's and FDW-315 and 316) to both SG's.
   1. Actuation setpoint is 550 psig on two (2) out of three (3) pressure transmitters on either steam line.

      On Units 2 and 3, NSMs have been implemented to provide trip/ capability for each of the 6 analog detection channels associated with each isolation digital channels (Train A and B). Key switches for each analog channel are located in SG Level Control cabinets in the units' cable rooms. If one of the analog channels becomes inoperable, PT/0600/001 has guidance for tripping the channel (to satisfy TS requirements). Only one key is available for each digital channel (only one analog channel can be tripped at a time) and key cannot be removed unless switch in the OPERATE position. Bypass switches were also provided to allow for testing of the analog channels. Unit 1 will receive the same mod during the next refueling outage.
   2. The pressure signal requires two (2) seconds to seal-in.
      a) The 2 second time delay prevents instantaneous (erroneous) signal from unnecessarily isolating FDW from the SG's.

33. 055EA202 001/T1G1/T1G1//C/A 4.4/4.6/N/OC002301/C/RFA
Which one of the following set of RCS parameters is correct if the operator is maintaining RCS P/T stable as MS pressure decreases during a Station Blackout?

RCS Temperature will ____ as decay heat load decreases over time following the initiating event. To combat this, the operator would ____ on either the TBVs or ADVs.

A. remains the same; throttle close

B. remains the same; throttle open

C. decrease; throttle open

D. decrease; throttle close

A) D

Distractor analysis:

If the operator is maintaining RCS P/T stable, as MS pressure decreases, RCS temperature would attempt to ***decrease***. This would begin to occur as decay heat load decreased over time following the initiating event. To combat this the operator would ***close down*** on either TBVs or ADVs (depending on which was being used). Once the Pressure Control Valves were fully closed, additional decreases in decay heat load would result in a decreasing MS pressure and decreasing RCS temperature and pressure. Once this condition is reached it becomes necessary to throttle EFDW flow to the SG's to control RCS temperature. This will likely result in a decrease in SG levels as well.

Reference: Book II of II, Vol 6, OP-OC-EAP-BO, page 8 of 50.
EO-4
K/A: 055EA202 (4.4/4.6)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.4/4.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

33. 055EA202 001

Which one of the following set of RCS parameters is correct if the operator is maintaining RCS P/T stable as MS pressure decreases during a Station Blackout?

RCS Temperature will ____ as decay heat load decreases over time following the initiating event. To combat this, the operator would ____ on either the TBVs or ADVs.

A. remain the same; throttle close

B. remain the same; throttle open

C. decrease; throttle open

D. decrease; throttle close

A) D

Distractor analysis:

If the operator is maintaining RCS P/T stable, as MS pressure decreases, RCS temperature would attempt to ***decrease***. This would begin to occur as decay heat load decreased over time following the initiating event. To combat this the operator would ***close down*** on either TBVs or ADVs (depending on which was being used). Once the Pressure Control Valves were fully closed, additional decreases in decay heat load would result in a decreasing MS pressure and decreasing RCS temperature and pressure. Once this condition is reached it becomes necessary to throttle EFDW flow to the SG's to control RCS temperature. This will likely result in a decrease in SG levels as well.

Reference: Book II of II, Vol 6, OP-OC-EAP-BO, page 8 of 50.
EO-4
K/A: 055EA202 (4.4/4.6)
RO/SRO: Both
Level: C
Author: rfa

No changes

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.4/4.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

34. 056K419 001/T2G1/T2G1//MEM 1.9/1.9/N/OC002301/C/RFA
Which one of the following trip the condensate booster pump?

A. FDWP suction pressure drops to <or = 360 psig and the associated FDWP suction valve is open.

B. FDWPT bearing oil pressure < 4 psig AND the associated FDWP suction valve is open AND CBP suction pressure is 16 psig for > 30 seconds.

C. A CBP suction or discharge valve is moved from full open position to 50%.

D. The discharge header pressure on both MFDWPs is < 770 psig.

A) C

Reference: Lesson Plans Vol X, OP-OC-CF-C , page 36 of 58.
EO - 24
K/A:056K419 (1.9/1.9)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 1.9/1.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

34. 056K419 001
Which one of the following trip the condensate booster pump?

A. FDWP suction pressure drops to = 360 psig and the associated FDWP suction valve is open.

B. FDWPT bearing oil pressure < 4 psig AND the associated FDWP discharge valve is open.

C. A CBP suction or discharge valve is moved from full open position to 50%.

D. The discharge header pressure on both MFDWPs is < 770 psig.

A) C

Reference: Lesson Plans Vol X, OP-OC-CF-C , page 36 of 58.
EO - 24
K/A:056K419 (1.9/1.9)
RO/SRO: BOTH
Level: M
Author: rfa

B & C correct. CBP will trip if 16 psig for >30 sec.
B. Deleted last part concerning CBP suction pressure, and changed "suction" to "discharge" in second part.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 1.9/1.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

e) Each CBP is provided with the following local indications:

1) Pump suction and discharge pressure gauges.

2) Pump bearing oil header pressure gauge.

3) Oil reservoir level sightglass and temperature gauge.

4) Oil cooler RCW flow gauge.

11. Automatic Trips

a) Like the HWPs, the CBPs will trip to prevent windmilling a FDWPT if the turbine does not have proper lubrication supplied.

CBPs trip will occur if there is a simultaneous:

1) FDWPT bearing oil pressure < 4 psig and

2) Associated FDWP suction valve open and

3) The discharge header pressure on both MFDWP's is < 770 psig (indicating that a FDWP is not running).

b) If a CBP suction or discharge valve is moved from full open position to 50% (+/- 25%).

c) Load shed signal.

d) The CBP's will trip on low CBP suction pressure of 16 psig if the low pressure condition is maintained for > 30 seconds.

1) The time delay allows for upsets that would otherwise be recoverable to clear before initiating a trip.

2) A minor modification completed in 1995 requires that the low CBP suction pressure of 16 psig be sensed on two out of three pressure switches before the pump will trip. This modification will prevent spurious CBP trips and subsequent reactor trips due to failed pressure switches.

3) On 3/16/96, Unit 3 tripped from 100% power due to a trip of all three CBPs on low suction pressure (PIP 3-O96-05321, 0532, 0559).

(a) During performance of a Switchyard Isolation Test, the loads off of 4160V switchgear 3TE were unexpectedly lost when an out of tolerance load shed relay inadvertently actuated.

(b) This resulted in the loss of 3C HWP, 3C CBP, 3D1 HDP, and 3E1 HDP. The 3B CBP auto started on low FDWP suction pressure and 3C CBP was manually restarted.

(c) The resultant flow/pressure transient resulted in low CBP suction pressure and a trip of all three CBPs, which

35. 056K605 001/T2G1/T2G1//MEM 1.4/1.5/N/OC002301/C/RFA
Which one of the following are correct indications to the operator of a feedwater heater blow through (a heater loses its shell side level)?

A. DCTD is high (>15 degrees), TD is zero, Increased inlet vs. outlet temperature on the cond/FDW side, An extraction isolation valve shuts.

B. Downstream heater drain level control valve goes full open, DCTD is high (>15 degrees), TD is zero, A false high level indication exist due to a flashed reference leg.

C. An extraction isolation valve shuts, A false high level indication exist due to a flashed reference leg, TD is zero, Increased inlet vs. outlet temperature on the cond/FDW side.

D. DCTD is high (>15 degrees), Increased HD flowrate, Increased inlet vs. outlet temperature on the cond/FDW side, An extraction isolation valve shuts, A false high level indication exist due to a flashed reference leg.

A) B

Distractor Analysis:

The following are indications to the operator that a feedwater heater is blowing through:

DCTD is high (>15 degrees), TD is zero, Increased inlet vs. outlet temperature on the cond/FDW side, A false high level indication exist due to a flashed reference leg, Downstream heater drain level control valve goes full open.

The following are indications that a feedwater tube leak is likely:

Increased HD flow rate, Downstream HD control valve full open, Increased HD pump amps, Cond/FDW side T decreases, An extraction isolation valve shuts, Condenser dump valve associated with "D" or "E" HD pump goes open.

Reference: Book I of II, Vol 2, OP-OC-STG-FHS, page 14 & 20 of 27.
EO - 18, 19
K/A: 056K603 (1.4/1.5)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 1.4/1.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

35. 056K605 001

Which ONE of the following describes how the Reactor Operator is initially alerted to a trip of C-61 (COND COOLER BYPASS CONTROL) and the resulting plant response following the trip?

C-61 tripped...

A. statalarm / Generator field and stator winding temperatures decreasing

B. OAC Alarm / Generator field and stator winding temperatures decreasing.

C. statalarm / Generator field and stator winding temperatures increasing

D. OAC Alarm / Generator field and stator winding temperatures increasing

A) D

A. incorrect, No statalarm available and field and stator winding temperatures will increase.
B. incorrect, OAC alarm will actuate but field and stator winding temperatures will increase. as described in "A" above.
C. incorrect, field and stator winding temperatures will increase but there is no statalarm. increase as stated in "C" above.
D: correct, OAC alarm that C-61 has tripped open and field and stator temperatures will increase due to decreased cooling flow through the Hydrogen coolers.

ONSW Bank question: CF127

Reference: Book I of II, Vol 2, OP-OC-STG-FHS, page 14 & 20 of 27.
EO - 18, 19
K/A: 056K603 (1.4/1.5)
RO/SRO: Both
Level: M
Author: rfa

Low KA: 1.4/1.5
A,B, & C correct

Replaced with bank question.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 1.4/1.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

0566605

3. TD > expected:
   a) If the heater level is high, the condensed steam is in contact with the C/FDW tubes too much and since the condensed steam is cooler than the extraction steam, the C/FDW will not warm up enough and the C/FDW discharge will be farther apart from the inlet steam saturation temperature. However, this condition will not result in heater tube damage.
   b) If the heater is not vented well, the noncondensable gases will insulate the C/FDW tubes from the extraction steam. The C/FDW will not warm up enough and the C\FDW discharge will be farther apart from the inlet steam saturation temperature.
4. TD < expected:
   a) This condition is usually due to a broken instrument.

D. The Problems of a Feedwater Heater "Blowing Thru":
1. If a heater loses its shell side level, it will "blow thru".
2. High velocity steam blasting through the heater will cause damage to the heater and downstream components.
3. Heater "blow thru" can result in a flashing of the level instrument reference leg. This will cause indicated level to fail high and the downstream level controller will go full open. This makes the "blow thru" even worse.
4. The following are <u>indications</u> to the Operator that a heater is blowing thru:
   a) DCTD is high (>15 degrees is suspect)
   b) TD is zero
   c) Increased inlet <u>vs</u>. outlet °T on the Cond/FDW side
   d) False high level indication (a flashed reference leg)
   e) Downstream heater drain level control valve full open (due to false high heater level)
5. The "blow thru" condition will also result in a decrease of overall plant efficiency. Due to the greatly increased extraction flow to the affected heater, extraction flow is decreased to the other heaters.

- OPEN = 3 psig

c) When the level is controlling properly, adjust the pressure on the instrument loading gauge to match the pressure on the manual loading gauge, switch control to auto. (Refer to step 2.7.B.6 for Fisher Controller description.)

10. The control room operator will place the recirc control switch to auto.

a) Auto level control is controlled by adjusting the sliding adjustment screw on the scale inside the Fisher Multi-Trol (usually done by SRO) (controls Inst Loading Press)

1) Gauge on bottom left of Fisher Multi-Trol indicates heater level.

- High level = 3 psig
- Low level = 27 psig

2) Gauge on bottom right of Fisher Multi-Trol indicates drain pump discharge control valve position.

- Open = 3 psig
- Closed = 27 psig
- Pump recirc valve opens at ~25 psig increasing
- Emergency dump opens at ~9 psig decreasing

2.8 Feedwater Heater Tube Leaks

A. Causes: Hydraulic shock (trips etc.), blowing through, and thermal stressing can result in a heater tube leak.

B. Symptoms: The following symptoms indicate that a Tube Leak is likely: (listed in order of importance and ability to detect)

1. Increased HD flow rate
2. Downstream HD control valve full open
3. Increased HD pump amps
4. Cond/FDW side □T decreases
5. An extraction isolation valve shuts
6. Condenser dump valve associated with "D" or "E" Heater Drain Pump goes Open
7. Increased Cond/FDW flowrate

C. Explanation of symptoms

1. The HD flowrate: If we had HD meter runs, this would be the ideal way to search out a tube leak. Some of the metering runs don't exist. Others couldn't be installed since other pipes run through the space. Also, instrumentation is not valved in on those that exist.

2. Downstream HD control valve full open: This is how Performance finds even single tube leaks. The Tech notes on secondary rounds the HD valve positions and checks them every day. When a tube leaks the valve opens. Obviously for this to work, you have to know the normal position of the valve. Also, you have to inspect all the heater drain valves since we have a cascade system. Refer to handout drawing ...
3. Increased HD pump amps: This would not be apparent until the leak had become large. Significant heater damage would have already occurred.
4. Symptoms #4 through #7 become progressively less effective in determining heater tube leaks in time to prevent heater damage.

D. Feedwater Heater Leak Check Procedure

1. The purpose of this operating procedure is to provide the method for checking feedwater heaters for tube leaks.
2. The heater is isolated and drained so that Mechanical Maintenance can perform a "dry check". The heater is pressurized with air and monitored for leakage.

2.9 Water Hammers Associated With Feedwater Heater

A. Causes of Water Hammer: Water hammer occurs usually due to one of the following situations:

1. Valving in steam to a line containing condensate, or
2. Sending a slightly subcooled liquid into a lower pressure system.
3. Closing a valve suddenly in a high volume flow rate water line.

B. Description of Water Hammer: When a water hammer occurs, steam has collapsed or a slug of water has suddenly decelerated. A loud bang, along with a severe shaking of the line occurs.

C. Possible Dangerous Results: Severe water hammer can be very dangerous. Possible line rupture can occur endangering personnel and equipment. For this reason water hammers should be avoided or minimized if possible.

D. Ways to Minimize Water Hammer: To avoid or minimize the severity of water hammer, the following operating methods should be adopted:

1. Always drain lines <u>prior</u> to admitting steam.
2. When admitting steam to an empty system, always valve it in <u>slowly</u>.
3. When connecting two systems of different pressures, open the valves <u>very slowly and cautiously</u>.

2.10 The Effects of Losing IA On The Heater Drain System and Subsequent Overall Plant Effect (REFER to ONS Incident Investigation Report B-1362)

A. The Incident:

36. 058AA101 001/T1G2/T1G2//MEM 3.4/3.5/B/OC002301/C/OC

Unit 1's DCA Bus has been inadvertently de-energized. Which ONE of the following correctly describes the status of 1KI Inverter?

1KI Inverter is automatically supplied from ....

A. the AC Line.

B. the 1CA battery.

C. the 1DCB bus via isolating diodes.

D. an alternate unit via isolating diodes.

Answer C

K/A: 058AA101 (3.4/3.5)
T1G2, T1G2
Bank
Reference: Facility updated question bank 27 EL262 EL2621

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 3.4/3.5
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

36. 058AA101 001

Unit 1's DCA Bus has been inadvertently de-energized. Which ONE of the following correctly describes the status of 1KI Inverter?

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C. the 1DCB bus via isolating diodes.

D. an alternate unit via isolating diodes.

Answer C

K/A: 058AA101 (3.4/3.5)
T1G2, T1G2
Bank
Reference: Facility updated question bank 27 EL262 EL2621

No changes

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 3.4/3.5
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

37. 059K107 001/T2G1/T2G1/0410402013/C/A 3.2/3.2/N/OC02301/C/CR

Reactor power has been reduced to 80% to investigate indicated Main Feedwater flow oscillations in the "A" loop. With the plant stable at this power, the "A" Main Feedwater flow transmitter fails low. Which of the following describes the expected ICS response to this failure? Consider the results if the transient is allowed to continue for at least one minute.

A. ICS will increase FW to both OTSGs. Reactor Power will decrease.

B. ICS will increase FW to the "A" OTSG and decrease FW to the "B" OTSG. Reactor Power will decrease.

C. ICS will increase FW to both OTSGs. Reactor Power will increase.

D. ICS will increase FW to the "A" OTSG and decrease FW to the "B" OTSG. Reactor Power will increase.

Reasons:

A. Correct Answer. Feedwater will increase on the "A" side due to the failed transmitter. This will decrease Tc on that side. The delta Tc circuit will attempt to decrease flow to the affected side (unable to decrease due to failed instrument) while increasing flow to the other OTSG. The net result is an increase in feedwater flow to both OTSGs. When the transimitter fails, a large reduction in indicated feedwater flow will result. The indicated flow will be more than 5% below demand and therefore result in a feedwater to reactor cross limit reducing reactor demand by the amount of error above 5%.

B. FW to the "B" OTSG will increase due to the actions of the delta Tc circuit discussed above.

C. Reactor power will decrease because of the feedwater to reactor cross limit discussed above.

D. FW to the "B" OTSG will increase and reactor power will decrease as discussed above.

OC Reference: AP/1/A/1700/028, ICS Instrument Failures

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:	0410402013	Cog Level:	C/A 3.2/3.2
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

37. 059K107 001

Plant conditions:

- Reactor power = 80%
- ICS SG Master in MANUAL
- All other ICS stations are in AUTO
- A 50 psi INCREASE Main Steam Pressure occurs

Which ONE of the following is correct? (.25)

ICS Main Feedwater Pump speed will...

A. increase due to the resulting Turbine Header Pressure error signal.

B. decrease due to the resulting Turbine Header Pressure error signal.

C. increase and FDW valves would initially throttle in the open direction.

D. decrease and FDW valves would initially throttle in the closed direction.

A) C

A. Incorrect: THP error is blocked by the SG master in Hand.
B. Incorrect: THP error is blocked by the SG master in Hand.
C. Correct: FDW valve DP would decrease causing FDWP demand to increase. FDW valves open due to increase in flow as SG pressure decreased.
D. Incorrect: FDW valve DP decreases causing the FDWPs demand to increase. Valves throttle open due to decreased flow with higher SG pressure

OC Reference: AP/1/A/1700/028, ICS Instrument Failures
Old ICS. ONS ICS responds differently.

Replaced with ONS Bank question.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:	0410402013	Cog Level:	C/A 3.2/3.2
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

38. 061K402 001/T2G1/T2G1//C/A 4.5/4.6/N/OC002301/C/RFA
Which one of the following set of automatic MDEFDW pump starts is correct when automatic control is selected to AUTO 2?

A. Upon receiving a 2 out of 2 low XSUR level logic signal in either SG, both MDEFDW pumps will start. Both MFDW pumps have low hydraulic oil pressure.

B. Upon receiving a 2 out of 2 low XSUR level logic signal in either SG, both MDEFDW pumps will start. AMSAC/DSS is enabled, combined with both MFDW pumps low discharge pressure.

C. Both MFDW pumps have low hydraulic oil pressure combined with both MFDW pumps low discharge pressure.

D. AMSAC/DSS is enabled, combined with both MFDW pumps low discharge pressure.

A) D

Reference: Lesson Plans Vol X, OP-OC-CF-EFW , page 23 of 46.
EO - 24
K/A:061K402 (4.5/4.6)
RO/SRO: BOTH
Level: C (must understand Auto 1/Auto2 logic)
Author: rfa

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 4.5/4.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

38. 061K402 001

Unit 1 conditions:

- Mode 3
- RCS Average Temperature = 485°F
- Motor Driven Emergency Feedwater pump (MDEFDWP) "1A" and "1B" control switches selected to AUTO 1

.

Which ONE of the following conditions will initiate an automatic start of the MDEFDWPs?

A. BOTH channels of AMSAC actuate

B. BOTH "B" SG XSUR levels = 20" for 40 seconds

C. Hydraulic oil pressure = 0 psig on the operating MFDWP

D. Low MFDWP discharge pressure on the operating MFDWP

A) B

A. INCORRECT - AUTO 2 function
B. CORRECT - Dry-Out protection is signaled from the AUTO 1 position. BOTH XSUR level indications < 21" for > 30 seconds starts both MDEFWPs.
C. INCORRECT - AUTO 2 function, both Main FDW Pumps would not be operating at this temperature.
D. INCORRECT - AUTO 2 function, both Main FDW Pumps would not be operating at this temperature.

Reference: Lesson Plans Vol X, OP-OC-CF-EFW , page 23 of 46.
EO - 24
K/A:061K402 (4.5/4.6)
RO/SRO: BOTH
Level: C (must understand Auto 1/Auto2 logic)
Author: rfa

All answers correct. AUTO 1 starts will actuate when selected to AUTO 2.

Replaced with ONS Bank question

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 4.5/4.6
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

061402 2. AUTO 2 position, MDEFDWPs will start when:

Both MFDWPs have low hydraulic oil pressure (< 75 psig)

OR *

AMSAC/DSS (Diverse Scram System) enabled, AND

Both MFDWPs have low hydraulic oil pressure (< 75 psig)

(This must occur on both AMSAC Channels)

OR

AMSAC/DSS enabled, AND

Both MFDWPs have low discharge pressure (< 770 psig)

(both AMSAC Channels)

C. AMSAC (ATWS Mitigation Safety Actuation Circuit) and DSS (Diverse Scram System) are provided to mitigate the consequences of anticipated transient without SCRAM. The AMSAC/DSS consists of two channels and uses a two-out-of-two coincidence logic to actuate. Each channel has an AMSAC portion and a DSS portion. Upon actuation, AMSAC will trip the Main Turbine and start all operable EFDWPs. DSS will trip Control Rod Groups 5, 6 and 7 and shift the Turbine Bypass Valves control setpoint bias to +125 psig.

1. AMSAC is required in order to provide some control over the inevitable RCS pressure increase for the loss of Main FDW during an ATWS event, since the reactor will be producing power until the rods trip. A design standard for AMSAC pressure limitation has been set at 4000 psia in accordance with B & W analysis. In order to meet this objective EFDW is required to provide at least 1350 gpm.
2. AMSAC receives MFDWP signals from an independent set of pressure switches.
3. DSS is required to limit the period of time the reactor is producing power during an ATWS event. The design standard for DSS is to limit RCS pressure to an arbitrary value of 3250 psia. In order to meet this objective DSS is required to trip reg rods at a setpoint of 2450 $\pm$ 25 psig.

D. Manual Control - TDEFDWP (Figure OC-CF-EF-15)

1. 4 position - Pull to Lock • OFF • AUTO • RUN
   a) spring return to AUTO from OFF
   b) controls solenoid operated pneumatic valve MS-93.
   c) solenoid normally energized - air pressure keeps MS-93 shut.
   d) KVID Bkr 9 power supply - solenoid
2. RUN - de-energizes solenoid - MS-93 opens
   a) LPSW-137 (LPSW to TDEFDWP Brng Cooling Water Jacket) opens.
   b) DC auxiliary oil pump starts.
   c) This causes AC-powered CCW cooling water pump to EFDWPT oil cooler to start.
3. OFF - re-energizes MS-93 solenoid and air pressure closes MS-93.
   a) Pull to Lock - bypasses emergency start pressure switches and maintains MS-93 solenoid energized.
4. Loss of KVID Bkr 9 - MS-93 will open.
5. Loss of instrument air (Both IA & AIA) - MS-93 will open.

E. Automatic Control – TDEFWP (Figure OC-CF-EF-15&20)
   1. Auto start signal - de-energizes solenoid - MS-93 opens
      a) LPSW-137 (LPSW TDEFDWP Cooling Jacket) opens.
      b) DC auxiliary oil pump starts.
      c) AC powered EFDWPT oil cooling water pump starts.
   2. In AUTO, the TDEFDWP will start when: (see Fig. OC-CF-EF-20)

"A" MFDWP has low hydraulic oil pressure (< 75 psig)

AND

"B" MFDWP has low hydraulic oil pressure (< 75 psig)

*** *OR* ***

AMSAC/DSS (Diverse Scram System) enabled

AND

Both MFDWPs have low hydraulic oil pressure(< 75 psig)

OR

Both MFDWPs have low discharge pressure (< 770 psig)

(Both AMSAC channels Actuate)

Note: If the switch is left in **AUTO** following an Auto-start, the pump will not stop when the Auto-start conditions are not satisfied (FDWPT reset). The operator must stop it.

2.5 Shaft Steam Seals

A. packing boxes - carbon seals

B. exhaust to atmosphere

C. seals break down pressure - condensate to trench

2.6 Aligning EFDW from Alternate Units (Figure OC-CF-EF-1)

A. Purpose - To allow any unit's EFDW system to supply any other unit's EFDW system.

1. Flowpath between units to the emergency header (FDW-313/314).
2. Through normally closed valves FDW-313 and FDW-314 (EFDW X-connects).
3. Open FDW-313 and FDW-314 for the unit supplying and for the unit receiving.

Note: Refer to AP/1700/19 "Loss of Main Feedwater" for additional information.

2.7 INSTRUMENTATION AND CONTROLS

A. Manual Control - MDEFDWP (Figure OC-CF-EF-13)

1. 4 position - OFF • AUTO 1 • AUTO 2 • RUN
2. No interlocks to prevent Manual start
3. Trip or OFF - prevents Auto start, secures pump after start

B. Automatic Control - MDEFWP (Figure-OC-CF-EF-13,21&22)

1. AUTO 1 position (Dryout Protection)

a) Purpose: Provide a diverse means of actuating MDEFDWPs as the SGs are approaching dryout conditions.

b) Upon receiving a two out of two low XSUR level logic signal in either SG (21" for 30 seconds), both MDEFDWPs will start and the EFDW level control will initiate to control at the appropriate XSUR level depending upon operation of the RCPs. (30"/240")

39. 062A101 001/T2G2/T2G2//C/A 3.4/3.8/B/OC002301/C/OC
Plant conditions:

1. Keowee Unit #2 is supplying ONS Unit 1, 2, 3 via the CT-4

Which ONE of the following CT-4 parameters indicate that the 22.4 MVA transformer rating on CT-4 has been exceeded?

MEGAWATTS = _____ / MAGAVARS = _____.

SEE ATTACHMENT

A. 17 / 11

B. 11 / 16

C. 14.5 / 16

D. 17 / 14.5

Answer D

A. Incorrect - This combination does not exceed the 112% line on the curve. The combination exceeds the 100% curve (20.6 MVA)
B. Incorrect - This combination does not exceed the 112% line on the curve. The combination exceeds the 100% curve (20.6 MVA)
C. Incorrect - This combination does not exceed the 100% or 112% line on the curve
D. Correct - This combination exceeds the 112% line on the curve

K/A: 062A101 (3.4/3.8)
T2G2, T2G2
Bank
Reference: Facility updated question bank 62 EL041201 EL041201

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

39. 062A101 001

Plant conditions:

- Keowee Unit #2 is supplying ONS Unit 1, 2, 3 via the CT-4

Which ONE of the following CT-4 parameters indicate that the 22.4 MVA transformer rating on CT-4 has been exceeded?

MEGAWATTS = _____ / MEGAVARS = _____.

SEE ATTACHMENT AP/11: Encl. 5.1A (CT-4 overload limits)

A. 17 / 11

B. 11 / 16

C. 14.5 / 16

D. 17 / 14.5

Answer D

A. Incorrect - This combination does not exceed the 112% line on the curve. The combination exceeds the 100% curve (20.6 MVA)
B. Incorrect - This combination does not exceed the 112% line on the curve. The combination exceeds the 100% curve (20.6 MVA)
C. Incorrect - This combination does not exceed the 100% or 112% line on the curve
D. Correct - This combination exceeds the 112% line on the curve

Attachment required: AP/11, encl. 5.1a (CT-4 overload limits)

K/A: 062A101 (3.4/3.8)
T2G2, T2G2
Bank
Reference: Facility updated question bank 62 EL041201 EL041201

Added attachment specifics to stem and answer explanation section
(AP/11 Enclosure 5.1A, CT4 Overload Limits)

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

40. 062G2.1.20 001/T1G1/T1G1//MEM 4.3/4.2/B/OC002301/C/OC

Which ONE of the following actions is required per SLC 16.11-3, if 1RIA-31 (Low Pressure Service Water) fails low and is declared inoperable with Unit 1 operating at 100% power?

A. Release may continue, provided that grab samples are taken every eight (8) hours and analyzed within twenty-four (24) hours.

B. Release may continue, provided that grab samples are taken and analyzed every twelve (12) hours.

C. Explain inoperability in next Semiannual Radioactive Effluent Release Report.

D. Submit a work request for repair using the normal scheduling process.

Answer D

SLC 16.11-3 only requires RIA-35. There is no requirement for RIA-31.

K/A: 062G2.1.20 (4.3/4.2)
T1G1, T1G1
Bank
Reference: Facility updated question bank 46 WE011301 WE011301

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.3/4.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

40. 062G2.1.20 001

Which ONE of the following actions is **REQUIRED** per SLC 16.11-3, if 1RIA-35 (Low Pressure Service Water) fails low and is declared inoperable with Unit 1 operating at 100% power?

SEE ATTACHMENT: SLC 16.11-3 (Radioactive Effluent Monitoring)

A. Release may continue, provided that grab samples are taken every eight (8) hours and analyzed within twenty-four (24) hours.

B. Release may continue, provided that grab samples are taken and analyzed immediately and every twelve (12) hours thereafter.

C. Explain inoperability in next Semiannual Radioactive Effluent Release Report.

D. Submit a work request for repair using the normal scheduling process.

Answer b

Required Attachment: SLC 16.11-3 (Radioactive Effluent Monitoring)

K/A: 062G2.1.20 (4.3/4.2)
T1G1, T1G1
Bank
Reference: Facility updated question bank 46 WE011301 WE011301

ONS bad question, no correct answer

Changed to RIA-35
made "B" correct

Suggest changing to C/A due to application of SLC.

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.3/4.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

41. 062K404 001/T2G2/T2G2//MEM 2.2/2.9/N/OC002301/C/RFA
Which one of the following set of relays only applies to 6900V breakers?

A. 81-over-frequency relay and 87M-bus differential relay.

B. 27-undervoltage relay and 81-over-frequency relay.

C. 87M-bus differential relay and 86B-bus lockout relay.

D. 86B-bus lockout relay and 27-undervoltage relay.

A) A

Reference: Lesson Plans Vol IX, OP-OC-EL-CB , page 35 of 57.
EO - 5.2
K/A: 062K404 (2.2/2.9)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.2/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

41. 062K404 001

Which ONE of the following statements correctly describes how to reset a 230 KV SWYD Yellow Bus Differential Lockout?

The 230 KV SWYD Yellow Bus Differential Lockout must be manually reset via ...

A. switches on the affected PCBs.

B. switches in the 230 KV relay house.

C. pushbuttons on cable room panels.

D. control room reset pushbuttons.

A) B

Reference: Lesson Plans Vol IX, OP-OC-EL-CB , page 35 of 57.
EO - 5.2
K/A: 062K404 (2.2/2.9)
RO/SRO: BOTH
Level: M
Author: rfa

Not required knowledge for ONS operators

Replaced with ONS Bank Question EL-173

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.2/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

062 K404

3. Concerning 230 kV PCB operation: (R-3)

   3.1 State the purpose of the Hydraulic Operating Mechanism.

   3.2 State the purpose of the SF6 Puffer Interrupter.

   3.3 Describe what effect low hydraulic system pressure (3400 psig) will have on PCB operation.

   3.4 Describe what automatic action associated with PCB operation will occur if hydraulic pressure decreases to approximately 3100 psig.

   3.5 Describe what automatic action associated with PCB operation will occur if SF6 gas pressure decreases to approximately 103 psig.

4. Describe basically how to manually close and how to manually trip a PCB from the associated Control Room Switch (other than the Main Generator output breakers). (R-4)

5. Concerning 6900V and 4160V Breaker operation (R-5)

   5.1 Explain how to differentiate between the "racked out", "test", and "racked in" positions.

      A. State the status of key operational contacts (primary connection & secondary connection) with the breaker in both connected and test positions.

   5.2 Describe the electrical (remote & local) operation of a 4160V or 6900V circuit breaker.

   5.3 Describe the manual (local) operation of a 4160V circuit breaker.

   5.4 Describe the basic steps that must be taken to "rack out" & "rack in" a typical 4160V or 6900V circuit breaker..

4. To Manually trip a 4160V Breaker perform the following steps;

   CAUTION: Ensure compartment Door is closed and properly secured prior to operating breaker. Do not stand directly in front of breaker cubicle when operating.

   a) Remove all Control Power Fuses to prevent inadvertent closing.

   b) Push "TRIP" button at bottom of breaker using glove protected hand or an insulated rod.

F. 4160V and 6900V Protective Relaying

1. 4160V and 6900V Breakers have protective relaying to protect the Breaker and the bus associated with that Breaker.

2. The following are typical Relays found on 4160V and 6900V Breakers and their function;

Note: Not all relays will be found on all Breakers

a) 27-Undervoltage Relay

b) 51, & 51G-Overcurrent Phase and Ground Fault Relay

c) 50, 50G, 50B, 50BG, & 62BN-Overcurrent Relay (Instantaneous & time delayed)

d) 81-Overfrequency Relay (6900V only)

e) 87M-Motor Differential Relay (6900V only)

f) 87B-Bus Differential Relay

g) 86B-Bus Lockout Relay

3. A tripped Relay will be indicated by "FLAG" being displayed in the Relay window.

   a) The affected relay may be reset (after the condition that tripped the relay has been corrected) by pushing "Up or Down" on the reset lever. The FLAG should disappear.

4. A tripped Lockout Relay will indicated tripped by;

   a) the spring-loaded handle will be unlatched and moved 1/8 of a turn counterclockwise from the vertical position,

   b) an Orange indicator is displayed directly above the handle, and

   c) the Amber lamp [if equipped, not all Lockouts have light indications] located above the Lockout Relay will be OFF.

42. 063K201 001/T2G2/T2G1//MEM 2.9/3.1/N/OC002301/C/RFA
Which one of the following correctly describes the essential inverter and its loads?

A. KI supplies ICS manual power, the operational aid computer power, line printers and the fire protection system. KU supplies ICS auto power and NI-9. KX supplies EHC cabinet power and TV monitors.

B. KI supplies ICS auto power and NI-9. KX supplies EHC cabinet power. KU supplies ICS manual power and the fire protection system.

C. KI supplies ICS auto power and NI-9. KX supplies EHC cabinet power, TV monitors and line printers. KU supplies ICS manual power and the fire protection system.

D. KI supplies ICS manual power, the operational aid computer power, line printers and the fire protection system. KU supplies ICS auto power and NI-9. KX supplies EHC cabinet power and the FDWP turbine control.

A) B

Reference: Lesson Plans Vol IX, OP-OC-EL-DCD , page 36 of 55.
EO - 6.3
K/A: 063K201 (2.9/3.1)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T2G2	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 2.9/3.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

42. 063K201 001

Plant conditions:

- Reactor power = 100%

Which ONE of the following will result from de-energizing the KU panelboard?

A. All ICS stations will transfer to HAND and NI-9 will fail LOW

B. EHC cabinets and FDWP turbine control will be de-energized

C. ICS feedwater control will be available ONLY in automatic mode

D. Non-nuclear instrumentation and fire protection system will lose power

A) C

Reference: Lesson Plans Vol IX, OP-OC-EL-DCD , page 36 of 55.
EO - 6.3
K/A: 063K201 (2.9/3.1)
RO/SRO: BOTH
Level: M
Author: rfa

ONS does not have currently line printers and TV monitors Re Bruce material incorrect
Substituted NEW ONS question

RO Tier:	T2G2	SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 2.9/3.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

43. 065AK303 001/T1G3/T1G2//C/A 2.9/3.4/M/OC002301/C/OC
Plant conditions:

INITIAL CONDITIONS:

1. Reactor power = 100%

CURRENT CONDITIONS:

1. Instrument Air pressure is rapidly DECREASING
2. NO ES actuation signals have been received

Assume NO operator actions are taken

The LDST level will decrease and the pressurizer level will increase.

Which one of teh following has caused this?

A. HP-5 and HP-31 both failed open.

B. HP-5 and HP-31 both failed closed.

C. HP-5 failed closed and HP-31 failed open.

D. HP-5 failed open and HP-31 failed closed.

Answer C

C
HP-5 will fail closed isolating all letdown, which stops input to the LDST. HP-31 fails open increasing input to the PZR.

K/A: 065AK303 (2.9/3.4)
T1G3, T1G2
Bank
Reference: Facility updated question bank 20 SSS044701 SSS044701

RO Tier:	T1G3	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 2.9/3.4
Source:	M	Exam:	OC002301
Test:	C	Misc:	OC

43. 065AK303 001

Plant conditions:

INITIAL CONDITIONS:

– Reactor power = 100%

CURRENT CONDITIONS:

- Instrument Air pressure is rapidly DECREASING
- NO ES actuation signals have been received

Assume NO operator actions are taken

The LDST level will decrease and the pressurizer level will increase.

Which one of the following has caused this?

A. HP-5 and HP-31 both failed open.

B. HP-5 and HP-31 both failed closed.

C. HP-5 failed closed and HP-31 failed open.

D. HP-5 failed open and HP-31 failed closed.

Answer C

C
HP-5 will fail closed isolating all letdown, which stops input to the LDST. HP-31 fails open increasing input to the PZR.

K/A: 065AK303 (2.9/3.4)
T1G3, T1G2
Bank
Reference: Facility updated question bank 20 SSS044701 SSS044701

No changes

RO Tier:	T1G3	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 2.9/3.4
Source:	M	Exam:	OC002301
Test:	C	Misc:	OC

44. 067AK101 001/T1G1/T1G1//MEM 2.9/3.9/N/OC002301/C/CR
Which of the following areas contain material which would be limited to a Class "B" fire?

A. Document control storage vault.

B. "A" ES 4160V switch gear room.

C. TB lube oil purifier.

D. I&C calibration lab in maintenance facility.

A. Paper Class "A".
B. Electical equipment Class "C".
C. CORRECT: Oil Class "B"
D. No fire hazard for Class "B"

Reference: Nuclear System Directives 112 and 316
GET

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 2.9/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

44. 067AK101 001
Which of the following areas contain material which would be limited to a Class "B" fire?

A. Document control storage vault.

B. "A" ES 4160V switch gear room.

C. TB lube oil purifier.

D. I&C calibration lab in maintenance facility.

A. Paper Class "A".
B. Electical equipment Class "C".
C. CORRECT: Oil Class "B"
D. No fire hazard for Class "B"

Reference: Nuclear System Directives 112 and 316
GET
No changes

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 2.9/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

45. 071A202 001/T2G1/T2G1//C/A 3.3/3.6/B/OC002301/C/OC
Unit 1 plant conditions:

INITIAL CONDITIONS:

1. DATE / TIME = 3-14-99 / 0015
- "1B" GWD Tank release commenced
- Waste Gas Flow Monitor "OOS"
- "1B" GWD Tank pressure = 68 psig

CURRENT CONDITIONS:

1. DATE / TIME = 3-14-99 / 0245
- Release completed
- "1B" GWD Tank pressure = 5 psig

Which ONE of the following indicates the estimated flow rate (scfm) for the 1B GWD Tank release?

SEE ATTACHED

A. 42

B. 32

C. 26

D. 10

Answer B

Flow estimate:
A. Incorrect, directly from the curve; 68 psig = 6300 scf 150 = 42 scfm
B. Correct, 68 to 5 psig ≈ 4800 scf 150 minutes = 32 scfm
C. Incorrect, mis-reading curve at 58 psig instead of 68 psig; 58 psig ≈ 5500 scf - 1500 scf 150 minutes = 26 scfm
D. Incorrect, directly from the curve; 5 psig = 1500 scf 150 = 10 scfm

K/A: 071A202 (3.3/3.6)
T2G1, T2G1
Bank
Reference: Facility updated question bank 57 WE011101 WE011101

SLC 16.11-3.5.b,(J) states effulent flow rate monitor can be OOS and releases continue provided the flow rate is estimated at least one every four hours.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.3/3.6
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

45. 071A202 001

Unit 1 plant conditions:

INITIAL CONDITIONS:

- DATE / TIME = 3-14-99 / 0015
- "1B" GWD Tank release commenced
- Waste Gas Flow Monitor "OOS"
- "1B" GWD Tank pressure = 68 psig

CURRENT CONDITIONS:

- DATE / TIME = 3-14-99 / 0245
- Release completed
- "1B" GWD Tank pressure = 5 psig

Which ONE of the following indicates the estimated flow rate (scfm) for the 1B GWD Tank release?

SEE ATTACHED: (1108/01, Encl. 3.3, GWD Tank Volume vs Pressure Curve)

A. 42

B. 32

C. 26

D. 10

Answer B

Flow estimate:
A. Incorrect, directly from the curve; 68 psig = 6300 scf 150 = 42 scfm
B. Correct, 68 to 5 psig ≈ 4800 scf 150 minutes = 32 scfm
C. Incorrect, mis-reading curve at 58 psig instead of 68 psig; 58 psig ≈ 5500 scf - 1500 scf 150 minutes = 26 scfm
D. Incorrect, directly from the curve; 5 psig = 1500 scf 150 = 10 scfm

Required reference: 1108/01, Encl. 3.3, GWD Tank Volume vs Pressure Curve

K/A: 071A202 (3.3/3.6)
T2G1, T2G1
Bank
Reference: Facility updated question bank 57 WE011101 WE011101

SLC 16.11-3.5.b,(J) states effulent flow rate monitor can be OOS and releases continue provided the flow rate is estimated at least one every four hours.

Added attachment (OP/1108/01, Curves and General Information; Enclosure 3.3, GWD Tank Volume vs. Pressure Curve to stem of question and answer explanation section.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.3/3.6
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

46. 076K201 001/T2G3/T2G3//C/A 2.7/2.7/N/OC002301/C/RFA
Which one of the following is correct, concerning HPSW pump operation with respect to a loss of power to a main feeder bus (MFB)?

A. HPSW pumps are powered from MCC 1XE which is fed from load center 1X3 normally and from 1X2 as an alternate source. Therefore, the HPSW pumps will be unaffected. However, if the HPSW pumps A and B are not running, they will BOTH get an auto start signal upon loss of power to 1X6 due to 1X6 feeding breaker #15, the power supply for EWST level control.

B. HPSW pumps are powered from the unit 1 MFBs. If one MFB is de-energized then the remaining HPSW pumps are vulnerable to single failure of the other unit 1 MFB. Backup power is NOT available.

C. HPSW pumps are powered from MCC 1XE which is fed from load center 1X3 normally and from 1X2 as an alternate source for units 1 and 2. Therefore, Unit 1 and 2s HPSW pumps will be unaffected. Unit 3s HPSW pumps are powered from the unit 3 MFBs. If one Unit 3 MFB is de-energized then the remaining Unit 3 HPSW pumps are vulnerable to single failure of the other unit 3 MFB. Backup power is NOT available.

D. HPSW pumps are powered from all three units MFBs. If one MFB is de-energized then the remaining HPSW pumps can be powered from the other units MFBs.

A) B

Reference: Lesson Plans Vol X, OP-OC-SSS-HPW , page 27 of 33.
EO - 17.3
K/A:076K201 (2.7/2.7)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G3	SRO Tier:	T2G3
Keyword:		Cog Level:	C/A 2.7/2.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

46. 076K201 001

Which one of the following is correct, concerning HPSW pump operation with respect to a loss of power to a main feeder bus (MFB)?

A. HPSW pumps are powered from MCC 1XE which is fed from load center 1X3 normally and from 1X2 as an alternate source. Therefore, the HPSW pumps will be unaffected. However, if the HPSW pumps A and B are not running, they will BOTH get an auto start signal upon loss of power to 1X6 due to 1X6 feeding breaker #15, the power supply for EWST level control.

B. HPSW pumps are powered from the unit 1 MFBs. If one MFB is de-energized then the remaining HPSW pumps are vulnerable to single failure of the other unit 1 MFB. Backup power is NOT available.

C. HPSW pumps are powered from MCC 1XE which is fed from load center 1X3 normally and from 1X2 as an alternate source for units 1 and 2. Therefore, Unit 1 and 2s HPSW pumps will be unaffected. Unit 3s HPSW pumps are powered from the unit 3 MFBs. If one Unit 3 MFB is de-energized then the remaining Unit 3 HPSW pumps are vulnerable to single failure of the other unit 3 MFB. Backup power is NOT available.

D. HPSW pumps are powered from all three units MFBs. If one MFB is de-energized then the remaining HPSW pumps can be powered from the other units MFBs.

A) B

Reference: Lesson Plans Vol X, OP-OC-SSS-HPW , page 27 of 33.
EO - 17.3
K/A:076K201 (2.7/2.7)
RO/SRO: BOTH
Level: C
Author: rfa

No changes.
Suggest cognitive level = knowledge
True/False question

RO Tier:	T2G3	SRO Tier:	T2G3
Keyword:		Cog Level:	C/A 2.7/2.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

47. 078K303 001/T2G3/T2G3//C/A 3.0/3.4/N/OC002301/C/RFA
Which one of the following sets of IA/AIA symptoms is correct for an IA line break?

A. BOTH the IA AND the AIA systems will begin losing pressure. The IA check valves will all close. The three AIA compressors will sequently start, if in automatic, as pressure drops from 88 psig to 85 psig.

B. ONLY the IA system will begin losing pressure because it operates at a much higher pressure. The IA check valves will NOT close because the lower pressure will tend to be on the AIA system side.

C. ONLY the IA system will begin losing pressure because it operates at a much higher pressure. At 88 psig, AIA system pressure, the three AIA compressors will start if in Automatic.

D. BOTH the IA AND the AIA systems will begin losing pressure. The IA check valves will NOT close because the lower pressure will tend to be on the AIA system side.

A) D

Reference: Lesson Plans Vol X, OP-OC-SSS-IA , page 37 of 49.
EO - 25 and 28
K/A:078K303 (3.0/3.4)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G3	SRO Tier:	T2G3
Keyword:		Cog Level:	C/A 3.0/3.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

47. 078K303 001
Which one of the following sets of IA/AIA symptoms is correct for an IA line break?

A. BOTH the IA AND the AIA systems will begin losing pressure. The IA check valves will all close. The three AIA compressors will sequently start, if in automatic, as pressure drops from 88 psig to 85 psig.

B. ONLY the IA system will begin losing pressure because it operates at a much higher pressure. The IA check valves will NOT close because the lower pressure will tend to be on the AIA system side.

C. ONLY the IA system will begin losing pressure because it operates at a much higher pressure. At 88 psig, AIA system pressure, the three AIA compressors will start if in Automatic.

D. BOTH the IA AND the AIA systems will begin losing pressure. At 88 psig, AIA system pressure, the three AIA compressors will start if in Automatic.

A) D

Reference: Lesson Plans Vol X, OP-OC-SSS-IA , page 37 of 49.
EO - 25 and 28
K/A:078K303 (3.0/3.4)
RO/SRO: BOTH
Level: C
Author: rfa

No correct answer. "D" incorrect due to check valves closing...IA side break in stem.
D. Changed the second part concerning check valve operation (not correct) and replaced using the second part from "C" alternative (which is correct). Balances alternatives and provides "D" as correct answer.

RO Tier:	T2G3	SRO Tier:	T2G3
Keyword:		Cog Level:	C/A 3.0/3.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

078 R303

3) If the IA system depressurizes because of loss of compressors (the Primary IA compressor should be running), the check valves at the tie-ins and at each component will close to prevent the AIA system from depressurizing.

4) If for some reason, the compressors are not able to regulate system pressure at 100 PSIG, they will automatically shut themselves down at 135 PSIG and then restart at 88 PSIG.

b) Loss of IA Pressure

1) Line break in the IA system.

(a) When the line breaks both the IA and the AIA systems will begin losing pressure.

(b) At 88 PSIG, AIA system pressure, the three AIA compressors will start if in automatic and control system pressure at 100 PSIG.

(c) At 85 PSIG, statalarm SA4/C5 **AUX BUILD. COMPR. AIR HEADER PRESSURE LOW** will actuate.

(d) As the IA system pressure continues to drop the check valves at the tie-in points and at the individual components will close and prevent further depressurization of the AIA system.

(e) The compressors will load and unload themselves to maintain system pressure at ≈100 PSIG. If system pressure increases to 135 PSIG the compressors will shut themselves down and not restart until pressure in the AIA system decreases to 88 PSIG.

2) Line break in the AIA system.

(a) If the line break is in the AIA system, the response will be the same as a break in the IA system as far as starting the compressors and maintaining pressure.

(b) The difference in the two will be that the check valves will not close because the lower pressure will tend to be on the AIA system side. (OC-SSS-IA-8)

(c) Since the AIA system piping is only 1.5 inches in diameter (largest) and the IA system (without the AIA system) can maintain system pressure > 80 PSIG with a 1.5 inch diameter break, the combined capacity of the two systems is more than adequate to accommodate the break.

2.3 Service Air System

A. The Service Air System is designed to provide compressed air to various areas of the plant for the following functions: (OC-SSS-IA-10)

48. 086A101 001/T2G2/T2G2//MEM 2.9/3.3/N/OC002301/C/CR
Given the following plant conditions:

A fire is in progress on the startup transformer.
A Loss of Offsite Power.
Fire header pressure has decreased to 100 psig.

Which one of the following will provide immediate (within 5 seconds) fire fighting water pressure?

A. HPSW pump "A" only.

B. HPSW pump "A" AND "B".

C. Jockey fire pump.

D. Elevated Water Storage Tank.

A. Keowee Units are NOT on line yet. Keowee requires 15 seconds.
B. Keowee Units are NOT on line yet
C. Keowee Units are NOT on line yet
D. Correct answer - power independent

Reference: Vol I, Actions Following a Fire
Vol. IX, Keowee Hydro Generators.

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.9/3.3
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

48. 086A101 001

Given the following plant conditions:

- Reactor trip from full power.
- A fire is in progress on the startup transformer.
- A Loss of Offsite Power.
- Fire header pressure has decreased to 100 psig.

Which one of the following will provide **IMMEDIATE** (within 5 seconds) fire fighting water pressure?

A. HPSW pump "A" only.

B. HPSW pump "A" AND "B".

C. Jockey fire pump.

D. Elevated Water Storage Tank.

A. Keowee Units are NOT on line yet. Keowee requires 15 seconds.
B. Keowee Units are NOT on line yet
C. Keowee Units are NOT on line yet
D. Correct answer - power independent

Reference: Vol I, Actions Following a Fire
Vol. IX, Keowee Hydro Generators.

Added bullet in stem for a reactor trip from full power to eliminate assumption that reactor remained on-line supplying power via T transformer.

Bolded and capped "immediate"

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.9/3.3
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

49. A01AA11 001/T1G2/T1G2//MEM3.7/3.7/B/OC002301/C/OC

Plant conditions:

1. ICS is in full automatic (Integrated Mode)
2. Control Rod Group 6 at 78% withdrawn

Which ONE of the following sets of plant conditions would cause the Asymmetric Rod Runback logic to initiate an ICS runback?

Core Thermal Power Demand (CTPD) and NI Power are...

A. 65%; the Group 4 Diamond "out limit" is lost.

B. 55%; the Group 5 Diamond "in limit" is received.

C. 61%; the Group 6 Diamond "in limit" is received.

D. 68%; the Group 7 Diamond "in limit" is received.

Answer C

A. INCORRECT - The out-limits for the safety groups must be accompanied by an asymmetric fault.
B. INCORRECT - Power needs to be >60% to satisfy the AND gate.
C. CORRECT - If at gp 6 @ 78% and an in-limit received, this implies an asymmetric fault must exist and group 5 > 80%.
D. INCORRECT - Group 6 must be >80% for a group 7 in-limit to generate runback.

K/A: A01AA11 (3.7/3.7)
T1G2, T1G2
Bank
Reference: Facility updated question bank question 41 IC020901 IC020901 ASYMMETRIC ROD RUNBACK LOGIC OP-OC-CRI-5.

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	MEM3.7/3.7
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

49. A01AA11 001

Plant conditions:

- ICS is in full automatic (Integrated Mode)
- Control Rod Group 6 at 78% withdrawn

Which ONE of the following sets of plant conditions would cause the Asymmetric Rod Runback logic to initiate an ICS runback?

Core Thermal Power Demand (CTPD) and NI Power are...

A. 65%; the Group 4 Diamond "out limit" is lost.

B. 55%; the Group 5 Diamond "in limit" is received.

C. 61%; the Group 6 Diamond "in limit" is received.

D. 68%; the Group 7 Diamond "in limit" is received.

Answer C

A. INCORRECT - The out-limits for the safety groups must be accompanied by an asymmetric fault.
B. INCORRECT - Power needs to be >60% to satisfy the AND gate.
C. CORRECT - If at gp 6 @ 78% and an in-limit received, this implies an asymmetric fault must exist and group 5 > 80%.
D. INCORRECT - Group 6 must be >80% for a group 7 in-limit to generate runback.

K/A: A01AA11 (3.7/3.7)
T1G2, T1G2
Bank
Reference: Facility updated question bank question 41 IC020901 IC020901 ASYMMETRIC ROD RUNBACK LOGIC OP-OC-CRI-5.

Double jeopardy with common #2
Suggest cognitive level above knowledge

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	MEM3.7/3.7
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

50. A04AK32 001/T1G2/T1G2//C/A 3.0/3.1/N/OC02301/C/CR
Given the following plant conditions:

52% power
AMSAC channel "B" is in TEST/CAL
"A" main feedwater flow instrument fails to 0%

Which of the following identifies the plant conditions?

A. AMSAC does not actuate.

B. AMSAC actuates the "A" channel of EFW.

C. AMSAC actuates and trips the turbine, the reactor will not trip.

D. AMSAC actuates and trips the turbine, which trips the reactor.

A. CORRECT: With a channel in TEST the other channel is blocked, no trip or actuation will occur.
B. The channel signal to EFW is blocked and it will not actuate.
C. The channel is blocked no turbine trip will occur.
D. The channel is blocked no turbine trip will occur or reactor.

Reference: Vol X, EFW System
E.O. 25

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.0/3.1
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

50. A04AK32 001

Which ONE of the following describes the operation of the AMSAC and the DSS during an ATWS (Anticipated Transient Without Scram) with a complete loss of Main Feedwater?

AMSAC trips the....

A. regulating rods and starts the EFDWPs while DSS trips the main turbine.

B. regulating rods while DSS trips the main turbine and starts the EFDWPs.

C. main turbine and starts the EFDWPs while DSS trips the regulating rods.

D. main turbine while DSS trips the regulating rods and starts the EFDWPs.

A) C
A. INCORRECT: AMSAC does not trip the regulating rods / DSS does not trip the MT
B. INCORRECT: AMSAC does not trip the regulating rods / DSS does not trip the MT or start EFWPT.
C. CORRECT: AMSAC trips the turbine, starts all EFDWPS, DSS trips the control rods (also +125 added to setpoint/not part of this question).
D. INCORRECT: DSS does not start the EFDWPs.

Reference: Vol X, EFW System
E.O. 25
No correct answer. Not ONS

Replace with ONS Bank CF026102.

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.0/3.1
Source:	N	Exam:	OC02301
Test:	C	Misc:	CR

2. AUTO 2 position, MDEFDWPs will start when:

Both MFDWPs have low hydraulic oil pressure (< 75 psig)
***OR **
AMSAC/DSS (Diverse Scram System) enabled, AND
Both MFDWPs have low hydraulic oil pressure (< 75 psig)
(This must occur on both AMSAC Channels)
***OR**
AMSAC/DSS enabled, AND
Both MFDWPs have low discharge pressure (< 770 psig)
(both AMSAC Channels)

C. AMSAC (ATWS Mitigation Safety Actuation Circuit) and DSS (Diverse Scram System) are provided to mitigate the consequences of anticipated transient without SCRAM. The AMSAC/DSS consists of two channels and uses a two-out-of-two coincidence logic to actuate. Each channel has an AMSAC portion and a DSS portion. Upon actuation, AMSAC will trip the Main Turbine and start all operable EFDWPs. DSS will trip Control Rod Groups 5, 6 and 7 and shift the Turbine Bypass Valves control setpoint bias to +125 psig.

1. AMSAC is required in order to provide some control over the inevitable RCS pressure increase for the loss of Main FDW during an ATWS event, since the reactor will be producing power until the rods trip. A design standard for AMSAC pressure limitation has been set at 4000 psia in accordance with B & W analysis. In order to meet this objective EFDW is required to provide at least 1350 gpm.
2. AMSAC receives MFDWP signals from an independent set of pressure switches.
3. DSS is required to limit the period of time the reactor is producing power during an ATWS event. The design standard for DSS is to limit RCS pressure to an arbitrary value of 3250 psia. In order to meet this objective DSS is required to trip reg rods at a setpoint of 2450 $\pm$ 25 psig.

D. Manual Control - TDEFDWP (Figure OC-CF-EF-15)

51. A07AK21 001/T1G3/T1G3//C/A 3.7/3.5/N/OC002301/C/RFA
Which one of the following is correct concerning CCW siphon flow during a loss of all AC?

A. The first siphon takes a suction from the condenser inlet piping, supplies flow through the condenser, and discharges to the Keowee Hydro tailrace. The high point that this first siphon must overcome is the discharge of the CCW Pumps.

B. The second siphon takes a suction from the condenser inlet piping, supplies flow through the condenser and discharges to the Keowee Hydro tailrace. The high point that the second siphon must overcome is just down stream of the condenser.

C. The first siphon takes suction from the CCW intake canal and supplies flow to the CCW crossover header where the LPSW system takes its suction. The high point that the first siphon must overcome is just down stream of the condenser.

D. The second siphon takes suction from the CCW intake canal and supplies flow to the CCW crossover header where the LPSW system takes its suction. The high point that this second siphon must overcome is the discharge of the CCW Pumps.

A) B

Distractor Analysis:

The first siphon takes suction from the CCW intake canal and supplies flow to the CCW crossover header where the LPSW system takes its suction. The high point that this second siphon must overcome is the discharge of the CCW Pumps.

The second siphon takes a suction from the condenser inlet piping, supplies flow through the condenser and discharges to the Keowee Hydro tailrace. The high point that the second siphon must overcome is just down stream of the condenser.

Reference: Book I of II, Vol 2, OP-OC-STG-CCW, page 20 of 39.
EO - 11
K/A: A07AK21 (3.7/3.5)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T1G3	SRO Tier:	T1G3
Keyword:		Cog Level:	C/A 3.7/3.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

51. A07AK21 001
Which one of the following is correct concerning CCW siphon flow during a loss of offsite power?

A. The first siphon takes a suction from the condenser inlet piping, supplies flow through the condenser, and discharges to the Keowee Hydro tailrace. The high point that this first siphon must overcome is the discharge of the CCW Pumps.

B. The second siphon takes a suction from the condenser inlet piping, supplies flow through the condenser and discharges to the Keowee Hydro tailrace. The high point that the second siphon must overcome is just down stream of the condenser.

C. The first siphon takes suction from the CCW intake canal and supplies flow to the CCW crossover header where the LPSW system takes its suction. The high point that the first siphon must overcome is just down stream of the condenser.

D. The second siphon takes suction from the CCW intake canal and supplies flow to the CCW crossover header where the LPSW system takes its suction. The high point that this second siphon must overcome is the discharge of the CCW Pumps.

A) B

Distractor Analysis:

The first siphon takes suction from the CCW intake canal and supplies flow to the CCW crossover header where the LPSW system takes its suction. The high point that this second siphon must overcome is the discharge of the CCW Pumps.

The second siphon takes a suction from the condenser inlet piping, supplies flow through the condenser and discharges to the Keowee Hydro tailrace. The high point that the second siphon must overcome is just down stream of the condenser.

Reference: Book I of II, Vol 2, OP-OC-STG-CCW, page 20 of 39.
EO - 11
K/A: A07AK21 (3.7/3.5)
RO/SRO: Both
Level: C
Author: rfa

KA?
Added "loss of off-site power" to question stem to prevent assumption of blackout conditions.
Suggest cognitive level = knowledge

RO Tier:	T1G3	SRO Tier:	T1G3
Keyword:		Cog Level:	C/A 3.7/3.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

52. E02EK11 001/T1G2/T1G2//C/A 3.6/3.6/B/OC002301/C/OC
Unit 1 conditions:

INITIAL CONDITIONS:

1. Reactor power = 20%
2. Unit startup in progress
3. All RCPs operating

CURRENT CONDITIONS:

1. Reactor trip
2. Reactor power = 1% and decreasing
3. RCS pressure = 1950 psig and deceasing
4. Condenser vacuum = 19 inches and decreasing
5. 1A2 RCP tripped

Which ONE of the following is the cause of the reactor trip?

A. Low RCS pressure.

B. Power to flow to imbalance.

C. Main turbine anticipatory.

D. Loss of feedwater anticipatory trip.

Answer D

A. Incorrect - RCS pressure > 1810 psig.
B. Incorrect - Rx power < min. flux/flow/imb trip setpoint.
C. Incorrect - Rx power < 29.75%, turb. anticipatory trip bypassed.
D. Correct - Operating MFDWP tripped on low vacuum.

K/A E02EK11 (3.6/3.6)
T1G2, T1G2
Bank
Reference: Facility updated question bank (Question 5 IC090301 IC090301)

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.6/3.6
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

52. E02EK11 001

Unit 1 conditions:

INITIAL CONDITIONS:

- Reactor power = 20%
- Unit startup in progress
- All RCPs operating

CURRENT CONDITIONS:

- Reactor trip
- Reactor power = 1% and decreasing
- RCS pressure = 1950 psig and decreasing
- Condenser vacuum = 19 inches and decreasing
- 1A2 RCP tripped

Which ONE of the following is the cause of the reactor trip?

A. Low RCS pressure.

B. Power to flow to imbalance.

C. Main turbine anticipatory.

D. Loss of feedwater anticipatory trip.

Answer D

A. Incorrect - RCS pressure > 1810 psig.
B. Incorrect - Rx power < min. flux/flow/imb trip setpoint.
C. Incorrect - Rx power < 29.75%, turb. anticipatory trip bypassed.
D. Correct - Operating MFDWP tripped on low vacuum.

K/A E02EK11 (3.6/3.6)
T1G2, T1G2
Bank
Reference: Facility updated question bank (Question 5 IC090301 IC090301)

No changes

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.6/3.6
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

53. E03EK21 001/T1G1/T1G1//C/A 3.4/3.8/B/OC002301/C/OC
Unit 3 plant conditions:

1. Reactor Building Pressure = 3.5 psig
2. RCS Pressure = 800 psig
3. RCS Tc = 445°F
4. RCS Th = 465°F
5. An average of ALL CETCs = 489°F
6. An average of 5 highest CETCs (ICCM Tr.B) = 518°F
7. An average of the 5 highest of ALL qualified CETC's = 547°F

Which ONE of the following is the correct Train "B" ICCM Core subcooling margin indication the operator will observe on the SCM window LED on UB1?

SEE ATTACHMENT

A. 0°F not flashing

B. (+) 9°F not flashing

C. 0°F flashing

D. (-) 9°F flashing

Answer C

A. incorrect - number "0" flashes in the sat. band
B. incorrect - uses average of all CETC's
C. correct - Average of the 5 highest CETC from B Train w/ 800 psig => saturated condition
D. Incorrect - uses 5 highest of ALL CETC's

K/A: E03EK21 (3.4/3.8)
T1G1, T1G1
Bank
Reference: Facility updated question bank 21 IC084302 IC084302

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

53. E03EK21 001

Unit 3 plant conditions:

- Reactor Building Pressure = 3.5 psig
- RCS Pressure (ICCM) = 800 psig
- RCS Tc = 445°F
- RCS Th = 465°F
- An average of ALL CETCs = 489°F
- An average of 5 highest CETCs (ICCM Tr.B) = 518°F
- An average of the 5 highest of ALL qualified CETC's = 547°F

Which ONE of the following is the correct Train "B" ICCM Core subcooling margin indication the operator will observe on the SCM window LED on UB1?

SEE ATTACHMENT: EOP Encl. 5.18, P/T Curves

A. 0°F not flashing

B. (+) 9°F not flashing

C. 0°F flashing

D. (-) 9°F flashing

Answer C

A. incorrect - number "0" flashes in the sat. band
B. incorrect - uses average of all CETC's
C. correct - Average of the 5 highest CETC from B Train w/ 800 psig => saturated condition
D. Incorrect - uses 5 highest of ALL CETC's

Required reference: EOP Encl. 5.18, P/T Curves

K/A: E03EK21 (3.4/3.8)
T1G1, T1G1
Bank
Reference: Facility updated question bank 21 IC084302 IC084302

Added "ICCM" to RCS pressure in stem
Added enclosure 5.18, P/T Curves (new EOP) to stem and answer explanation section.

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.4/3.8
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

54. E03EK3.1 001/T1G1/T1G1//MEM 3.2/3.8/N/OC002301/C/CR
Given the following plant conditions:

- The reactor is tripped.
- RCS subcooled margin is zero.

Which of the following actions would result in increasing RCS subcooling margin?

A. Decrease RCS pressurizer level.

B. Decrease RCS hot leg flow.

C. Increase RCS loop pressure.

D. Increase RCS hot leg temperature.

A- This would further reduce RCS pressure, if a bubble still exists in the PZR, level may increase if voids are forming.
B- This would decrease the ability to transfer heat, and therefore would not increase SCM
C- CORRECT Raising pressure will increase the SCM by moving the RCS up and to the left on the SPDS trace moving away from the saturation and zero SCM line.
D- This would move the RCS to the right on the ICCM trace and therefore decrease RCS SCM.

Reference: Vol V, Bk 1 of 2, Loss of Subcooling

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.2/3.8
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

54. E03EK3.1 001

Given the following plant conditions:

- The reactor is tripped.
- RCS subcooled margin is zero.

Which of the following actions would result in increasing RCS subcooling margin?

A. Decrease RCS pressurizer level.

B. Decrease RCS hot leg flow.

C. Increase RCS loop pressure.

D. Increase RCS hot leg temperature.

A- This would further reduce RCS pressure, if a bubble still exists in the PZR, level may increase if voids are forming.
B- This would decrease the ability to transfer heat, and therefore would not increase SCM
C- CORRECT Raising pressure will increase the SCM by moving the RCS up and to the left on the SPDS trace moving away from the saturation and zero SCM line.
D- This would move the RCS to the right on the ICCM trace and therefore decrease RCS SCM.

Reference: Vol V, Bk 1 of 2, Loss of Subcooling
No changes

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.2/3.8
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

55. E04EK21 001/T1G2/T1G2//C/A 3.8/4.2/N/OC002301/C/CR
Given the following plant conditions:

- Time is 5 minutes after a reactor trip due to loss of both Main Feedwater Pumps.
- No Emergency/Auxiliary Feedwater Pumps are operating.
- Tincore is 590°F and increasing.
- RCS pressure is 2325 psig and increasing.
- All 4 RCPs are running.
- "A" OTSG level is 30 inches Narrow Range.
- "A" OTSG pressure is 1010 psig and stable.
- "B" OTSG level is 0 inches Narrow Range.
- "B" OTSG pressure is 800 psig and decreasing.
- RCS heat up rate is +30°F / Hr.
- RCP "A" seal supply is 10 gpm.

Which of the following action(s) is required concerning operation of the RCPs?

A. Stop 1 RCP per loop.

B. Stop RCP 1A.

C. Stop all 4 RCPs.

D. Continue to run all 4 RCPs.

A. CORRECT; RNO Step 3 of the EOP's Loss of Heat transfer tab, reduces the running RCPs to 1 per loop.
B. Misconception that leave 1 RCP for spray flow.
C. Do not place plant in NC with no other heat removal sources (OTSG), also have not increased T incore 50° since the trip.
D. Running 4 RCPS just adds more heat to the RCS.

Reference: EOP's Loss of Heat Transfer tab

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.8/4.2
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

55. E04EK21 001

Given the following plant conditions:

- Time is 15 minutes after a reactor trip due to loss of both Main Feedwater Pumps.
- No Emergency Feedwater Pumps are operating.
- CETCs is 590°F and increasing.
- RCS pressure is 2325 psig and increasing.
- All 4 RCPs are running.
- "1A" OTSG level indicates 15 inches XSUR.
- "1A" OTSG pressure is 1010 psig and stable.
- "1B" OTSG level indicates 13 inches XSUR.
- "1B" OTSG pressure is 800 psig and decreasing.
- RCS heat up rate is +30°F / Hr.
- RCP "1A1" seal supply is 10 gpm.

Which of the following action(s) is required concerning operation of the RCPs?

A. Stop one RCP per loop.

B. Stop RCP 1A1.

C. Stop all 4 RCPs.

D. Stop all but one RCP.

A. RNO Step 3 of the EOP's Loss of Heat transfer tab, reduces the running RCPs to 1 per loop but this step does not apply because HPI F/C would have been initiated.
B. Misconception that leave 1 RCP for spray flow.
C. Do not place plant in NC with no other heat removal sources (OTSG), also have not increased T incore 50° since the trip.
D. Correct; RULE 4 (Initiation of HPI Forced Cooling) will have been perfromed because RCS pressure is > 2300 psig and no SG feed. RULE 4 reduces operating RCPs to one.

No correct answer for ONS. HPI forced cooling would be initiated at 2300 psig per LOHT tab of EOP and a transfer would be made to HPI C/D tab. Step 3 RNO would not be performed. Rule 4 would be performed which will secure all but 1 RCP.
Changed stem and alternatives to unit 1 specific
Changed time from reactor trip to 15 minutes. ONS SGs may not be dry at 5 minutes from trip with loss of FDW. 15 minutes allows time to boil SGs dry and CETCs to increase to 590 degrees.
Deleted "auxiliary" from stem...not ONS terminology
Changed "Tincore" to CETCs to match ONS terminology
Changed "Narrow Range" to XSUR to match ONS terminology
Changed "30 inches" level in A OTSG to 15 inches to match expected SG level for loss of heat transfer with RCPs running.
Changed "D" alternative to be correct answer "Stop all but 1 RCP".

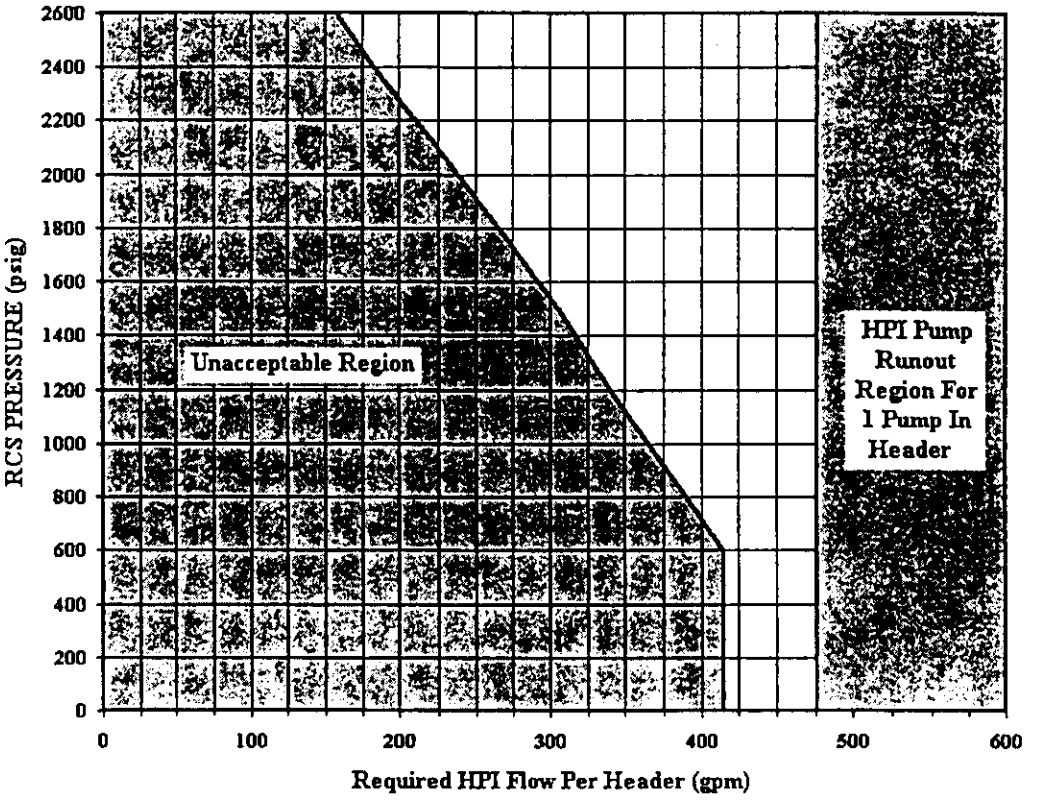
RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.8/4.2
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Close 1HP-5.	
2. __ Verify <u>any</u> HPI pump can be operated.	1. __ Stop <u>all</u> RCPs. 2. __ Ensure 1RC-66 SETPOINT SELECTOR is in HIGH. 3. __ **GO TO** Step 16.
3. Ensure the following are open: __ 1HP-24 __ 1HP-25	1. __ **IF** <u>both</u> BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. Ensure the following are open: __ 1LP-6 __ 1LP-7 __ 1LP-9 __ 1LP-10 __ 1LP-15 __ 1LP-16 B. __ Start 1A or 1B LPI Pump. C. __ Dispatch an operator to open 1HP-363 (LETDOWN LINE TO LPI PUMP SUCTION BLOCK) (A-1-119, U1 LPI Hatch Rm, N end). D. __ **GO TO** Step 4. 2. __ Start 1C HPI Pump. 3. __ **IF** 1C HPI Pump is operating, **THEN GO TO** Step 5. 4. __ Start standby HPIP. 5. __ **GO TO** Step 5.
4. __ Ensure <u>all available</u> HPI pumps are operating.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5. Open the following: __ 1HP-26 __ 1HP-27	
6. __ Ensure 1RC-4 is open.	
7. __ Verify flow exists in any HPI header.	__ **GO TO** Step 9.
8. __ Open PORV.	
9. __ Verify ≥ two HPI pumps operating.	1. __ **IF NO** HPI pumps are operating, **THEN** perform the following: A. __ Stop all RCPs. B. __ Ensure 1RC-66 SETPOINT SELECTOR is in HIGH. C. __ **GO TO** Step 16. 2. __ **IF** 1A, **OR** 1B HPI Pump is operating, **THEN** perform the following: A. __ Open 1HP-410. B. __ **GO TO** Step 11.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. __ Verify flow in <u>both</u> HPI headers is in the acceptable region of Figure 1 (Required HPI Flow Per Header).	1. __ **IF** 1A HPI header flow is unacceptable, **THEN** open 1HP-410. 2. __ **IF** 1B HPI header flow is unacceptable, **THEN** open 1HP-409.

Figure 1
Required HPI Flow Per Header



11. __ Verify flow exists in <u>any</u> HPI header.	1. __ Stop <u>all</u> RCPs. 2. __ Ensure 1RC-66 SETPOINT SELECTOR is in HIGH. 3. __ **GO TO** Step 16.
12. __ Ensure PORV is open.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. __ Verify > one RCP operating.	__ **GO TO** Step 15.

NOTE

1A1 RCP provides the best Pzr spray and is preferred to be left running in case recovery from HPI forced cooling is performed and a Pzr bubble drawn.

14. __ Stop <u>all but one</u> RCP.	
15. __ Limit HPI flow to ≤ 475 gpm (including seal injection) in each header with only one HPI pump operating.	
16. __ De-energize <u>all</u> Pzr heaters.	
17. __ **EXIT** this enclosure.	

END

56. E05EA11 001/T1G1/T1G1//MEM 4.2/4.2/B/OC002301/C/OC

With Unit 1 operating at 100% power and the ICS in the fully integrated mode, a loss of KI (ICS AUTO) occurs. Which ONE of the following will occur IF the reactor trips one minute later?

ASSUME NO OPERATOR ACTION

A. Turbine Bypass Valves (TBVs) FAIL closed causing a RCS heatup.

B. Excessive Main FDW flow will cause RCS overcooling.

C. Turbine bypass valves fail open causing overcooling.

D. Reduced MFW flow will cause an RCS heatup.

Answer B

A. Incorrect: TBVs are operable in manual on KU (hand) source.
B.Correct: Loss of KI reverts all stations to manual. FDW valves and pumps remain in manual and FDW does not runback upon unit trip.
C.Incorrect: TBVs are operable in manual on KU (hand) source.
D.Incorrect: TBVs are operable in manual on KU (hand) source.

K/A: E05EA11 (4.2/4.2
T1G1, T1G1
Bank
Reference: Facility updated question bank 31 STG123302 STG123302

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.2/4.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

56. E05EA11 001

With Unit 1 operating at 100% power and the ICS in the fully integrated mode, a loss of KI (ICS AUTO) occurs. Which ONE of the following will occur IF the reactor trips one minute later?

ASSUME NO OPERATOR ACTION

A. Turbine Bypass Valves (TBVs) FAIL closed causing a RCS heatup.

B. Excessive Main FDW flow will cause RCS overcooling.

C. Turbine bypass valves fail open causing overcooling.

D. Reduced MFW flow will cause an RCS heatup.

Answer B

A. Incorrect: TBVs are operable in manual on KU (hand) source.
B.Correct: Loss of KI reverts all stations to manual. FDW valves and pumps remain in manual and FDW does not runback upon unit trip.
C.Incorrect: TBVs are operable in manual on KU (hand) source.
D.Incorrect: TBVs are operable in manual on KU (hand) source.

K/A: E05EA11 (4.2/4.2
T1G1, T1G1
Bank
Reference: Facility updated question bank 31 STG123302 STG123302

No changes
Suggest cognitive level above knowledge

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 4.2/4.2
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

57. E09EA12 001/T1G1/T1G1//C/A 3.3/3.5/B/OC002301/C/OC
Given the following plant conditions:

Reactor trip has occurred.
Natural Circulation cooldown in progress with Emergency Feedwater.
During the cooldown, a transition is made from EFW to MFW.

Which of the following identifies the resulting core delta T (Thot minus Tcold) following this transition?

A. Decreases because OTSG saturation temperature decreases.

B. Decreases because natural circulation flow in the RCS decreases due to a higher thermal center with MFW.

C. Increases because natural circulation flow in the RCS decreases due to a lower thermal center with MFW.

D. Remains the same because of the hotter water and lower thermal center with MFW.

A. This only affects the OTSG Tcold.
B. The thermal center is lower with MFW.
C. CORRECT: Lower thermal center less driving head lower flow therefore higher delta T
D. With lower flow and lower center delta T has to change.

Reference: Vol VII, Accident Mitigation Core Cooling mechanics

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.3/3.5
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

57. E09EA12 001

Given the following plant conditions:

- Reactor trip has occurred.
- Natural Circulation in progress with Emergency Feedwater.
- 30 minutes later, a transition is made from EFW to MFW.

Which of the following identifies the resulting core delta T (Thot minus Tcold) following this transition?

A. Decreases because OTSG saturation temperature decreases.

B. Decreases because natural circulation flow in the RCS decreases due to a higher thermal center with MFW.

C. Increases because natural circulation flow in the RCS decreases due to hotter water with MFW.

D. Remains the same because of the hotter water and lower thermal center with MFW.

A. This only affects the OTSG Tcold.
B. The thermal center is lower with MFW.
C. CORRECT: Lower thermal center less driving head lower flow therefore higher delta T
D. With lower flow and lower center delta T has to change.

Reference: Vol VII, Accident Mitigation Core Cooling mechanics
Deleted "cooldown" in stem to match expected time frame for MFW conditions. MFW temperature is assured to be hotter than EFW 30 minutes after the trip. A cooldown would not be initiated this soon. Without a timeframe, cannot be assured that MFW temp > EFW temp.

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.3/3.5
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

58. G2.1.17 001/T3/T3//MEM 3.5/3.6/B/OC002301/C/OC
Unit 3 plant conditions:

1. Reactor power = 100%
2. Statalarm 3SA-8/D3 (FDWPT A Turning Gear Motor Overload) actuates
3. The CRSRO is in the OSC

Which ONE of the following is correct per NSD-509 (Site Standards in support of operational focus)?

After acknowledging the alarm the BOP must...

A. find the CRSRO and communicate the alarm to him face-to-face.

B. page the CRSRO to the Control Room using the Plant PA system.

C. brief the CRSRO on the alarm when he returns to the Control Room.

D. communicate the alarm to the OATC since the CRSRO is absent.

A. Required per AI-412.
B. CORRECT: This may be deleted when face to face communication is used.
C. Required per AI-412.
D. Required per AI-412.

Reference: Vol IX, Communication Standards

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.5/3.6
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

58. G2.1.17 001

Unit 3 plant conditions:

- Reactor power = 100%
- Statalarm 3SA-8/D3 (FDWPT A Turning Gear Motor Overload) actuates
- The CRSRO is in the OSC

Which ONE of the following is correct per NSD-509 (Site Standards in Support of Operational Focus)?

After acknowledging the alarm the BOP must...

A. find the STA and communicate the alarm face-to-face.

B. page the CRSRO to the Control Room using the Plant PA system.

C. brief the CRSRO on the alarm upon return to the Control Room.

D. call the WCC and communicate the alarm to the WCC SRO.

A) C

Reference: NSD-509
A, C, and D are acceptable methods of communicating the alarm to the SRO.

Modified "A" and "D" to be incorrect.

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.5/3.6
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

EXAMPLES

- Maintenance provides a list of alarms prior to starting on-line engineered safeguards testing.
- NLO calls the control room immediately prior to generating alarms during battery testing on rounds.
- CR SRO identifies potential Loose Parts Monitor alarms in the pre-job briefing for an RCP start.
- Painter calls the control room after accidentally striking a level float in a sump.

2. **Guidance and Examples on Announcing Alarms** (Applicable to all annunciator/statalarms, all priority OAC alarms and any other OAC alarms deemed important by the RO.)

   Note: IF the CR SRO is not available in the immediate area of the control boards to acknowledge the receipt of unexpected alarms, he will be provided a summary of those alarms received in his absence upon his return.

   Unexpected Alarm: Acknowledging RO announces the noun name of the alarm. The other RO and the CR SRO repeats or paraphrases the noun name of the alarm.

   Individual Expected Alarm: Acknowledging RO announces the noun name of the alarm and "previously reviewed" or "expected" along with the reason for the alarm. If the alarm response has been reviewed during the shift, acknowledging RO states "previously reviewed" or "expected". The other RO and CR SRO repeat or paraphrase the announcement of the alarm.

   Multiple Expected Alarms due to preplanned (briefed) evolutions: Acknowledging RO announces the noun names of the alarms and "expected alarms", or announces the reason for the alarms and "expected alarms". The other RO and CR SRO repeat or paraphrase the alarms.

   Nuisance Alarm: The CRSRO may direct the RO to acknowledge the alarm without announcing the alarm or announce "expected" as appropriate.

   Exceptions:

   1. The SRO may choose to require only the acknowledging RO and the SRO to verbalize alarms if critical plant evolutions are in progress which require increased focus on plant indications/controls. For this exception to apply:

      1.1. The SRO will communicate to the RO that his activity is considered 'critical'.

      1.2. The RO will not be involved in communications about alarms not directly related to his task while performing the 'critical' task.

      1.3. The SRO shall determine which alarm(s) to communicate to the RO involved in the critical evolution.

      1.4. The RO shall inform the SRO when his critical task is completed and will participate in 3 way communication on all subsequent CR alarms.

EXAMPLES

- Unexpected alarm "Turbine Building Temperature High".

  Communication: 1st RO: "Bill and Pete, 'Turbine Building Temperature High' ".
  CR SRO: "Turbine building high temp".
  2nd RO "Turbine building high temperature".
  1st RO: "That's correct". (BOP RO reviews alarm response.)

- Expected alarm "Turbine Building Sump In Purge" received for the first time on shift

  Communication: BOP RO: "Bill and Pete 'Turbine Building Sump In Purge', expected alarm".
  2nd RO "Turbine Building Sump In Purge, expected alarm".

59. G2.1.20 001/T3/T3//MEM 4.3/4.2/N/OC002301/C/RFA
Which one of the following set of requirements is correct for "Out of Sequencing of Procedure Steps" as stated in NSD 704, "Technical Procedure Use and Adherence?"

A. The performer AND the Operations Manager shall initial the applicable step(s). An evaluation of the consequences of the change shall be performed by the Operations manager. An explanation for the sequence change should be documented on the procedure.

B. The performer ONLY shall initial the applicable step(s). The re-sequencing of the step does not alter the acceptance criteria or overall intent of the procedure. An evaluation of the consequences of the change shall be performed by the Operations manager.

C. The performer AND the Operations Manager shall initial the applicable step(s). An evaluation of the consequences of the change shall be performed by the Operations manager. The re-sequencing of the step must not alter the acceptance criteria or overall intent of the procedure.

D. The performer only shall initial the applicable step(s). An evaluation of the consequences of the change shall be performed by the Operations manager. An explanation for the sequence change should be documented on the procedure.

A) A

Reference: Lesson Plans Vol X, OP-OC-BPS-BP , page 27 of 47.
EO - 5.5C.2
K/A: G2.1.20 (4.3/4.2)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 4.3/4.2
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

59. G2.1.20 001

Which one of the following set of requirements is correct for "Out of Sequencing of Procedure Steps" as stated in OMP 1-9, "Use of Procedures?"

A. The performer AND the Operations Shift Manager shall initial the applicable step(s). An evaluation of the consequences of the change shall be performed by the Operations manager. An explanation for the sequence change shall be documented on the procedure.

B. The performer ONLY shall initial the applicable step(s). The re-sequencing of the step does not alter the acceptance criteria or overall intent of the procedure. An evaluation of the consequences of the change shall be performed by the Operations manager.

C. The performer AND the Operations Shift Manager shall initial the applicable step(s). An evaluation of the consequences of the change shall be performed by the Operations manager. The re-sequencing of the step MAY alter the acceptance criteria or overall intent of the procedure.

D. The performer ONLY shall initial the applicable step(s). An evaluation of the consequences of the change shall be performed by the Operations manager. An explanation for the sequence change should be documented on the procedure.

A) A

Reference: Lesson Plans Vol X, OP-OC-BPS-BP , page 27 of 47.
EO - 5.5C.2
K/A: G2.1.20 (4.3/4.2)
RO/SRO: BOTH
Level: M
Author: rfa

Initially "A" and "C" correct answers. OMP 1-9, Use of Procedures section 6.3 further defines Operations policy for out of sequencing steps.

Operations further defines procedure adherence within OMP 1-9 Use of Procedures.
Changed stem to use OMP 1-9 as reference instead of NSD 509. NSD 509 uses terminology "supervisor" while the OMP defines this supervisor to be the OSM. To make stem and alternatives compatible, changed stem to OMP reference.
Changed "C" alternative to be incorrect by changing last sentence from "must not..." to "MAY...".

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 4.3/4.2
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

b) Minor deviations which **DO NOT** alter the intent of the procedure are allowed as follows:

1) Out-of-Sequencing of Procedure Steps

- Shall be approved by an Operations Manager
- The performer and the Operations Manager shall initial the Step(s).
- An explanation for the sequence change should be documented on the Procedure.
- An evaluation of the consequences of this change of sequence shall be performed by the Operations Manager.

2) NAing of Procedure Steps

- Conditional steps can be NAed by the performer.
- Non-conditional steps must be approved by an Operations Manager.
- The performer and the Operations Manager shall initial the Step(s).
- An explanation for the omission of the step is noted on the Procedure.
- The omission of the step does not alter the acceptance criteria or overall intent of the procedure.

5. Management Expectations (selected)

- If at any time during the performance of a procedure, the anticipated results are not, or will not be obtained, the performer should immediately stop, and if necessary, return the system to a safe condition. This condition should be immediately reported to supervision.
- Continuous Use or Reference Use procedures shall be at the job site.
- When a procedure is performed within a contaminated or other remote area, the performer shall have a copy of those applicable pages at the job site, or be in direct communication with someone who does.
- Information Use procedures are not required to be at the job site, IF the procedure is frequently performed and relatively simple, such that the procedure requirements have been committed to memory.
- For Continuous Use procedures, each step shall be read, understood, and performed as written, then signed off when completed, if signoff is required.
- Procedures shall only be used for the intent and purpose for which they were written.

60. G2.1.28 001/T3/T3//MEM 3.2/3.3/N/OC002301/C/RFA
Which one of the following set of switch manipulations (located in the HVAC room), is correct for the exhaust fans and associated dampers to the SSF DG ventilation subsystem?

A. When switch (SW-1) is in the OFF position and the ON push button of purge switch (SW-2) is pushed, all fire protection is bypassed and fan XF-1 will start. When the purge OFF button is pushed OR SW-1 is moved, the fan will shutdown and fire protection will be reinstated.

B. When switch (SW-1) is in the ON position, the starting and stopping of the system is controlled by the operation of the SSF DG. When switch (SW-1) is in the AUTO position, AND the fire protection equipment is in the NORMAL mode, exhaust fan (XF-1) will start and associated dampers will operate.

C. When switch (SW-2) is in the OFF position and the ON push button of purge switch (SW-1) is pushed, all fire protection is bypassed and fan XF-1 will start. When the purge OFF button is pushed AND SW-1 is moved, the fan will shutdown and fire protection will be reinstated.

D. When switch (SW-2) is in the ON position, the starting and stopping of the system is controlled by the operation of the SSF DG. When switch (SW-2) is in the AUTO position, AND the fire protection equipment is in the NORMAL mode, exhaust fan (XF-1) will start and associated dampers will operate.

A) A

Reference: Lesson Plans Book 1 of 2 Vol V, OP-OC-EAP-SSF , page 46 of 83.
EO - 26.4
K/A: G2.1.28 (3.2/3.3)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.2/3.3
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

60. G2.1.28 001

Plant conditions:

- A fire in the SSF Diesel Room has been detected
- PBM Pushbutton is depressed for TWO seconds

Which ONE of the following is the response of the SSF Diesel Carbon Dioxide Fire Suppression System?

A. Carbon dioxide is IMMEDIATELY discharged into the Diesel Room and stops discharging after TWO seconds.

B. Carbon dioxide is IMMEDIATELY discharged into the Diesel Room and is automatically stopped by a pre-set timer.

C. After ~sixty (60) seconds, carbon dioxide is discharged into the Diesel Room and is automatically stopped by a pre-set timer.

D. After ~sixty (60) seconds, carbon dioxide is discharged into the Diesel Room for a TWO second period.

A) C
A. Incorrect. If PBM pushbutton is used CO2 does not actually discharge until about 60 sec. At the end of the first timer (60 sec.) another timer will actuate and a full CO2 system discharge will occur for about 60 sec.
B. Incorrect. See A
C. Correct. See A
D. Incorrect. See A

Reference: Lesson Plans Book 1 of 2 Vol V, OP-OC-EAP-SSF , page 46 of 83.
EO - 26.4
K/A: G2.1.28 (3.2/3.3)
RO/SRO: Both
Level: M
Author: rfa

Would like to substitute another question placing importance of fire protection with the system. When adding switch noun names to question, "C" alternative becomes implausible.

Replaced with ONS Bank question:EAP204301

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.2/3.3
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

61. G2.1.7 001/T3/T3//C/A 3.7/4.4/N/OC002301/C/RFA
Given the following, which one of the following is correct MVA Load on the Main Generator?

- The generators design maximum load is 1038 MWe.
- The phase angle is 25.84 degrees
- The current MW load is 800 MW

A. 348.7

B. 452.4

C. 888.9

D. 1153.3
A) C

Distractor Analysis:

MVA = current MWe/P.F.
P.F.= Cos of the phase angle.

a. 800 x sin 25.84 = 348.7
b. 1038 x sin 25.84 = 452.4
c. 800/cos 25.84 = 888.9
d. 1038/cos 25.84 = 1153.3

Reference: Book I of II, Vol 2, OP-OC-STG-015, page 40 of 45.
EO - 7
K/A: G2.1.7 (3.7/4.4)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	C/A 3.7/4.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

61. G2.1.7 001

Which ONE of the following is the MAXIMUM MVAR load when operating at 500 MW at a .9 Power Factor, and 30 psig H_2 in generator?

SEE ATTACHMENT: Generator Capability Curve

A. 675

B. 445

C. 321

D. 140

A) B

Reference: Book I of II, Vol 2, OP-OC-STG-015, page 40 of 45.
EO - 7
K/A: G2.1.7 (3.7/4.4)
RO/SRO: Both
Level: C
Author: rfa

Substituted ONS question on generator capability to utilize application of the operating procedures. Current question not operationally oriented for ops procedures.

Reference required: generator capability curve

ONS Bank question STG-151

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	C/A 3.7/4.4
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

62. G2.2.22 001/T3/T3//MEM 3.4/4.1/N/OC002301/C/CR/RFA
Which of the following will require initiation of a reactor shutdown per Technical Specifications?

A. Unidentified RCS leakage of 1 gpm uncorrected for 1 hour.

B. Identified RCS leakage of 10 gpm uncorrcted for 1 hour.

C. 300 gpd total primary to secondary leakage through ALL OSTG's OR 150 gpd primary to secondary leakage through any one OTSG uncorrected for 12 hours.

D. 300 gpd total primary to secondary leakage through ALL OSTG's AND 150 gpd primary to secondary leakage through any one OTSG uncorrected for 5 hours.

A) D

Reference: TS 3.4.13

K/A: 2.2.22 (3.4/4.1)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.4/4.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR/RFA

62. G2.2.22 001

Which of the following will require INITIATION of a reactor shutdown per Technical Specifications?

SEE ATTACHMENT: TS 3.4.13 (RCS Operational Leakage)

A. Unidentified RCS leakage of 1 gpm for 1 hour.

B. Identified RCS leakage of 10 gpm for 1 hour.

C. 300 gpd total primary to secondary leakage through ALL OSTG's OR 150 gpd primary to secondary leakage through any one OTSG for 12 hours.

D. 300 gpd total primary to secondary leakage through ALL OSTG's AND 150 gpd primary to secondary leakage through any one OTSG for 5 hours.

A) D

Reference required: TS 3.4.13

K/A: 2.2.22 (3.4/4.1)
RO/SRO: Both
Level: M
Author: rfa

Capitalized "initiation" in stem for clarification
Removed "uncorrected" from alternatives. Term not used in ONS TS.
Added attachment TS 3.4.13 RCS Operational Leakage, reference required to answer question.
Suggest cognitive level above knowledge

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.4/4.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR/RFA

63. G2.2.34 001/T3/T3//C/A 2.8/3.2/N/OC002301/C/CR
Given the following plant conditions:

PZR off scale low
RCS pressure 1200 psig and decreasing slowly
Core Exit Thermocouples (CETs) reading 950°F and increasing slowly
NI-1/2 reading 5000 cps and increasing
Self Powered Neutron Detectors (SPNDs) current readings increasing

Which one of the following would explain the excore detectors increasing value?

A. Boron precipitation in the core.

B. Fuel coefficients effects.

C. Voiding in the downcomer.

D. Temperature effects on the excore detectors.

A. Boron would be decreasing the neutron population.
B. Fuel coefficients would have a negative affect on neutron population.
C. CORRECT: Given the conditions with the plant in region 3 of ICC would have downcomer voiding which will increase leakage for the excore detectors.
D. Temperature will not cause the indication to increase in the detectors.

Reference: Vol VIII, NI's,
Vol VII, Loss of DHR

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	C/A 2.8/3.2
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

63. G2.2.34 001

Given the following plant conditions:

- PZR off scale low
- RCS pressure 1200 psig and decreasing slowly
- Core Exit Thermocouples (CETCs) reading 950°F and increasing slowly
- NI-1/2 reading 5000 cps and increasing
- Self Powered Neutron Detectors (SPNDs) current readings increasing

Which one of the following would explain the excore detectors increasing value?

A. Boron precipitation in the core.

B. Fuel coefficients effects.

C. Voiding in the downcomer.

D. Temperature effects on the excore detectors.

A. Boron would be decreasing the neutron population.
B. Fuel coefficients would have a negative affect on neutron population.
C. CORRECT: Given the conditions with the plant in region 3 of ICC would have downcomer voiding which will increase leakage for the excore detectors.
D. Temperature will not cause the indication to increase in the detectors.

Reference: Vol VIII, NI's,
Vol VII, Loss of DHR
Changed acronym "CETs" to "CETCs" for ONS terminology

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	C/A 2.8/3.2
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

64. G2.3.1 001/T3/T3//MEM 2.6/3.0/B/OC002301/C/OC
An individual has accumulated the following doses:

1. Committed Dose Equivalent (CDE) is 2525 mr
2. Deep Dose Equivalent (DDE) is 2355 mr
3. Lens Dose Equivalent (LDE) is 744 mr
4. Committed Effective Dose Equivalent (CEDE) is 605 mr
5. Shallow Dose Equivalent (SDE) is 435 mr

Which ONE of the following is the individual's Total Effective Dose Equivalent (TEDE)?

A. 2790 mr

B. 2960 mr

C. 3534 mr

D. 4880 mr

Answer B
A. 2355 + 435 = 2790
B. Correct. TEDE = 605 (CEDE) + 2355 (DDE) = 2960
C. 2355 + 744 + 435 = 3534
D. 2525 + 2355 = 4880

K/A: G2.3.1 (2.6/3.0)
T3, T3
Bank/Mod
Reference: Facility updated question bank 61 RAD022501 RAD022501

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.6/3.0
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

64. G2.3.1 001

An individual has accumulated the following doses:

- Committed Dose Equivalent (CDE) is 2525 mr
- Deep Dose Equivalent (DDE) is 2355 mr
- Lens Dose Equivalent (LDE) is 744 mr
- Committed Effective Dose Equivalent (CEDE) is 605 mr
- Shallow Dose Equivalent (SDE) is 435 mr

Which ONE of the following is the individual's Total Effective Dose Equivalent (TEDE)?

A. 2790 mr

B. 2960 mr

C. 3534 mr

D. 4880 mr

Answer B
A. 2355 + 435 = 2790
B. Correct. TEDE = 605 (CEDE) + 2355 (DDE) = 2960
C. 2355 + 744 + 435 = 3534
D. 2525 + 2355 = 4880

K/A: G2.3.1 (2.6/3.0)
T3, T3
Bank/Mod
Reference: Facility updated question bank 61 RAD022501 RAD022501

No changes
Suggest cognitive level above knowledge

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.6/3.0
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

65. G2.3.2 001/T3/T3//MEM 2.5/2.9/N/OC002301/C/CR

A valve needs to be repositioned for the completion of a surveillance. The valve is located in a high radiation area. Lead shielding is draped over the valve handwheel. Which of the following is an accepted ALARA practice for repositioning the valve?

A. Reposition the lead shielding along the valve piping enough to reposition the valve; replace the shielding to its original position; inform Health Physics when you have completed the task.

B. Reposition the lead shielding so that it stays between you and the valve; reposition the valve by reaching around the shielding; replace the shielding to its original position.

C. Remove the lead shielding; reposition the valve; leave the lead shielding for the Health Physics technician to replace.

D. Remove the lead shielding with the permission of Health Physics; reposition the valve; replace the lead shielding.

A) D

Reasons:

A., B., and C. Lead shielding must not be moved without permission from Health Physics.

D. Lead shielding can only be moved with prior permission from Health Physics.

Reference: Vol I, Radiation Protection Practices

MEM

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.5/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

65. G2.3.2 001

A valve needs to be repositioned for the completion of a surveillance. The valve is located in a high radiation area. Lead shielding is draped over the valve handwheel. Which of the following is an accepted ALARA practice for repositioning the valve?

A. Reposition the lead shielding along the valve piping enough to reposition the valve; replace the shielding to its original position; inform Radiation Protection when you have completed the task.

B. Reposition the lead shielding so that it stays between you and the valve; reposition the valve by reaching around the shielding; replace the shielding to its original position.

C. Remove the lead shielding; reposition the valve;contact the WCC SRO to have the lead shielding replaced.

D. Stop work, contact WCC SRO to have an evaluation performed.

A) D

Reasons:

Do not move or remove shielding without RP and engineering evaluation.

Reference: GET Manual, Page 44
No correct answer per ONS procedures.

Changed "D" to be correct.
Changed "C" to add balance.

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.5/2.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

5.4 Temporary Shielding

Since shielding reduces dose, temporary shielding may be installed. The following are guidelines to use with temporary shielding:

- ALARA does not apply just to the individual but to the plant as a whole. If shielding reduces an individual's dose by 30 mrem, but causes other individuals to receive 50 mrem during the installation ***and removal of the shielding***, there is a net increase of 20 mrem for the station.

- ***Temporary shielding, usually in the form of blankets containing lead, may not be installed, removed, or moved without the permission of the RP and Engineering groups. Temporary shielding is heavy. It may stress a component beyond its design. If it is moved or removed, it may significantly change the dose rate. Consequently, it would change the dose received.***

5.5 Calculating Stay Time

The amount of time permitted in a Radiation Area, or stay time, depends on the:

- ***Maximum allowable exposure (MAE) dose limit.***
- ***Current TEDE.***
- ***Allowed dose .***
- ***Dose Rate.***

Stay time is used to ensure an individual does not exceed a limit by restricting the amount of time allowed in a radiation field.

66. G2.3.4 001/T3/T3//MEM2.5/3.1/N/OC002301/C/RFA
Which one of the following is considered to be an equivalent to a dose of 1 REM?

A. A dose of 1 REM of gamma radiation, a dose of 1 RAD of beta, a dose of 0.1 RADs of high energy protons, a dose of 0.5 RADs of alpha.

B. A dose of 1 RAD of gamma radiation, a dose of 1 RAD of beta, a dose of 0.05 RADs of neutrons, a dose of 0.1 RADs of alpha.

C. A dose of 1 REM of gamma radiation, a dose of 0.1 RADs of high energy protons, a dose of 0.05 RADs of neutrons, a dose of 0.5 RADs of alpha.

D. A dose of 1 RAD of gamma radiation, a dose of 1 RAD of beta, a dose of 0.1 RADs of high energy protons, a dose of 0.05 RADs of alpha.

A) D

Reference: Lesson Plans Vol 2, OP-OC-RAD-RPP, page 23 of 77.
EO - 1
K/A: G2.3.4 (2.5/3.1)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM2.5/3.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

66. G2.3.4 001

Which one of the following is considered to be an equivalent to a dose of 1 REM?

A. A dose of 1 REM of gamma radiation, a dose of 1 RAD of beta, a dose of 0.1 RADs of high energy protons, a dose of 0.5 RADs of alpha.

B. A dose of 1 RAD of gamma radiation, a dose of 1 RAD of beta, a dose of 0.05 RADs of neutrons, a dose of 0.1 RADs of alpha.

C. A dose of 1 REM of gamma radiation, a dose of 0.1 RADs of high energy protons, a dose of 0.05 RADs of neutrons, a dose of 0.5 RADs of alpha.

D. A dose of 1 RAD of gamma radiation, a dose of 1 RAD of beta, a dose of 0.1 RADs of high energy protons, a dose of 0.05 RADs of alpha.

A) D

Reference: Lesson Plans Vol 2, OP-OC-RAD-RPP, page 23 of 77.
EO - 1
K/A: G2.3.4 (2.5/3.1)
RO/SRO: BOTH
Level: M
Author: rfa

No changes

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM2.5/3.1
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

67. G2.4.12 001/T3/T3//MEM 3.4/3.9/N/OC002301/C/CR
Given the following plant conditions:

100% power.
A tube rupture occurs that results in an ES actuation on low RCS pressure.
An ALERT is declared based on the Fission Product Barrier Matrix.

Which one of the following identifies the notification requirements for the NRC Operations Center, State and County agencies?

A. Notify the NRC Operations Center within 15 minutes; notify the State and County agencies as soon as possible.

B. Notify the NRC Operations Center in less than one (1) hour; notify the State and County agencies within 15 minutes.

C. Notify the NRC Operations Center as soon as possible; notify the State and County agencies within 15 minutes.

D. Notify the NRC Operations Center within 15 minutes; notify the State and County agencies in less than one (1) hour.

A. Personnel as soon as possible, SWP w/i 15 minutes.
B. Personnel as soon as possible, SWP w/i 15 minutes.
C. CORRECT: Personnel as soon as possible, SWP w/i 15 minutes.
D. Personnel as soon as possible, SWP w/i 15 minutes.

Reference: Vol. V, Bk 1 of 2, OP-OC-EAP-SEP
Nuclear System Directives 114, 201, 202

E.O. 17.2

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.4/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

67. G2.4.12 001

Given the following plant conditions:

- 100% power.
- A tube rupture occurs that results in an ES actuation on low RCS pressure.
- An ALERT is declared based on the Fission Product Barrier Matrix.

Which one of the following identifies the INITIAL notification requirements for the NRC Operations Center, State and County agencies?

A. Notify the NRC Operations Center within 75 minutes; notify the State and County agencies as soon as possible.

B. Notify the NRC Operations Center in less than one (1) hour; notify the State and County agencies within 15 minutes.

C. Notify the NRC Operations Center within 75 minutes; notify the State and County agencies within 15 minutes.

D. Notify the NRC Operations Center within 15 minutes; notify the State and County agencies in less than one (1) hour.

A. Notify the NRC Operations Center in less than one (1) hour; notify the State and County agencies within 15 minutes.
B. CORRECT: Notify the NRC Operations Center in less than one (1) hour; notify the State and County agencies within 15 minutes.
C. Notify the NRC Operations Center in less than one (1) hour; notify the State and County agencies within 15 minutes.
D. Notify the NRC Operations Center in less than one (1) hour; notify the State and County agencies within 15 minutes.

Reference: Vol. V, Bk 1 of 2, OP-OC-EAP-SEP
Nuclear System Directives 114, 201, 202
RP/1002, Enc, 4.2 Alert

E.O. 17.2
"B" and "C" both correct. See reference for RP/1000/02, enclosure 4.3, Alert. NRC notification < 1 hr.
Added "initial notification" to stem for clarification
A. Changed NRC notification to 75 min.
C. Changed NRC to 75 min.
Changed correct answer to "B"

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.4/3.9
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

1. Immediate Actions

NOTE:
- State and County Agencies must be notified of event classification within **15 minutes** of Emergency Declaration.
- Provide Offsite Communicator with declaration time.

☐ 1.1 **IF** It has been determined that an Emergency Action Level for an Initiating Condition has been met,

THEN Declare an **Alert**.

Time of Declaration: _____

☐ 1.2 Appoint a person to maintain the Emergency Coordinator Log **OR** maintain the log yourself.

NOTE:
- Remind the Control Room Offsite Communicator that Follow Up notifications (updates) are required at least every **60 minutes** for this classification.
- Condition B for Keowee Hydro Project Dams/Dikes also requires notification of the Georgia Emergency Management Agency and National Weather Service. Remind the Control Room Offsite Communicator to notify these agencies in addition to and after SC State, Oconee County, and Pickens County.

☐ 1.3 Appoint Control Room Offsite Communicator(s).

NOTE: Steps 1.5 - 1.11 may be started/completed while the Emergency Notification Form is being prepared by the Offsite Communicator.

☐ 1.4 Review and approve completed Emergency Notification Form.

1.4.1 Sign Emergency Notification Form.

NOTE: Activate the Alternate TSC and OSC in the Oconee Office Building, Rooms 316 and 316A, if a fire in the Turbine Building, flooding conditions, security events, or onsite/offsite hazardous materials spill have occurred or area occurring.

☐ 1.5 Activate the Emergency Response Organization (ERO) by completing the following actions.

1.5.1 Activate ERO Pagers as follows:

NOTE: Flooding/dam failure/earthquake conditions assume bridges may be impassable to reach emergency facilities. Provide the code below for these conditions.

☐ A. **IF** ERO activation for an Emergency (Blue Echo) is required,
THEN Press ERO Pager Activation Panel Button **1**.

☐ B. **IF** ERO activation for an Emergency affecting bridges (Blue Echo Bridges) is required,
THEN Press ERO Pager Activation Panel Button **2**.

☐ C. **IF** ERO activation for a Drill (Blue Delta) is required,
THEN Press ERO Pager Activation Panel Button **3**.

☐ D. **IF** ERO activation for a Drill affecting bridges (Blue Delta Bridges) is required,
THEN Press ERO Pager Activation Panel Button **4**.

☐ E. **IF** Alternate TSC/OSC will be used,
THEN Press ERO Pager Activation Panel Button **5**.

☐ F. **IF** A Security Event is in progress,
THEN Press ERO Pager Activation Panel Button **6**.

☐ 1.5.2 Wait one minute and repeat step 1.5.1.

☐ 1.5.3 Monitor ERO Pager and verify that message has been provided to the ERO.

☐ 1.5.4 Repeat steps 1.5.1 - 1.5.3 if message is not displayed on ERO Pager.

A. **REFER TO** Enclosure 4.8, (ERO Pager Activation By Security), if the ERO Pager is not activated by the completion of Steps 1.5.1 - 1.5.3.

☐ 1.5.5 **IF** ERO activation is after normal working hours,

THEN Contact Security at extension 3636 or 2309.

Security Officer Name _____

A. Request Security Officer to activate the CAN call list.

WARNING: Conducting Site Assembly during a Security Event may not be prudent.

☐ 1.6 Contact the Security Shift Supervisor.

1.6.1 Inform the Security Shift Supervisor that the ERO has been activated.

1.6.2 Discuss the need to conduct Site Assembly.

☐ 1.7 **IF** A Security Event does **NOT** exist,

OR A Security Event does exist and the Security Shift Supervisor agrees,

THEN Conduct Site Assembly per RP/0/B/1000/009, (Procedure For Site Assembly), Enclosure 4.1 and 4.3.

☐ 1.8 **IF** Area Radiation Monitors are in **ALARM**,

OR Steam Line Break has occurred,

THEN Contact shift RP and dispatch onsite monitoring teams

NOTE:
- Remind the NRC Communicator to complete the NRC Event Notification Worksheet and Plant Status Sheet from OMP 1-14 (Notifications).
- An open line to the NRC may be required.

☐ 1.9 Appoint an SRO to notify the NRC immediately after notification of the Offsite Agencies but not later than **one (1) hour** after declaration of the emergency.

1.9.1 NRC Communicator (SRO) Name _____

NOTE: The NRC Communicator is responsible for activating ERDS.

☐ 1.9.2 Start the Emergency Response Data System (ERDS) for unit(s) involved within **one (1) hour** of the emergency classification.

A. **REFER TO** RP/0/B/1000/003A, (ERDS Operation).

☐ 1.10 **IF** Condition B at Keowee exists,

THEN **REFER TO** Enclosure 4.7, (Condition A/Condition B Response Actions), Step 3.0, for additional response actions.

☐ 1.11 Notify the Unit Operations Coordinator/Duty person of emergency status.

☐ 1.12 Return to Step 3.0, (Subsequent Actions), of this procedure.

68. G2.4.24 001/T3/T3//C/A 3.3/3.7/N/OC002301/C/CR
Given the following plant conditions:

100% power
RCS pressure 2155 psig
RCS temperature 579°F
RCS makeup flow has increased from 60 to 65 gpm
Pressurizer level is slowly decreasing
RA-47, (Auxiliary Building Ventilation Exhaust Duct) is in alarm
RA-40, (Condenser Vacuum Pump Off Gas Exhaust) is in alarm

Which one of the following entry conditions has been met?

A. A small break LOCA is in progress, enter the EPIAs and perform the Immediate and Subsequent Actions.

B. A small break LOCA is in progress, enter the SGTR tab section of the EOPs.

C. A tube leak is in progress, enter the EPIAs and perform the Immediate and Subsequent Actions.

D. A tube leak is in progress, enter AP-31, Primary to Secondary Leakage.

A) D

Reference: AOP 31, Primary to Secondary Leakage

C/A

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	C/A 3.3/3.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

68. G2.4.24 001

Given the following plant conditions:

- 100% power
- RCS pressure 2155 psig
- RCS temperature 579°F
- RCS makeup flow has increased from 40 to 45 gpm and stable
- Pressurizer level decreased and is now at setpoint and stable
- RIA-40, (CSAE Off-Gas Monitor) is in alarm

Which one of the following entry conditions has been met?

A. A small break LOCA is in progress, enter the EOP and perform the Immediate and Subsequent Actions.

B. A small break LOCA is in progress, enter the SGTR tab section of the EOP.

C. A tube leak is in progress, enter the EOP and perform the Immediate and Subsequent Actions.

D. A tube leak is in progress, enter AP/31, Primary to Secondary Leakage.

A) D

Reference: AP/31, Primary to Secondary Leakage

C/A
Changes to question for clarification of <25 gpm tube leak. Above this value would require EOP entry. Also made changes to stem based on expected ONS plant response. See below:

Deleted RA-47 from stem...not an ONS component.
Changed name of RA-40 to RIA-40 (CSAE Off-Gas Monitor)" to support ONS terminology.
Changed RCS makeup flow to read "40-45 and stable" to match ONS expected plant response.
Changed stem to indicate that pressurizer level is stable.
A & B alternatives: changed EPIAs to EOP to match ONS terminology

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	C/A 3.3/3.7
Source:	N	Exam:	OC002301
Test:	C	Misc:	CR

69. G2.4.25 001/T3/T3//M 2.9/3.4/B/OC002301/C/OC
Plant conditions:

1. A fire has occurred
2. Appendix R pumps required for plant shutdown cannot be operated from their normal power supply

Which ONE of the following is correct?

I&E will align power to these pumps from...

A. CT-5 (Lee Station feeder) through the Appendix R Switchgear.

B. CT-5 (Lee Station feeder) through motor starters on the back of the Appendix R Portable Valve Control Panel.

C. CT-4 (Keowee underground feeder) through the Appendix R Switchgear.

D. CT-4 (Keowee underground feeder) through motor starters on the back of the Appendix R Portable Valve Control Panel.

Answer C

K/A: (2.9/3.4)
T3, T3
Bank
Reference: Facility updated question bank 46 CP101202 CP101202

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	M 2.9/3.4
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

69. G2.4.25 001

Plant conditions:

- A fire has occurred
- Appendix R pumps required for plant shutdown cannot be operated from their normal power supply

Which ONE of the following is correct?

I&E will align power to these pumps from...

A. CT-5 (Lee Station feeder) through the Appendix R Switchgear.

B. CT-5 (Lee Station feeder) through motor starters on the back of the Appendix R Portable Valve Control Panel.

C. CT-4 (Keowee underground feeder) through the Appendix R Switchgear.

D. CT-4 (Keowee underground feeder) through motor starters on the back of the Appendix R Portable Valve Control Panel.

Answer C

K/A: (2.9/3.4)
T3, T3
Bank
Reference: Facility updated question bank 46 CP101202 CP101202

No changes

RO Tier:	T3	SRO Tier:	T3
Keyword:		Cog Level:	M 2.9/3.4
Source:	B	Exam:	OC002301
Test:	C	Misc:	OC

1. 001A411 001/T2G1///C/A 3.5/4.1/N/OC002301/RO/RFA
Which one of the following should the operator do, in accordance with the Controlling procedure for Unit Startup (OP/1,2,3/A1102/01), if shutdown margin has been reduced with intent of going critical and reactor startup is temporarily suspended?

A. Insert CRDs to group 1 at 50% and calculate a shutdown margin per PT/1103/015, Reactivity balance Calculation.

B. Limit SG levels to < 40 inches on Startup Range and maintain >1%delta K/K Shutdown Margin for 200 F RCS temperature with a Xenon free core.

C. Insert CRDs to group 1 at 50% and limit SG levels to < 40 inches on Startup Range.

D. Calculate a shutdown margin per PT/1103/015, Reactivity balance Calculation and maintain >1%delta K/K Shutdown Margin for 200 F RCS temperature with a Xenon free core.

A) a

Distractor Analysis:

When in mode 3 or higher, maintain the following:

Limit SG levels to < 40 inches on Stertup Range OR maintain >1%delta K/K Shutdown Margin for 200 F RCS temperature with a Xenon free core.

This prevents accidental criticality caused by a MS line break overcooling.

If shutdown margin has been reduced with intent of going critical and reactor Startup is suspended (this does not apply during ZPPT) then:

Insert CRDs to group 1 at 50% and calculate a shutdown margin per PT/1103/015, Reactivity balance Calculation.

Inserting rods to group 1 at 50% will place the reactor in a condition of being shutdown by the worth of the safety rods, while having further shutdown capability with the remaining worth of Group 1.

Reference: Lesson Plans Vol 2, OP-OC-CP-011, page 11 of 43.
EO - 23
K/A: 001A411 (3.5/4.1)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 3.5/4.1
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

QUESTIONS REPORT
for 2002-301 RO-SRO-ONLY UTILITY COMMENTS R1

1. 001A411 001

Shutdown margin has been reduced with the intent of going critical and reactor startup has been temporarily suspended.

In accordance with the Controlling procedure for Unit Startup (OP/1,2,3/A1102/01), which one of the following describes the **MINIMUM** required operator actions?

A. Insert CRDs to group 1 at 50% and calculate a shutdown margin per PT/1103/015, Reactivity balance Calculation.

B. Limit SG levels to < 40 inches on Startup Range and maintain >1%delta K/K Shutdown Margin for 200 F RCS temperature with a Xenon free core.

C. Insert CRDs to group 1 at 50% and limit SG levels to < 40 inches on Startup Range.

D. Calculate a shutdown margin per PT/1103/015, Reactivity balance Calculation and maintain >1%delta K/K Shutdown Margin for 200 F RCS temperature with a Xenon free core.

A) a

Distractor Analysis:

When in mode 3 or higher, maintain the following:

Limit SG levels to < 40 inches on Stertup Range OR maintain >1%delta K/K Shutdown Margin for 200 F RCS temperature with a Xenon free core.

This prevents accidental criticality caused by a MS line break overcooling.

If shutdown margin has been reduced with intent of going critical and reactor Startup is suspended (this does not apply during ZPPT) then:

Insert CRDs to group 1 at 50% and calculate a shutdown margin per PT/1103/015, Reactivity balance Calculation.

Inserting rods to group 1 at 50% will place the reactor in a condition of being shutdown by the worth of the safety rods, while having further shutdown capability with the remaining worth of Group 1.

Reference: Lesson Plans Vol 2, OP-OC-CP-011, page 11 of 43.
EO - 23
K/A: 001A411 (3.5/4.1)
RO/SRO: Both
Level: C
Author: rfa

RO

Could be double jeopardy
Suggest cognitive level = knowledge
Reordered stem: moved plant conditions first.
Added "minimum" to stem to prevent "D" from being a correct response in accordance with OP/1102/01, Controlling Procedure for Unit Startup limit and precaution 2.11 on page 3 of 9.
KA?

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 3.5/4.1
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

2. 001AK103 001/T1G2///C/A 3.9/4.0/B/OC002301/RO/OC

The unit is operating at 80% power when it is determined that the Control Rods (CRs) are in the restricted area due to a momentary continuous rod withdrawal . A calculation has been completed that indicates RCS boron concentration will have to be increased from 435 ppm to 460 ppm to return CRs to an acceptable position. The following conditions exist for CBAST:

1. volume = 13,200 gal.
2. concentration = 11,240 ppm

Which ONE of the following is the volume of CBAST that will have to be added to the RCS to accomplish this concentration change?

A. 117 gallons

B. 139 gallons

C. 173 gallons

D. 204 gallons

Answer B

A. calculated using 13,200 ppm and hot volume (59860)
B. correct - 11240(X)+435(59860)=460(59860+X)
C. calculated using 13,200 ppm and cold volume (88,000)
D. calculated using 11,240 ppm and cold volume

K/A: 001AK103 (3.9/4.0)
T1G2, T1G1
Bank
Reference: Facility updated question bank 26 CP050102 CP050102

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	C/A 3.9/4.0
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

2. 001AK103 001

The unit is operating at 80% power when it is determined that the Control Rods (CRs) are in the restricted area due to a momentary continuous rod withdrawal . A calculation has been completed that indicates RCS boron concentration will have to be increased from 435 ppm to 460 ppm to return CRs to an acceptable position. The following conditions exist for CBAST:

- CBAST concentration = 11,240 ppm
- CBASTvolume = 13,200 gal.
- RCS Hot Volume = 59,860 gals
- RCS Cold Volume = 88,000 gals

Which ONE of the following is the volume of CBAST that will have to be added to the RCS to accomplish this concentration change?

A. 117 gallons

B. 139 gallons

C. 173 gallons

D. 204 gallons

Answer B

A. calculated using 13,200 ppm and hot volume (59860)
B. correct - 11240(X)+435(59860)=460(59860+X)
C. calculated using 13,200 ppm and cold volume (88,000)
D. calculated using 11,240 ppm and cold volume

K/A: 001AK103 (3.9/4.0)
T1G2, T1G1
Bank
Reference: Facility updated question bank 26 CP050102 CP050102

RO

KA?

Added RCS hot and cold volumes. Would be included in the Boron addition procedure. OP/1104/03

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	C/A 3.9/4.0
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

3. 001AK118 001//T1G1//MEM 3.4/3.8/B/OC002301/SRO/OC
Given Unit 3 plant conditions:

1. Initial startup in progress following RFO
2. Moderator temperature coefficient = +.00265 ΔK/K/°F

Which ONE of the following is correct?

In the event of a rod ejection accident, the first reactivity coefficient that would insert negative reactivity is the...

A. moderator temperature coefficient only.

B. moderator void coefficient only.

C. both moderator temperature and void coefficient.

D. fuel temperature coefficient.

Answer D

K/A: 001AK118 (3.4/3.8)
T1G2, T1G1
Bank
Reference: Facility updated question bank 32 RT059 RT059

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.4/3.8
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

3. 001AK118 001

Given Unit 3 plant conditions:

- Initial startup in progress following RFO
- Moderator temperature coefficient = +.00265 ΔK/K/°F

Which ONE of the following is correct?

In the event of a rod ejection accident, the first reactivity coefficient that would insert negative reactivity is the...

A. moderator temperature coefficient only.

B. moderator void coefficient only.

C. both moderator temperature and void coefficient.

D. fuel temperature coefficient.

Answer D

K/A: 001AK118 (3.4/3.8)
T1G2, T1G1
Bank
Reference: Facility updated question bank 32 RT059 RT059

No changes

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.4/3.8
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

4. 003K402 001/T2G1///MEM 2.5/2.7/B/OC002301/RO/OC
Unit 2 plant conditions:

1. Reactor power = 55%
2. RCS Tave = 579°F
3. 2B2 RCP AC Oil Lift Pump operating:
   - Pressure = 700 psig
4. 2A CC Pump operating:
   - CRD Outlet Hdr flow = 150 gpm
   - Total CC flow = 890 gpm

Which ONE of the following describes why the 2B2 Reactor Coolant Pump will **NOT** start at this time?

_____ is too _____.

A. RCS temperature / high

B. Reactor power / high

C. Oil lift pressure / low

D. CC flow / low

Answer B

A. Incorrect - RCS temperature is > 325°F which is required to start the 4th RCP. If RCS temperatutre was < 325°F this would be a correct answer.
B. Correct – Reactor power should be < 50% to start any RCP. Rx Power must be below 50% to satisfy the start interlock circuitry.
C. Incorrect – Oil lift press is > 600 psig which meets the requirement of the start interlock. If Oil Lift Pressure was < 600 psig this would be a correct answer.
D. Incorrect – CC flow is > 575 gpm If Total CC flow was < 575 gpm this would be a correct answer. To answer correctly the student must know that the interlock is fed from TOTAL flow and not CRD RETURN flow.

K/A: 003K402 (2.5/2.7)
T2G1, T2G1
Bank
Reference: Facility updated question bank 5 PNS061403 PNS061403

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 2.5/2.7
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

4. 003K402 001

Unit 2 plant conditions:

- Reactor power = 55%
- RCS Tave = 579°F
- 2B2 RCP AC Oil Lift Pump operating:
  - Pressure = 700 psig
- 2A CC Pump operating:
  - CRD Outlet Hdr flow = 150 gpm
  - Total CC flow = 890 gpm

Which ONE of the following describes why the 2B2 Reactor Coolant Pump will **NOT** start at this time?

_____ is too _____.

A. RCS temperature / high

B. Reactor power / high

C. Oil lift pressure / low

D. CC flow / low

Answer B

A. Incorrect - RCS temperature is > 325°F which is required to start the 4th RCP. If RCS temperatutre was < 325°F this would be a correct answer.
B. Correct – Reactor power should be < 50% to start any RCP. Rx Power must be below 50% to satisfy the start interlock circuitry.
C. Incorrect – Oil lift press is > 600 psig which meets the requirement of the start interlock. If Oil Lift Pressure was < 600 psig this would be a correct answer.
D. Incorrect – CC flow is > 575 gpm If Total CC flow was < 575 gpm this would be a correct answer. To answer correctly the student must know that the interlock is fed from TOTAL flow and not CRD RETURN flow.

K/A: 003K402 (2.5/2.7)
T2G1, T2G1
Bank
Reference: Facility updated question bank 5 PNS061403 PNS061403

RO

No changes

QUESTIONS REPORT

for 2002-301 RO-SRO-ONLY UTILITY COMMENTS R1

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 2.5/2.7
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

5. 004G2.1.30 001/T2G1///C/A 3.9/3.4/N/OC002301/RO/CR
Given the following plant conditions:

- 100% power.
- "B" HPI is in operation.
- Channel LDST "B" is selected for LDST indication.

Which of the following describes the response of the HPI system if the Channel "A" LDST level transmitter fails low?

A. Only "A" side BWST suction valve will receive an open signal.

B. Only "B" side BWST suction valve will receive an open signal.

C. Both "A" and "B" side BWST suction valves will receive an open signal.

D. Neither "A" nor "B" BWST suction valves will receive an open signal.

A) D
Reference: Vol IV, HPI System
C/A

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 3.9/3.4
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

5. 004G2.1.30 001

Given the following plant conditions:

- 100% power.
- "1B" HPI pump is in operation.
- LDST Level "2" is selected.

Which of the following describes the response of the HPI system if the LDST level "1" transmitter fails low?

A. Only 1HP-24, "1A" HPI BWST suction, will receive an open signal.

B. Only 1HP-25, "1B" HPI BWST suction, will receive an open signal.

C. Both 1HP-24 and 1HP-25, "1A" **AND** "1B" HPI BWST suction, will receive an open signal.

D. Neither 1HP-24, "1A" HPI BWST suction **NOR** 1HP-25, "1B" HPI BWST suction, will receive an open signal.

A) D
Reference: Vol IV, HPI System
C/A
RO

Changed nomenclature for LDST to match ONS (level 1 & 2) in stem
Added valve numbers to alternatives "A" and "B"
Bolded AND & NOR in alternatives "C" and "D"

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 3.9/3.4
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

6. 005K408 001/T2G3///MEM3.1/3.5/N/OC002301/RO/RFA
Which one of the following statements is the basis for why the operator must verify that the two LPI pumps are operating during LOCA Cooldown (LCD), EP/1/A/1800/001, Step 4?

A. Because BOTH LPI pumps must be in operation in order to provide adequate suction pressure for HPI injection.

B. Because LPI pumps will need to be in operation when the BWST is depleted.

C. Because LPI interlocks will NOT allow switch-over to the RB sumps on BWST low level without LPI pumps in operation.

D. Because it is possible to enter LCD while RCS pressure still requires the use of HPI pumps.

A) D

Reference: Book II of II, Vol 6, OP-OC-EAP-LCD, page 11 of 40.
TO-2
K/A: 005K408 (3.1/3.5)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM3.1/3.5
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

6. 005K408 001

Which one of the following statements is the basis for why the operator must verify that the two LPI pumps are operating during LOCA Cooldown (LOCA CD), EP/1/A/1800/001, Step 4?

A. BOTH LPI pumps must be in operation in order to provide adequate suction pressure for HPI injection.

B. LPI pumps will need to be in operation when the BWST is depleted.

C. LPI interlocks will NOT allow switch-over to the RB sumps on BWST low level without LPI pumps in operation.

D. LOCA CD section of the EOP may require both HPI pumps and LPI pumps to be in operation.

A) D

Reference: Book II of II, Vol 6, OP-OC-EAP-LCD, page 11 of 40.
TO-2
K/A: 005K408 (3.1/3.5)
RO/SRO: Both
Level: M
Author: rfa

RO

No correct answer
SRO only knowledge for ONS
Changed "D" to be correct.

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 3.1/3.5
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

7. 006G2.1.12 001//T2G2//MEM 2.9/4.0/B/OC002301/SRO/OC
Unit 1 plant conditions:

1. RCS temperature = 225°F.

Which ONE of the following describes the ECCS train(s) and/or component(s) required to be **OPERABLE** to meet the Low Pressure Injection requirements while in this MODE?

A. One LPI train is required to be OPERABLE.

B. Two LPI trains are required to be OPERABLE.

C. One LPI train AND LP-9 and LP-10 manually OPERABLE.

D. Two LPI trains AND LP-9 and LP-10 manually OPERABLE.

Answer A

A Correct

006G2.006G2.1.12 (2.9/4.0)
SRO - T2G2
Bank
Reference: Facility updated question bank 1 ADM010610 ADM010610
Per 3.5.3 NOTE 1 based on MODE 4.
MEM

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

7. 006G2.1.12 001

Unit 1 plant conditions:

- RCS temperature = 225°F.

Which ONE of the following describes the ECCS train(s) and/or component(s) required to be **OPERABLE** to meet the Low Pressure Injection requirements while in this MODE?

SEE ATTACHMENT: TS 3.5.3, Low Pressure Injection

A. One LPI train is required to be OPERABLE.

B. Two LPI trains are required to be OPERABLE.

C. One LPI train AND LP-9 and LP-10 manually OPERABLE.

D. Two LPI trains AND LP-9 and LP-10 manually OPERABLE.

Answer A

A Correct

006G2.006G2.1.12 (2.9/4.0)
SRO - T2G2
Bank
Reference: Facility updated question bank 1 ADM010610 ADM010610
Per TS 3.5.3, Low Pressure Injection NOTE 1 based on MODE 4.
MEM

SRO

Added attachment 3.5.3, Low Pressure Injection to stem. Required for question
Suggest cognitive level above knowledge

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

8. 008K303 001/T2G3///C/A 4.1/4.2/N/OC002301/RO/RFA
Unit 1 is experiencing a loss of component cooling (CC). Which one of the following AUTOMATIC action(s) should have occurred given that:

Letdown Temperature is 132 degrees F.
CRD stator temperatures are 190 degrees F.
CC flow and inventory are reduced to 500 gpm and 90% respectively.

A. The standby CC pump should have started and the reactor should have tripped.

B. ALL RCP seal return valves should have closed, and the standby CC pump should have started.

C. 1HP-5 should have closed and the reactor should have tripped.

D. ALL RCP seal return valves should have closed, 1HP-5 should have closed, and the standby CC pump should have started.

A) B

Distractor Analysis:

The standby CC pump should starts at 575 gpm CC total flow decreasing.
1HP-5 closes at letdown temperature > 135 degrees F.
All RCP seal return valves close upon loss of both RCP seal injection and CC with RCS pressure > 400 psig.
If IAAT >/= two CRD stator temperatures > 180 degrees F then MANUALLY trip the reactor.

Reference: AP/1/A/1700/020, Unit 1, Vol 1 electronic ref - OX002GX , page 1 of 11.
EO - 17 and 18, LP Vol IV, OP-OC-PNS-CC, page 7 of 23
K/A: 008K303 (4.1/4.2)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	C/A 4.1/4.2
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

8. 008K303 001

Unit 1 is experiencing a loss of component cooling (CC). Which one of the following **AUTOMATIC** action(s) should have occurred given that:

- Letdown Temperature is 138°F.
- CRD stator temperatures are 190°F.
- CC flow = 500 gpm
- CC Surge Tank Level = 30 inches decreasing.

A. The standby CC pump should have started and 1HP-5 should have closed.

B. The standby CC pump should have started and the reactor should have tripped.

C. ALL RCP seal return valves should have closed and the reactor should have tripped.

D. ALL RCP seal return valves should have closed and 1HP-5 should have closed.

A) B

Distractor Analysis:

The standby CC pump should starts at 575 gpm CC total flow decreasing.
1HP-5 closes at letdown temperature > 135 degrees F.
All RCP seal return valves close upon loss of both RCP seal injection and CC with RCS pressure > 400 psig.
If IAAT >/= two CRD stator temperatures > 180 degrees F then MANUALLY trip the reactor.

Reference: AP/1/A/1700/020, Unit 1, Vol 1 electronic ref - OX002GX , page 1 of 11.
EO - 17 and 18, LP Vol IV, OP-OC-PNS-CC, page 7 of 23
K/A: 008K303 (4.1/4.2)
RO/SRO: Both
Level: C
Author: rfa

RO

No correct answer
Changed L/D temperature to 138 degrees in stem
Changed "A" alternative to be correct answer by removing reactor trip part and adding auto start of standby CC pump.
Changed "B" alternative to remove seal return valve part and add standby CC pump start.
Changed "C" alternative
Changed "D" alternative to remove standby CC pump start to add balance to alternatives

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	C/A 4.1/4.2
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

a) Opening the CC pump drains and draining the system to the CC drain tank.

b) After the CC drain tank has been emptied, the CC inlet valve to the service structure is closed, an air hose is attached to a service structure inlet header vent valve, and air is slowly admitted to the CRD service structure.

c) The contents of the service structure are blown out of the service structure, through the CC return header, and through the CC pump drain valves to the CC drain tank.

4. The CRD service structure is drained to the portable CC drain tank by:

a) Closing the CC service structure inlet and outlet valves.

b) Attaching a hose to the service structure low point drain valve and placing the other end of the hose in the portable CC drain tank which is sitting on the transfer canal floor.

c) The service structure inlet vent and low point drain valves are opened and the contents of the service structure are drained to the portable drain tank.

d) After the service structure quits draining, an air hose is attached to the inlet vent valve and the remaining contents are blown to the portable drain tank.

5. The CRD service structure is filled by either:

a) Filling it in conjunction with the rest of the system by repeatedly filling the CC surge tank with demineralized water until the surge tank level stabilizes or by,

b) Filling it from the portable CC drain tank:

1) Hose is attached between the discharge of the portable drain tank pump and the service structure low point drain valve.

2) Service structure low point drain valve and inlet vent valve are opened.

3) Portable drain tank pump discharge valve is throttled open, pump is started, and contents of drain tank are transferred to the service structure.

D. Reopening CC-8 Manually Due to a Loss of Instrument Air to the Valve

1. CC-8 must be re-opened as soon as possible if it shuts during power operation.

a) CRD stator temperature will exceed 180°F within 4 minutes of a loss of CC flow.

b) The reactor must be manually tripped if two or more individual CRD stator temperatures exceed 180°F.

c) Also, a loss of cooling will result in HP-5 automatically shutting at 135°F letdown temperature.

d) CC pumps will trip when CC-8 shuts, and will automatically restart after it has been re-opened.

2. CC-8 is reopened manually after it shuts by:

a) Placing the selector lever in the MANUAL position and then rotating the handwheel in the open direction (counterclockwise). The lever does not have to be held in the manual position while operating the valve.

b) If containment integrity is required, the operator must stay with the valve while it is open in manual, and return the lever to AUTO once the situation has been corrected. This returns the valve to automatic. Otherwise, the valve will be inoperable remotely.

E. High Letdown temperature effects on the RCS

1. As letdown temperature increases, the demineralizer in service will tend to release born into the system. This will add negative reactivity to the core, resulting in an RCS temperature decrease and/or outward rod motion to maintain the same reactor power level.

2. If temperature reaches 135°F, HP-5, Letdown Isolation will automatically close to protect the downstream demineralizers.

a) When HP-5 closes and letdown isolates, pressurizer level will begin to increase. This causes the RCS volume control valve (HP-120) to close to maintain RCS level.

b) Although letdown and makeup are now essentially stopped, there will remain a net increase in RCS volume (pzr increases) due to the continued flow of seal injection into the RCS.

c) Unit 1 will see an RCS volume increase of ~20 gpm (5 gpm/pump of seal flow enters RCS) while Units 2&3 will be ~ 36 gpm (9 pm/pump enters RCS).

d) The operator will utilize AP/*/1700/14, Loss of Normal HPI Makeup or Letdown to re-establish proper makeup flow. If this cannot be accomplished, guidance will be given to shutdown.

1) If a shutdown is required, the rate of shutdown will have to be fast enough to reach 15% and begin cooling the RCS before the pressurizer fills, causing RCS pressure control problems and potentially challenging the PORV.

2.6 Interlocks Associated With the CC System

A. If in AUTO, the standby CC Pump starts at 575 GPM flow.

B. If de-energized, the CRDs cannot be energized if CC flow is less than 138 GPM to the CRDs.

C. A reactor coolant pump cannot be started if CC flow is less than 575 GPM. Low CC flow will not affect a running RCP.

D. Letdown cooler CC inlet valve CC-1 (CC-2) must be open before letdown cooler inlet valve HP-1 (HP-2) will open.

E. CC-7 and 8 close on actuation of ES Channels 5 and 6 (respectively)

F. If CC-7 or CC-8 goes closed, the CC pumps will trip and automatically restart when CC-7 and CC-8 are reopened.

2.7 Procedural Limits and Precautions:

A. Caution must be exercised to prevent repositioning of any component flow control valve from the balanced flow position. Any change in position of any flow control valve(s) will alter the flow balance through all other parallel flow paths.

B. Component cooling system temperatures and affected equipment (RCPs, letdown temperature, quench tank temperature, and CRD temperatures) must be monitored closely when removing or placing component coolers in service. Any change in the system will alter the flow balance and may result in temperature changes. Caution must be exercised to ensure operational limits are not exceeded.

C. The component cooling system must be in operation for any of the following conditions:

1. Control rod drives energized. There is an interlock to prevent the CRDs from being energized without component cooling water, but will not de-energize the drive upon loss of cooling water.

   - *Prevents thermal damage to the CRD stators*

   Instructor note:

   This interlock can be overridden by pressing green "CC Interlock button" located in System Logic Cabinet No. 3 in the cable room to allow I&E testing of CRDs during unit outage.

2. Prior to operating any RC Pump.

   - *RCP starting interlock which ensures that the seal coolers are operational prior to pump start.*

3. Prior to establishing RC letdown flow if RC temperature is above 120° F.

   - *Prevent isolation of letdown on high temperature interlock.*

4. When RC temperature is greater than 190° F.

9. 009EK202 001//T1G2//C/A2.3/2.6/B/OC002301/SRO/OC
Unit 1 plant conditions:

TIME

1300 - Small break LOCA occurs; SUBCOOLING MARGIN = 0°F

1301 - ES Channels 1 and 2 actuate

1330 - ES Channels 3 and 4 actuate

1331 - RCS pressure = 1035 psig and steady

Which ONE of the following is the MAXIMUM time the LPI pumps can operate at these conditions?

A. 1302

B. 1310

C. 1400

D. 1430
Answer C

A. Incorrect- This is the time by which the RCPs would have to be tripped if subcooling were lost.
B. Incorrect- This is the time by which HPI flow should be verified to be at its acceptable flow.
C. Correct- The LPI pumps can only run for 30 minutes deadheaded and must be stopped to prevent pump damage time, pump damage would occur.
D. Incorrect - Twice the allowed time. This allows the operator not to pick the maximum time available for the correct answer.

K/A: 009EK202 (2.3/2.6)
SRO - T1G1
Bank
Reference: Facility updated question bank 18 PNS122401 PNS122401

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A2.3/2.6
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

9. 009EK202 001

Unit 1 plant conditions:

TIME

1300 - Small break LOCA occurs; SUBCOOLING MARGIN = 0°F

1301 - ES Channels 1 and 2 actuate

1330 - ES Channels 3 and 4 actuate

1331 - RCS pressure = 1035 psig and steady

Which ONE of the following is the MAXIMUM time the LPI pumps can operate at these conditions?

A. 1302

B. 1310

C. 1400

D. 1430

Answer C

A. Incorrect- This is the time by which the RCPs would have to be tripped if subcooling were lost.
B. Incorrect- This is the time by which HPI flow should be verified to be at its acceptable flow.
C. Correct- The LPI pumps can only run for 30 minutes deadheaded and must be stopped to prevent pump damage time, pump damage would occur.
D. Incorrect - Twice the allowed time. This allows the operator not to pick the maximum time available for the correct answer.

K/A: 009EK202 (2.3/2.6)
SRO - T1G1
Bank
Reference: Facility updated question bank 18 PNS122401 PNS122401

SRO

No changes

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A2.3/2.6
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

10. 011A104 001//T2G2//C/A 3.1/3.1/B/OC002301/SRO/OC
Unit 1 plant conditions:

INITIAL CONDITIONS:

1. Reactor power = 100%
2. ALL ICS stations in MANUAL
3. 1HP-120 in MANUAL

CURRENT CONDITIONS:

1. Pressurizer level = 222" and increasing

Which ONE of the following would explain the reason for the level increase?

A. LDST level has decreased to 39".

B. Letdown temperature has increased to 132 degrees F.

C. 1E1 HDP has tripped due to a failed open heater dump valve.

D. 1C-14/15, Pol Demin Bypass Vlv Control, has tripped open.

Answer C

A. Incorrect - At 40" LDST level, HP-24&25 will open. HPIP recircs would cause an increase in pressurizer level.

B. Incorrect - LD interlock on HP-5 at 135 degrees therefore no affect should be seen.

C. Correct - Reduction in FDW flow causes Tave increase and RCS expansion

D. Incorrect - Causes increase in FDW flow, Tave decrease and RCS shrink.

K/A: 011A104 (3.1/3.3)
SRO - T2G2
Bank
Reference: Facility updated question bank 4 PNS110402 PNS110402
C/A

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.1/3.1
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

10. 011A104 001

Unit 1 plant conditions:

INITIAL CONDITIONS:

- Reactor power = 100%
- ALL ICS stations in MANUAL
- 1HP-120 in MANUAL

CURRENT CONDITIONS:

- Pressurizer level = 222" and increasing

Which ONE of the following would explain the reason for the level increase?

A. LDST level has decreased to 39".

B. Letdown temperature has increased to 132 degrees F.

C. 1E1 HDP has tripped due to a failed open heater dump valve.

D. 1C-14/15, Pol Demin Bypass Vlv Control, has tripped open.

Answer C

A. Incorrect - At 40" LDST level, HP-24&25 will open. HPIP recircs would cause an increase in LDST level.

B. Incorrect - LD interlock on HP-5 at 135 degrees therefore no affect should be seen.

C. Correct - Reduction in FDW flow causes Tave increase and RCS expansion

D. Incorrect - Causes increase in FDW flow, Tave decrease and RCS shrink.

K/A: 011A104 (3.1/3.3)
SRO - T2G2
Bank
Reference: Facility updated question bank 4 PNS110402 PNS110402
C/A
SRO

No changes

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 3.1/3.1
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

11. 014A102 001/T2G2///MEM 3.2/3.6/B/OC002301/RO/OC

Which ONE of the following identifies the rod position indicating (PI) system selected on the Control Rod Position Indication Panel for normal monitoring and describe why this one is selected?

A. ABSOLUTE - allows immediate verification that all control rods are fully inserted on a reactor trip.

B. ABSOLUTE - allows continuous monitoring of sequence fault conditions during control rod motion.

C. RELATIVE - allows immediate verification that all control rods are fully inserted on a reactor trip.

D. RELATIVE-- allows continuous monitoring of sequence fault conditions during control rod motion.

Answer A

A. Correct – API reed switch array provides physical position of rods.
B. Incorrect – Sequence fault monitoring is provided and by RPI.
C. Incorrect – RPI will not respond to rod insertion on reactor trip due to CRD de-energizing...step motor of RPI will not respond because CRD phases are not energized.
D. Incorrect – RPI will not respond as indicated in "C" above.

K/A: 014A102 (3.2/3.6)
RO - T2G2
Bank
Reference: Facility updated question bank question 36 IC020601 IC020601

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 3.2/3.6
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

11. 014A102 001

Which ONE of the following identifies the rod position indicating (RPI) system selected on the Control Rod Position Indication Panel for normal monitoring and describe why this one is selected?

A. ABSOLUTE - allows immediate verification that all control rods are fully inserted on a reactor trip.

B. ABSOLUTE - allows continuous monitoring of sequence fault conditions during control rod motion.

C. RELATIVE - allows immediate verification that all control rods are fully inserted on a reactor trip.

D. RELATIVE-- allows continuous monitoring of sequence fault conditions during control rod motion.

Answer A

A. Correct – API reed switch array provides physical position of rods.
B. Incorrect – Sequence fault monitoring is provided and by RPI.
C. Incorrect – RPI will not respond to rod insertion on reactor trip due to CRD de-energizing...step motor of RPI will not respond because CRD phases are not energized.
D. Incorrect – RPI will not respond as indicated in "C" above.

K/A: 014A102 (3.2/3.6)
RO - T2G2
Bank
Reference: Facility updated question bank question 36 IC020601 IC020601

RO

No changes

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 3.2/3.6
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

12. 015A201 001/T2G1///MEM 3.5/3.9/N/OC002301/RO/RFA
Which one of the following is correct following a power supply failure to the NIs?

A. It causes a complete loss of output signal and computer alarms fail high.

B. It causes a complete loss of output signal and statalarms fail in the NO alarm state.

C. It causes a complete loss of output signal ONLY.

D. Statalarms fail in the NO alarm state and computer alarms fail high.

A) C

Reference: Lesson Plans Vol VIII, OP-OC-IC-NI , page 39 of 41.
EO - 27.1
K/A: 015A201 (3.5/3.9)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.5/3.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

12. 015A201 001
Which one of the following is correct following a power supply failure to the NIs?

A. It causes a complete loss of output signal and computer alarms fail high.

B. It causes a complete loss of output signal and statalarms fail in the NO alarm state.

C. It causes a complete loss of output signal and statalarms actuate.

D. Statalarms fail in the NO alarm state and computer alarms fail high.

A) C

Reference: Lesson Plans Vol VIII, OP-OC-IC-NI , page 39 of 41.
EO - 27.1
K/A: 015A201 (3.5/3.9)
RO/SRO: BOTH
Level: M
Author: rfa

RO

Changed "C" alternative to add "statalarms actuate". Removed "ONLY" due to other events occurring at ONS. Reference SA-5/ A7 ARG, NI Power Range 5 Power Supply Failure.

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.5/3.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

13. 015A304 001//T2G1//C/A 3.3/3.5/N/OC002301/SRO/RFA
Which one of the following is the correct response for a reactor at 100% RTP with a 25% axial power imbalance?

Power at the top of the core is approximately ___% and at the bottom it is ___%

A. 25/75

B. 75/25

C. 63/37

D. 37/63

A) C

Distractor Analysis:

Improved TS defines Axial Power Imbalance as follows. The power at the top half of the core, expressed as a percentage of RTP minus the power in the bottom half of the core, expressed as a percentage of RTP.

Top half minus bottom half = imbalance.

Solution: a - b = 25%
a + b = 100%

a = 62.5, b = 37.5

Reference: Lesson Plans Vol 2, OP-OC-CP-018, page 6 of 22.
EO - 1
K/A: 015A304 (3.3/3.5)
RO/SRO: SRO
Level: C
Author: rfa

RO Tier:		SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.3/3.5
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

13. 015A304 001
Which one of the following is the correct response for a reactor at 100% RTP with a + 25% axial power imbalance?

Power at the top of the core is approximately ___% and at the bottom it is ___%

A. 25/75

B. 75/25

C. 63/37

D. 37/63

A) C

Distractor Analysis:

Improved TS defines Axial Power Imbalance as follows. The power at the top half of the core, expressed as a percentage of RTP minus the power in the bottom half of the core, expressed as a percentage of RTP.

Top half minus bottom half = imbalance.

Solution: a - b = 25%
a + b = 100%

a = 62.5, b = 37.5

Reference: Lesson Plans Vol 2, OP-OC-CP-018, page 6 of 22.
EO - 1
K/A: 015A304 (3.3/3.5)
RO/SRO: Common
Level: C
Author: rfa

Common

Added "+" to stem to clarify a positive imbalance exists.

RO Tier:		SRO Tier:	T2G1
Keyword:		Cog Level:	C/A 3.3/3.5
Source:	N	Exam:	OC002301
Test:	COMMON	Misc:	RFA

14. 015AA201 001//T1G2//C/A3.0/3.5/B/OC002301/SRO/OC
Unit 3 plant conditions:

1. Operating in Mode 3
2. RCS pressure = 2150 psig
3. Quench Tank level increasing

RCP seal cavity pressures (PSIG) are:

	LOWER CAVITY PRESSURE	UPPER CAVITY PRESSURE
RCP 3A1	2100	1050
RCP 3A2	1400	700

Which ONE of the following accurately describes the condition of the RCP seals?

A. RCP 3A1: Lower Seal - failed
RCP 3A2: All Seals - OK

B. RCP 3A1: All Seals - OK
RCP 3A2: Middle Seal - failed

C. RCP 3A1: Middle Seal - failed
RCP 3A2: Upper Seal - failed

D. RCP 3A1: Upper Seal - failed
RCP 3A2: Middle Seal - failed

Answer A

A. Correct. Each seal on Unit 3 breaks down pressure approximatly 1/3 of system pressure. Lesson plan page 24 (2.4). Based on working knowledge of the Bingham seal package.
B., C., D. Incorrect. RCP 3A1 lower seal is failed.

K/A: 015AA201 (3.0/3.5)
T1G1, T1G2
Bank
Reference: Facility updated question bank 2 PNS072002 PNS072002
AP/3/1700/16 Case A and B.

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A3.0/3.5
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

14. 015AA201 001
Unit 3 plant conditions:

- Operating in Mode 3
- RCS pressure = 2150 psig
- Quench Tank level increasing

RCP seal cavity pressures (PSIG) are:

	LOWER CAVITY PRESSURE	UPPER CAVITY PRESSURE
RCP 3A1	2100	1050
RCP 3A2	1400	700

Which ONE of the following accurately describes the condition of the RCP seals?

A. RCP 3A1: Lower Seal - failed
RCP 3A2: All Seals - OK

B. RCP 3A1: All Seals - OK
RCP 3A2: Middle Seal - failed

C. RCP 3A1: Middle Seal - failed
RCP 3A2: Upper Seal - failed

D. RCP 3A1: Upper Seal - failed
RCP 3A2: Middle Seal - failed

Answer A

A. Correct. Each seal on Unit 3 breaks down pressure approximatly 1/3 of system pressure. Lesson plan page 24 (2.4). Based on working knowledge of the Bingham seal package.
B., C., D. Incorrect. RCP 3A1 lower seal is failed.

K/A: 015AA201 (3.0/3.5)
T1G1, T1G2
Bank
Reference: Facility updated question bank 2 PNS072002 PNS072002
AP/3/1700/16 Case A and B.

SRO

No changes

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.0/3.5
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

15. 015K105 001/T2G1///MEM 3.9/3.9/N/OC002301/RO/RFA
Which one of the following groups of power reduction rates is correct when an automatic load limit is received?

A. Loss of RC flow - 20%/min, Loss of RCPs - 25%/min, Maximum Runback 20%/min.

B. Loss of FWP - 20%/min, Loss of RC flow - 25%/min, Loss of RCPs - 20%/min.

C. Loss of RC flow - 20%/min, Loss of RCPs - 25%/min, Maximum Runback 25%/min.

D. Loss of FWP - 25%/min, Loss of RC flow - 25%/min, Loss of RCPs - 20%/min.

A) A

Reference: Lesson Plans Book II of II, Vol III, OP-OC-STG-ICS , page 27-28.
EO - 3.2
K/A: 015K105 (3.9/3.9)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.9/3.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

15. 015K105 001

Which one of the following groups of power reduction rates is correct when an automatic load limit is received?

A. Loss of RC flow - 20%/min, Loss of RCPs - 25%/min, Maximum Runback 20%/min.

B. Loss of FWP - 20%/min, Loss of RC flow - 25%/min, Loss of RCPs - 20%/min.

C. Loss of RC flow - 20%/min, Loss of RCPs - 25%/min, Maximum Runback 25%/min.

D. Loss of FWP - 25%/min, Loss of RC flow - 25%/min, Loss of RCPs - 20%/min.

A) A

Reference: Lesson Plans Book II of II, Vol III, OP-OC-STG-ICS , page 27-28.
EO - 3.2
K/A: 015K105 (3.9/3.9)
RO/SRO: BOTH
Level: M
Author: rfa

RO

No Changes
KA?

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.9/3.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

16. 016G2.1.31 001/T2G2///MEM 4.2/3.9/N/OC002301/RO/CR
Given the following RCS instruments, during full power operation:

INSTRUMENT	INITIAL	FINAL (following inst. drift)
PZR Level Ch 1	220	208
RCS Tcold (NR)	555	557
PZR Temp	648	665
RCS Press (NR)	2155	2135

Which instrument would the Smart Auto Signal Selector (SASS) module perform an automatic TRANSFER?

A. PZR Level

B. RCS Tcold

C. PZR Temp

D. RCS Press

A. CORRECT, Pressurizer Level is only one SASS controlled.
B. Non SASS controlled.
C. Non SASS controlled.
D. Non SASS controlled.

Reference: Vol. VIII, Instrumentation & Controls, Reactor Coolant Instrumentation

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 4.2/3.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

16. 016G2.1.31 001

Given the following RCS instruments, during full power operation:

INSTRUMENT	INITIAL	FINAL (rapid change)
PZR Level Ch 1	220	208
RCS Tcold (NR)	555	557
PZR Temp	648	665
RCS Press (NR)	2155	2135

Which instrument would the Smart Auto Signal Selector (SASS) module perform an automatic TRANSFER?

A. PZR Level

B. RCS Tcold

C. PZR Temp

D. RCS Press

A. CORRECT, Pressurizer Level is only one SASS controlled.
B. Non SASS controlled.
C. Non SASS controlled.
D. Non SASS controlled.

Reference: Vol. VIII, Instrumentation & Controls, Reactor Coolant Instrumentation

RO

Changed information in bracket of stem to "(rapid change)". SASS will not auto swap on a signal drift.
Suggest cognitive level above knowledge

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 4.2/3.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

17. 016K403 001/T2G2///MEM 2.8/2.9/N/OC002301/RO/RFA
Which one of the following is a correct list of RCS pressure indications, from where they are fed and a portion of what they feed?

A WR - A Hot Leg; WR Recorder, OAC and ...
A NR - A Hot Leg; NR Recorder, OAC and ...

A. pressurizer spray and heaters
LPI Vlv Intl, pressurizer PORVs.

B. pressurizer heaters
LPI Vlv Intl, pressurizer spray and PORVs.

C. LPI Vlv Intl.
pressurizer spray, heaters and PORVs.

D. LPI Vlv Intl and pressurizer heaters.
pressurizer spray and PORVs.

A) C

Reference: Lesson Plans Vol 2, OP-OC-CP-012, page 24 of 32.
EO - 22 (OP-OC-IC-RCI, Vol VIII, Page 9 of 62)
K/A: 016K403 (2.8/2.9) (NNIS Pressure Input to control systems)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 2.8/2.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

17. 016K403 001

Which one of the following is a correct list of RCS pressure indications and a portion of what they feed?

A. RCS WR Pressure "A" feeds: WR Recorder, pressurizer spray and heaters.

B. RCS WR Pressure "A" feeds: WR Recorder and pressurizer heaters.

C. RCS NR Pressure "A" feeds: NR Recorder, pressurizer spray, heaters and PORV.

D. RCS NR Pressure "A" feeds: NR Recorder, pressurizer spray and PORV.

A) C

Reference: Lesson Plans Vol 2, OP-OC-CP-012, page 24 of 32.
EO - 22 (OP-OC-IC-RCI, Vol VIII, Page 9 of 62)
K/A: 016K403 (2.8/2.9) (NNIS Pressure Input to control systems)
RO/SRO: Both
Level: M
Author: rfa

RO

Removed where indications are fed and reference to OAC from stem. Both indications are common to A hot leg and OAC.

Spelled out "valve" and "interlock" in alternatives.

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 2.8/2.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

18. 022A301 001/T2G1///MEM 4.1/4.3/N/OC002301/RO/RFA
Which one of the following contains completely correct statements with respect to RBCU operation following an ESF actuation?

A. RB Aux fans receive NO signal, upon an ES signal, RBCUs are LOCKED in low speed, LPSW-565 opens and LPSW-566 closes thus restoring full LPSW flow to the "B" RBCU.

B. RBCUs are LOCKED in low speed, LPSW-565 opens and LPSW-566 closes thus restoring full LPSW flow to the "B" RBCU, and RBCUs receive a signal from ES 5 & 6.

C. Fusible dropout plates will drop if the RB air temperature heats up to a temperature between 150 F and 165 F, One second after the fusible dropout plates drop, the RBCU fans swap to high speed.

D. All RBCU go to slow speed, The RBCU outlet valves go full open, and RBCUs receive a signal from ES 5 & 6.

A) D
EO: 4 and 5.2
K/A: 022A301 (4.1/4.3)
Reference: Vol IV, OP-OC-PNS-RBC Pages 16 and 18 of 23.
Author: RFA

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 4.1/4.3
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

18. 022A301 001

Which one of the following contains completely correct statements with respect to RBCU operation following an ES actuation?

A. RB Aux fans receive a start signal, upon an ES signal, RBCUs are in low speed, LPSW-565 (RB AUX FANS COOLERS INLET) opens and LPSW-566 ("B" RBCU ISOLATION) closes restoring full LPSW flow to the "B" RBCU.

B. RBCUs receive a signal from ES 1 & 2, all RBCUs go to low speed, LPSW-565 (RB AUX FANS COOLERS INLET) opens and LPSW-566 ("B" RBCU ISOLATION) closes restoring full LPSW flow to the "B" RBCU.

C. Fusible dropout plates will drop if the RB air temperature heats up to a temperature between 150°F and 165°F, One second after the fusible dropout plates drop, the RBCU fans swap to high speed.

D. RBCUs receive a signal from ES 5 & 6, all RBCUs go to low speed, and the RBCU LPSW outlet valves go full open.

A) D
EO: 4 and 5.2
K/A: 022A301 (4.1/4.3)
Reference: Vol IV, OP-OC-PNS-RBC Pages 16 and 18 of 23.
Author: RFA
RO

"A" could be correct answer. RBCUs will be in low with ES signal holding them in low until ES signal is removed. This can be interpreted as "locked". Removed "locked from alternatives. Removed "NO" from "A" alternative and added "start" to make incorrect.
"B" could be correct for the same reason as "A". Changed ES 5&6 to ES 1&2 to make incorrect.
Changed "D" from "slow" to "low" to match ONS terminology.
Moved last phrase to beginning of alternatives "B" and "D" due to ES signal being the first thing that happens (logical progression).
Added "LPSW" to "D" alternative to define outlet valves.

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 4.1/4.3
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

G. Verify operability of RBCU fans

PT/0160/002, RBCU Air Flow Test, demonstrates operability of the RBCU fans

1. A Pitot tube (connected to a manometer) is placed in the discharge flow path for a selected RBCU fan. The total pressure created by the fan is recorded and referenced (via a curve) to convert the pressure to SCFM.
2. The acceptance criteria for a RBCU fan is > 40,000 SCFM through each fan at LOW speed.

2.3 Engineered Safeguards (ES) Operation

A. RB Aux Fans

1. Receive no ES signal
2. IT #5 (Maximize RB Cooling) of EP/1800/01, verifies all RB Aux Fans running. This maximizes RB cooling and minimizes the possibility of hydrogen pockets forming in RB atmosphere.
3. Independent Task (IT) #5 , Maximize RB Cooling, verifies all RB Aux fans running.

B. RBCUs

1. Receive signal from ES 5 & 6 (3 psig Reactor Building Pressure)
2. All RBCUs go to low speed
   a) RBCU's are run in low speed due to the higher density RB atmosphere. The higher density atmosphere could cause fan motors to fail in high speed because of the increased horsepower required to move the denser air.
3. Fusible dropout plates will drop if the Reactor Building air temperature heats up to a temperature between 150°F and 165°F.

C. Associated LPSW valves

1. RBCU outlet valves go full open.
2. LPSW-565 closes and LPSW-566 opens restoring full LPSW flow to "B" RBCU.
3. This results in full LPSW flow to all 3 RBCUs.

D. Gas Dispersal

- The RCS High Point Vents, which may be used in an emergency situation to vent non-condensable gas and steam voids from the RCS, are routed to the RBCU supply grilles. During an emergency, this helps to ensure an even distribution of the potential release of a flammable mixture of hydrogen and oxygen, preventing buildup to combustible concentrations.

E. Returning RBCUs to normal following ES actuation.

1. Upon ES signal, RBCUs are locked in low speed. Control room switches have no effect.
2. After the digital and analog ES signals have been reset or after "MANUAL" is selected on RZ module, a seal in logic must also be reset prior to regaining control of the RBCUs.
3. Above each damper position indicator on AB3 is a "PUSH TO RETURN TO NORMAL AFTER ES RESET" button.
4. After ES signals are reset or the RZ module is in "MANUAL", the reset button for the associated RBCU is pushed and the RBCU will go to the position presently selected on the RBCU switch.
5. LPSW-565, 566, and cooler outlet valves must be repositioned as desired. The reset push buttons have no effect on these valves.

19. 026A301 001//T2G1//MEM 4.3/4.5/N/OC002301/C/RFA
Which on of the following statements, regarding the RBS system, is correct When RB pressure reaches 10 psig?

A. All RBS pumps start, BS-1 AND BS-2 open, LP-21 AND LP-22 receive an open signal.

B. All RBS pumps start, BS-11 and BS-16 open, LP-21 AND LP-22 receive an open signal, ES channels 7 & 8 actuate.

C. Only one RBS pump starts, BS-1 AND BS-2 open, LP-21 AND LP-22 receive an open signal, ES channels 7 & 8 actuate.

D. Only one RBS pump starts, BS-11 and BS-16 open, LP-21 AND LP-22 receive an open signal, but will NOT open.

A) A
K/A: 026A301 (4.3/4.5)
EO: 10
Reference: Vol IV, OP-OC-PNS-BS, Page 14 of 14.
Author: RFA

Distractor Analysis:

At 10 psig RB pressure, ES channels 7 and 8 actuate, All RBS pumps start, BS-1 and BS-2 open, LP-21 and LP-22 receive an open signal.

RO Tier:		SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 4.3/4.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

19. 026A301 001

Which one of the following statements, regarding the RBS system, is correct when RB pressure reaches 10 psig?

A. ES channels 7 & 8 actuate causing **ALL** RBS pumps to start, BS-1 and BS-2 ("A" and "B" RBS HEADER RB ISOLATION) open, LP-21 AND LP-22 receive an open signal.

B. ES channels 5 & 6 actuate causing **ALL** RBS pumps to start, BS-11 and BS-16 ("A" and "B" RBS DISCHARGE CHECK) open, LP-21 AND LP-22 ("A" and "B" LPI BWST SUCTION) receive an open signal.

C. ES channels 7 & 8 actuate causing **ONLY ONE** RBS pump to start, BS-1 and BS-2 will open ("A" and "B" RBS HEADER RB ISOLATION), LP-21 AND LP-22 ("A" and "B" LPI BWST SUCTION) will receive an open signal.

D. ES channels 5 & 6 actuate causing **ONLY ONE** RBS pump to start, BS-11 and BS-16 ("A" and "B" RBS DISCHARGE CHECK) will open, LP-21 and LP-22 ("A" and "B" LPI BWST SUCTION) will receive an open signal, but will NOT open.

A) A
K/A: 026A301 (4.3/4.5)
EO: 10
Reference: Vol IV, OP-OC-PNS-BS, Page 14 of 14.
Author: RFA

Distractor Analysis:

At 10 psig RB pressure, ES channels 7 and 8 actuate, All RBS pumps start, BS-1 and BS-2 open, LP-21 and LP-22 receive an open signal.

SRO

Two correct answers
"B" alternative correct also. BS-11 and 16 are discharge check valves and will open upon pump start.
Changed "B" ES channels from 7&8 to ES 5&6 to make incorrect.
Moved ES signal actuation to the front of alternatives "B" and "C" to match logical progression.
Added ES actuation "A" and "D" alternatives to balance alternatives.
Added valve noun names to all alternatives.
Capped and bolded ALL and ONLY ONE

RO Tier:		SRO Tier:	T2G1
Keyword:		Cog Level:	MEM 4.3/4.5
Source:	N	Exam:	OC002301
Test:	C	Misc:	RFA

20. 027G2.1.28 001/T2G3///MEM 3.2/3.3/N/OC002301/RO/CR

Which one of the following parameters (by design) is controlled to limit the amount of iodine in the RB atmosphere following a LOCA?

A. The volume of galvanized metal inside containment.

B. The volume of aluminum inside containment.

C. The pH of the RB sump.

D. The temperature of the RB atmosphere.

Reasons:

A. This parameter is limited to reduce the amount of post-LOCA hydrogen and does not affect iodine in the RB atmosphere.

B. This parameter is limited to reduce the amount of post-LOCA hydrogen and does not affect iodine in the RB atmosphere.

C. Correct Answer. TSP baskets inside containment adjust the pH of the RB sump to between 7.0 and 11.0. This range of pH creates non-volatile iodine and limits the amount of iodine in the RB atmosphere.

D. RB spray limits containment pressure by spraying liquid into the steam atmosphere but any reduction of RB temperature is a byproduct of this pressure reduction and not intended to limit iodine in the RB atmosphere.

Reference: Vol IV, RB Spray

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 3.2/3.3
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

20. 027G2.1.28 001

Which one of the following parameters is controlled to limit the amount of iodine in the RB atmosphere following a LOCA?

A. The volume of galvanized metal inside containment.

B. The volume of aluminum inside containment.

C. The pH of the RB sump.

D. The temperature of the RB atmosphere.

Reasons:

A. This parameter is limited to reduce the amount of post-LOCA hydrogen and does not affect iodine in the RB atmosphere.

B. This parameter is limited to reduce the amount of post-LOCA hydrogen and does not affect iodine in the RB atmosphere.

C. Correct Answer. TSP baskets inside containment adjust the pH of the RB sump to between 7.0 and 11.0. This range of pH creates non-volatile iodine and limits the amount of iodine in the RB atmosphere.

D. RB spray limits containment pressure by spraying liquid into the steam atmosphere but any reduction of RB temperature is a byproduct of this pressure reduction and not intended to limit iodine in the RB atmosphere.

Reference: Vol IV, RB Spray

RO

Removed "by design" from stem

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 3.2/3.3
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

21. 032AA202 001//T1G2//C/A 3.6/3.9/N/OC02301/SRO/CR
Given the following plant conditions:

Reactor Startup in progress.
Initial Source Range counts NI-1 = 70 cps; NI-2 = 80 cps.
ECP 50% on group 6.
Rods are currently at 75% on group 5 and holding.
NI-1/2 count rate is stable.

Which of the following count rates for NI-1/2 would you expect for this condition?

A. 105/120

B. 140/160

C. 350/400

D. 2100/2400

A. This is a factor of 50% increase the rods have moved 50% of travel but the counts are not a factor 0f 50% higher.
B. CORRECT: a factor of two if you have added half of the reactivity which is 50 % of the rod movement. Therefore, twice the initial CR at this level.
C. Factor of 5 doublings is for criticality from initial CR not at 50 % of rod motion.
D. Factor of 30 times the inital CR is for not reaching criticality within the ECP.

Reference: Reactivity Thumb rules

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.6/3.9
Source:	N	Exam:	OC02301
Test:	SRO	Misc:	CR

21. 032AA202 001

While withdrawing control rods during an approach to criticality, the stable count rate doubles. If the same amount of reactivity that caused the first doubling is added again, stable count rate will _____ and the reactor will be _____.

A. double; subcritical

B. more than double; subcritical

C. double; critical

D. more than double; critical

A) D

Doubling counts means halving the distance to criticality. Adding the same amount of reactivity again will make the reactor critical.

Reference: Reactivity Thumb rules
SRO

Not enough information in stem to answer question at ONS

Replaced with GFES bank question
Changes supercritical to subcritical in "B".

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 3.6/3.9
Source:	N	Exam:	OC02301
Test:	SRO	Misc:	CR

22. 034A202 001//T2G2//MEM 3.4/3.9/N/OC002301/SRO/CR
Given the following plant conditions:

Bringing new fuel storage cask into the spent fuel building.
While lifting the shipping cask off the truck, the rigging breaks, the cask drops onto the truck. The first cask knocks another cask off the truck and both cask are laying on the ground. Both casks are severely dented

Health Physics takes gamma radiation readings:
15 mrem/hr on contact with the dropped casks.
3 mrem/hr at 1 meter from each cask.
2 mrem/hr general background reading.

Which of the following would be the proper posting for this general area?

A. Radiation Controlled Area.

B. Radiation Area.

C. High Radiation Area.

D. Extra High Radiation Area.

A. CORRECT: General area for radiological protection for all workers, requires an RWP and dosimetry.
B. Dose rate is less than 5 mr/hr at 30 cm.
C. Dose rate is less than 100 mr/hr at 30 cm.
D. Dose rate is less than 1000 mr/hr at 30 cm.

Reference: Vol 1, Radiation/Radiation Controls Chapter 2.
GET

MEM

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.4/3.9
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

22. 034A202 001

Given the following plant conditions:

Bringing new fuel storage cask into the spent fuel building. While lifting the shipping cask off the truck, the rigging breaks, the cask drops onto the truck. The first cask knocks another cask off the truck and both cask are laying on the ground. Both casks are severely dented. Health Physics takes gamma radiation readings:

- 15 mrem/hr on contact with the dropped casks.
- 3 mrem/hr at 30 cm from each cask.
- 2 mrem/hr general background reading.

Which of the following would be the proper posting for this general area?

A. Radiation Controlled Area.

B. Radiation Area.

C. High Radiation Area.

D. Extra High Radiation Area.

A. CORRECT: General area for radiological protection for all workers, requires an RWP and dosimetry.
B. Dose rate is less than 5 mr/hr at 30 cm.
C. Dose rate is less than 100 mr/hr at 30 cm.
D. Dose rate is less than 1000 mr/hr at 30 cm.

Reference: Vol 1, Radiation/Radiation Controls Chapter 2.
GET

MEM
SRO

Two correct answers

"B" also correct when calculating a 30cm reading from the 3 mr/hr @ 1 meter dose rate. Calculates to ~33 mr/hr @ 30 cm. This makes it a radiation area.

Changed stem dose rate from a 3 mr/hr @ 1 meter reading from each cask to a 3 mr/hr @ 30 cm. Which will make "B" incorrect.

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.4/3.9
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

23. 037AA209 001//T1G2//MEM 2.8/3.4/B/OC002301/SRO/OC
Unit 3 plant conditions:

INITIAL CONDITIONS:

1. Reactor power = 100%
2. 3RIA-40 = 2874 cpm

CURRENT CONDITIONS:

1. Reactor power = 92% and decreasing
2. 3RIA-40 = 354,874 cpm and slowly increasing

Which ONE of the following describes the required position of 3V-196 (CSAE Exhaust to Stack Drain)?

A. OPEN

B. Locked OPEN

C. CLOSED

D. Locked CLOSED

Answer D

D. Correct - When secondary activity increases V-196 should be LOCKED CLOSED to prevent release of activity to the basement trench.

K/A: 037AA209 (2.8/3.4)
T1G2, T1G2
Bank
Reference: Facility updated question bank 46 STG050601 STG050601

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 2.8/3.4
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

23. 037AA209 001

Unit 3 plant conditions:

INITIAL CONDITIONS:

- Reactor power = 100%
- 3RIA-40 = 2874 cpm

CURRENT CONDITIONS:

- Reactor power = 92% and decreasing
- 3RIA-40 = 354,874 cpm and slowly increasing

Which ONE of the following describes the required position of 3V-196 (CSAE Exhaust to Stack Drain)?

A. OPEN

B. Locked OPEN

C. CLOSED

D. Locked CLOSED

Answer D

D. Correct - When secondary activity increases V-196 should be LOCKED CLOSED to prevent release of activity to the basement trench.

K/A: 037AA209 (2.8/3.4)
T1G2, T1G2
Bank
Reference: Facility updated question bank 46 STG050601 STG050601

SRO

No changes
KA?

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 2.8/3.4
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

24. 038EA215 001//T1G2//MEM 4.2/4.4/N/OC002301/SRO/CR
The EOP Steam Generator Tube Rupture tab , step 32 states:

While maintaining RCP NPSH and pressurizer level, minimize core SCM by de-energizing all pressurizer heaters, using pressurizer sprays, or throttling HPI.

Which one of the following is the reason for minimizing SCM?

A. Ensure MSSV's remain closed.

B. Prevent reactor head bubble formation.

C. Minimize primary to secondary leakage.

D. Maximize HPI flow into the core.

A. SCM will not ensure the MSSV's remain closed
B. Head bubble formation is a function of cooldown.
C. CORRECT: Reduces the delta P for leakage
D. Will allow for more flow but not a factor in the tube rupture step.

Reference: EOP Steam Generator Tube Rupture tab , step 32, page 7.

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 4.2/4.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

24. 038EA215 001

The EOP Steam Generator Tube Rupture tab , step 32 states:

While maintaining RCP NPSH and pressurizer level, minimize core SCM by de-energizing all pressurizer heaters, using pressurizer sprays, or throttling HPI.

Which one of the following is the reason for minimizing SCM?

A. Ensure MSSV's remain closed.

B. Prevent reactor head bubble formation.

C. Minimize primary to secondary leakage.

D. Maximize HPI flow into the core.

A. SCM will not ensure the MSSV's remain closed
B. Head bubble formation is a function of cooldown.
C. CORRECT: Reduces the delta P for leakage
D. Will allow for more flow but not a factor in the tube rupture step.

Reference: EOP Steam Generator Tube Rupture tab , step 32, page 7.
No changes

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	MEM 4.2/4.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

25. 039A403 001/T2G2///MEM 2.8/2.8/N/OC002301/RO/CR
Which of the following is available on the main control board (ICS section) for the main feedwater turbine?

A. Control valve position.

B. First stage pressure.

C. Steam pressure (chest).

D. Stop valve position.

A. Main Turbine indication in control room, NOT MFW turbine.
B. Main Turbine indication in control room, NOT MFW turbine.
C. Main Turbine indication in control room, NOT MFW turbine.
D. CORRECT:

Reference: Vol III, Bk 2 of 2, ICS

MEM

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 2.8/2.8
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

25. 039A403 001
Which of the following is available on the main control board (1UB1 bench board) for the main feedwater pump turbine?

A. Control valve position.

B. First stage pressure.

C. Steam pressure (chest).

D. Stop valve position.

A. Main Turbine indication in control room, NOT MFW turbine.
B. Main Turbine indication in control room, NOT MFW turbine.
C. Main Turbine indication in control room, NOT MFW turbine.
D. CORRECT:

Reference: Vol III, Bk 2 of 2, ICS

MEM
RO

Added "pump" to stem for clarification. Changed "ICS section" to state "UB1 Benchboard" to match ONS board configuration nomenclature.

RO Tier:	T2G2	**SRO Tier:**	
Keyword:		**Cog Level:**	MEM 2.8/2.8
Source:	N	**Exam:**	OC002301
Test:	RO	**Misc:**	CR

26. 045G2.1.12 001//T2G3//C/A 2.9/4.0/B/OC002301/SRO/OC
Unit 1 plant conditions:

1. Reactor power = 100%
2. Channel "B" of the Turbine Stop Valve (TSV) closure instrumentation was declared inoperable at 1200 on 1/10.

Using the attached selecton of TS, which ONE of the following TS ACTIONS is required?

A. Restore TSV #3 and TSV #4 to OPERABLE status by 2100 on 1/10.

B. Restore ALL TSVs to OPERABLE status by 2100 on 1/10.

C. Enter LCO 3.0.3 by 1300 on 1/10.

D. Enter LCO 3.0.3 immediately.

Answer C

A INCORRECT - No condition applies per 3.7.2 - go to LCO 3.0.3.
B INCORRECT - No condition applies per 3.7.2.
C CORRECT
D INCORRECT - 1 hour permitted per 3.3.15 to declare inoperable.

K/A: 045G2.1.12 (2.9/4.0)
SRO - T2G3
Bank
Reference: Facility updated question bank 70 ADM010603 ADM010603
ITS 3.3.15 also 3.7.2

RO Tier:		SRO Tier:	T2G3
Keyword:		Cog Level:	C/A 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

26. 045G2.1.12 001

Unit 1 plant conditions:

- Reactor power = 100%
- Channel "B" of the Turbine Stop Valve (TSV) closure instrumentation was declared inoperable at 1200 on 1/10.

Which ONE of the following TS ACTIONS is required?

SEE ATTACHMENTs: TS 3.3.15 (Turbine Stop Valve Closure)
TS 3.7.2 (Turbine Stop Valves)

A. Restore TSV #3 and TSV #4 to OPERABLE status by 2100 on 1/10.

B. Restore ALL TSVs to OPERABLE status by 2100 on 1/10.

C. Enter LCO 3.0.3 by 1300 on 1/10.

D. Be in MODE 3 by 0300 on 1/11.

Answer C

A. INCORRECT - No condition applies per 3.7.2 - go to LCO 3.0.3.
B. INCORRECT - No condition applies per 3.7.2.
C. CORRECT
D. INCORRECT - Must in MODE 3 by 0100 on 1/11

K/A: 045G2.1.12 (2.9/4.0)
SRO - T2G3
Bank
Reference: Facility updated question bank 70 ADM010603 ADM010603
ITS 3.3.15 also 3.7.2

SRO

Added TS numbers and names to stem
"D" alternative as is could be a conservative choice resulting in a correct answer. To prevent post exam comment from conservative selection, changed "D" to reflect time past required Mode 3 shutdown requirement in TS 3.0.3

RO Tier:		SRO Tier:	T2G3
Keyword:		Cog Level:	C/A 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

27. 045K120 001/T2G3///MEM 3.4/3.6/N/OC002301/RO/RFA
Which one of the following statements is correct regarding the turbine power/load unbalance (PLU) circuit?

The PLU circuit:

A. will not generate a reactor trip until the turbine is at approximately 110.00% of rated speed.

B. will not generate a reactor trip until the turbine is at approximately 111.25% of rated speed.

C. will not generate a reactor trip until turbine speed is above 100 RPM and BOTH speed signals are lost.

D. does not generate an automatic trip signal.

A) D

Reference: Book I of II, Vol 2, OP-OC-STG-EHC, page 13 & 14 of 30.
EO - 8
K/A: 045K120 (3.4/3.6) Considering the PLU circuit as a protection system
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 3.4/3.6
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

27. 045K120 001

Which one of the following statements is correct regarding the turbine power/load unbalance (PLU) circuit?

The PLU circuit will not generate...

A. a reactor trip until the turbine is at approximately 110.00% of rated speed.

B. a reactor trip until the turbine is at approximately 111.25% of rated speed.

C. a reactor trip until turbine speed is above 100 RPM and BOTH speed signals are lost.

D. an automatic reactor trip signal.

A) D

Reference: Book I of II, Vol 2, OP-OC-STG-EHC, page 13 & 14 of 30.
EO - 8
K/A: 045K120 (3.4/3.6) Considering the PLU circuit as a protection system
RO/SRO: Both
Level: M
Author: rfa

RO

Modified "D" alternative to match A,B,&C. Changed "does" to "will"
Moved "will not generate" from each distractor to the stem

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 3.4/3.6
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

28. 054AA202 001/T1G2///C/A 4.1/4.4/B/OC002301/RO/OC

Unit 3 plant conditions:

1. 3A & 3B Main FDW pumps have tripped
2. ALL EFWPs have started with 200 gpm EFW flow to each SG
3. 3FDW-315 & 316 (3A and 3B OTSG EFW Flow Control Valves) in manual
4. 3A and 3B SG levels = 33" XSUR and stable
5. 3A Main Feedwater pump is reset
6. Hydraulic oil pressure = 115 psig
7. 3A MFW Pump discharge pressure = 670 psig

Which ONE of the following is correct?

If 3FDW-315 & 316 are placed in Automatic, then 3FDW 315 & 316 will...

A. be controlled by the Manual Loader signal.

B. close and stay closed until SG level decreases below 25" on SU level.

C. close and stay closed until SG level decreases below 30".

D. close and stay closed until the SG Dryout Protection circuit places 3FDW-315 & 316 on Auto Level Control.

Answer C

A- No automatic is controlling signal to valves
B - No 25" on SU is control level for MFDW
C - Correct
D- No - on automatic level control when automatic is selected

K/A: 054AA202 (4.1/4.4)
T1G2, T1G2
Bank
Reference: Facility updated question bank question 17 CF023203 CF023203

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	C/A 4.1/4.4
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

28. 054AA202 001

Unit 3 plant conditions:

- 3A & 3B Main FDW pumps have tripped
- ALL EFWPs have started with 200 gpm EFW flow to each SG
- 3FDW-315 & 316 (3A and 3B OTSG EFW Flow Control Valves) in manual
- 3A and 3B SG levels = 33" XSUR and stable
- 3A Main Feedwater pump is reset
- 3A Main Feedwater pump hydraulic oil pressure = 115 psig
- 3A MFW Pump discharge pressure = 670 psig

Which ONE of the following is correct?

If 3FDW-315 & 316 are placed in Automatic, then 3FDW 315 & 316 will...

A. be controlled by the Manual Loader signal.

B. close and stay closed until SG level decreases below 25" on SU level.

C. close and stay closed until SG level decreases below 30".

D. close and stay closed until the SG Dryout Protection circuit places 3FDW-315 & 316 on Auto Level Control.

Answer C

A- No automatic is controlling signal to valves
B - No 25" on SU is control level for MFDW
C - Correct
D- No - on automatic level control when automatic is selected

K/A: 054AA202 (4.1/4.4)
T1G2, T1G2
Bank
Reference: Facility updated question bank question 17 CF023203 CF023203

RO

Added "3A Main Feedwater Pump" to bullet for hydraulic oil pressure to match other bullets.

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	C/A 4.1/4.4
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

29. 054AK301 001//T1G2//C/A 4.1/4.4/N/OC002301/SRO/CR
An anticipatory reactor trip (ARTS) is designed to prevent which of the following condition(s)?

A. Challenges to OTSG tube integrity.

B. Exceeding core thermal limits (fuel centerline melt).

C. Challenges to the PORV and code safeties.

D. Exceeding core DNBR limits.

A. They would be stressed but still within design limits.
B. These limits are based on LOCAs.
C. CORRECT; based on limiting the pressure spike on the loss of heat sink.
D. These are based on RCS flow, temperature, and flux.

Reference: Vol. VIII, Instrumentation & Controls, RPS

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 4.1/4.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

29. 054AK301 001
The Main FDW pumps and Main Turbine anticipatory reactor trips are designed to prevent which of the following condition(s)?

A. Challenges to OTSG tube integrity.

B. Exceeding core thermal limits (fuel centerline melt).

C. Challenges to the PORV and code safeties.

D. Exceeding core DNBR limits.

A. They would be stressed but still within design limits.
B. These limits are based on LOCAs.
C. CORRECT; based on limiting the pressure spike on the loss of heat sink.
D. These are based on RCS flow, temperature, and flux.

Reference: Vol. VIII, Instrumentation & Controls, RPS
SRO

Removed acronym ARTS from stem...not used at ONS. Spelled out the two anticipatory trips at ONS. Changed "C" to correct answer. Answer explanation was correct, just had the wrong alternative selected. Suggest cognitive level = knowledge

RO Tier:		SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 4.1/4.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

30. 056AA254 001/T1G3///MEM 2.9/3.0/B/OC002301/RO/OC
Plant conditions:

INITIAL CONDITIONS:

1. ONS Units 1 and 2 are operating at 100% power
2. ONS Unit 3 MFB's are powered by Central Switchyard via CT-5
3. Keowee Unit 1 is generating to the grid @ 40 MWe

CURRENT CONDITIONS:

1. ONS Unit 2 has a LOCA/LOOP resulting in **PROPER** actuation of ES Channels 1-6

After power has been regained to ONS Unit 2 MFB's, which ONE of the following statements is correct?

Assume NO operator action

A. 2C LPIP may be started immediately.

B. 2C LPIP may be started after 30 seconds.

C. 2X5 will Load Shed, re-energizing in 30 seconds.

D. 2X5 will NOT Load Shed and will remain energized.

Answer D

A & B incorrect - LPIP C cannot be started during a loadshed unless either "A" or "B" LPIP are not running.
C. Incorrect - See D explanation.
D. Correct - 2X5 wil not load shed upon ES even if at least 1 of the SL breakers is closed.

K/A: 056AA254 (2.9/3.0)
T1G3, T1G3
Bank
Reference: Facility updated question bank 26 EL050601 EL050601

RO Tier:	T1G3	SRO Tier:	
Keyword:		Cog Level:	MEM 2.9/3.0
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

30. 056AA254 001

Plant conditions:

INITIAL CONDITIONS:

- ONS Units 1 and 2 are operating at 100% power
- ONS Unit 3 MFB's are powered by Central Switchyard via CT-5
- Keowee Unit 1 is generating to the grid @ 40 MWe

CURRENT CONDITIONS:

- ONS Unit 2 has a LOCA/LOOP resulting in **PROPER** actuation of ES Channels 1-6

After power has been regained to ONS Unit 2 MFB's, which ONE of the following statements is correct?

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B. 2C LPIP may be started after 30 seconds.

C. 2X5 will Load Shed, re-energizing in 30 seconds.

D. 2X5 will NOT Load Shed and will remain energized.

Answer D

A & B incorrect - LPIP C cannot be started during a loadshed unless either "A" or "B" LPIP are not running.
C. Incorrect - See D explanation.
D. Correct - 2X5 wil not load shed upon ES even if at least 1 of the SL breakers is closed.

K/A: 056AA254 (2.9/3.0)
T1G3, T1G3
Bank
Reference: Facility updated question bank 26 EL050601 EL050601

RO

Suggest cognitive level above knowledge

RO Tier:	T1G3	SRO Tier:	
Keyword:		Cog Level:	MEM 2.9/3.0
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

31. 057AA105 001//T1G1//MEM 3.2/3.4/N/OC002301/SRO/CR
Given the following plant conditions:

100% power
KI power is lost.

Which of the following describes how seal injection flow to the RCPs would be controlled via HP-31, seal injection control valve?

A. Will respond in the manual mode only.

B. Will respond in auto from a backup power supply.

C. Will fail closed, the bypass valve will need to be throttled.

D. Will fail open, the auxiliary building operator will need to control flow locally.

A. Will control in manual AND automatic with a loss of KI
B. CORRECT:Will control in manual AND automatic with a loss of KI
C. The valve does not fail closed.
D. The valve does not fail open.

Reference: AOP Vol 1, AP/1/A/1700/014, Loss of Normal HPI MU and/or RCP Seal Injection.

Vol IV, HPI System

MEM

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.2/3.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

31. 057AA105 001

Given the following plant conditions:

- 100% power
- KI powerboard is deenergized

Which one of the following describes how seal injection flow to the RCPs would be controlled via HP-31 (seal injection control valve)?

A. Will respond in the manual mode only.

B. Will respond in auto from a backup power supply.

C. Will fail closed, the bypass valve will need to be throttled.

D. Will fail open, the auxiliary building operator will need to control flow locally.

A. Will control in manual AND automatic with a loss of KI
B. CORRECT:Will control in manual AND automatic with a loss of KI
C. The valve does not fail closed.
D. The valve does not fail open.

Reference: AOP Vol 1, AP/1/A/1700/014, Loss of Normal HPI MU and/or RCP Seal Injection.

Vol IV, HPI System

MEM

SRO

Modified word "lost" in stem to state "de-energized"

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.2/3.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

32. 057AA106 001/T1G1///MEM 3.5/3.5/B/OC002301/RO/OC
Unit 2 plant conditions:

1. A loss of power to MCC 2XO has occurred
2. Regulated Power panelboards are being supplied by SOURCE 2 (Motor Control Center (MCC) 2XP)

Which ONE of the following will occur if Unit 2 experiences a loss of power to MCC 2XP?

A. KRA/KRB will become de-energized.

B. Any Vital Bus Inverter on "AC Line" will swap to "Inverter".

C. The Isolating Diodes output will be supplied by their backup source.

D. KRA/KRB will be supplied from the I&C Batteries until power is restored from MCC 2XO or 2XP.

Answer A

A.Correct
B.Incorrect - Vital bus inverters do not have an auto swap feature.
C.Incorrect - The statement is false. A loss of 2XO/2XP has no affect on Battery Charger operation. Isolating Diode output would be from their normal source, the Battery Charger.
D.Incorrect - KRA/KRB do not have battery backup.

K/A: 057AA106 (3.5/3.5)
T1G1, T1G1
Bank
Reference: Facility updated question bank 18 EL070901 EL070901

RO Tier:	T1G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.5/3.5
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

32. 057AA106 001

Unit 2 plant conditions:

- A loss of power to MCC 2XO has occurred
- Regulated Power panelboards (2KRA/2KRB) are being supplied by SOURCE 2 (Motor Control Center (MCC) 2XP)

Which ONE of the following will occur if Unit 2 experiences a loss of power to MCC 2XP?

A. 2KRA/2KRB will become de-energized.

B. Any Vital Bus Inverter on "AC Line" will swap to "Inverter".

C. The Isolating Diodes output will be supplied by their backup source.

D. 2KRA/2KRB will be supplied from the I&C Batteries until power is restored from MCC 2XO or 2XP.

Answer A

A.Correct
B.Incorrect - Vital bus inverters do not have an auto swap feature.
C.Incorrect - The statement is false. A loss of 2XO/2XP has no affect on Battery Charger operation. Isolating Diode output would be from their normal source, the Battery Charger.
D.Incorrect - KRA/KRB do not have battery backup.

K/A: 057AA106 (3.5/3.5)
T1G1, T1G1
Bank
Reference: Facility updated question bank 18 EL070901 EL070901

RO

Added "2KRA/KRB" to stem in second bullet.
Added unit number to beginning of "A" and "D" alternatives.
Suggest cognitive level above knowledge

RO Tier:	T1G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.5/3.5
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

33. 059A306 001/T2G1///C/A 3.2/3.3/N/OC002301/RO/RFA
A recent modification was installed to add safety related detection and isolation circuitry following the detection of a MSLB. Which one of the following is correct concerning this system and the closing of the FDW main and startup control valves during an MSLB?

A. The valves can be in AUTO or MANUAL for the system to operate. If instrument air is lost, the FDW control valves will fail "as is."

B. The valves must be in AUTO for the system to operate. The auto-start feature of the TDEFW pump is inhibited.

C. The valves can be in AUTO or MANUAL for the system to operate. The auto-start feature of the TDEFW pump is inhibited.

D. The valves must be in AUTO for the system to operate. If instrument air is lost, the FDW control valves will fail "as is."

A) A

Reference: Lesson Plans Vol X, OP-OC-CF-FDW , page 29 of 33.
EO - 16 and 17
K/A:059A306 (3.2/3.3)
RO/SRO: BOTH
Level: C (must understand new modification logic)
Author: rfa

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 3.2/3.3
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

33. 059A306 001

Which one of the following is correct concerning this system and the closing of the FDW valves during an MSLB?

A. The FDW control valves can be in AUTO or MANUAL for the system to operate. If instrument air is lost, the FDW control valves will fail "as is."

B. The FDW control valves must be in AUTO for the system to operate. The auto-start feature of the TDEFW pump is inhibited.

C. The FDW block valves can be in AUTO or MANUAL for the system to operate. The auto-start feature of the TDEFW pump is inhibited.

D. The FDW block valves must be in AUTO for the system to operate. If instrument air is lost, the FDW block valves will fail closed.

A) A

Reference: Lesson Plans Vol X, OP-OC-CF-FDW , page 29 of 33.
EO - 16 and 17
K/A:059A306 (3.2/3.3)
RO/SRO: BOTH
Level: C (must understand new modification logic)
Author: rfa

RO

Two correct answers (A & C). Per CF-FDW lesson plan, TDEFW pump will not start in auto.(" Inhibit auto-start or initiate an auto-stop (trip) of the TDEFWP (if switch is in AUTO).")
Removed first sentence. No affect on question level.
Moved valve type (control valves) from stem to alternatives.
"A" alternative - added FDW control valves
"B" alternative – added FDW control valves
"C" alternative – added FDW block valves
"D" alternative – added FDW block valves and modified last part to make alternative incorrect.
Suggest cognitive level = knowledge

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	C/A 3.2/3.3
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

FF. At ~70% CTP, start third HWP.

2.8 ES Functions

A. Main Feedwater serves no direct ES function, but does penetrate Reactor Bldg. Containment.

1. Both Main FDW lines penetrate containment in the East Penetration Room. These penetrations are isolated in the event of FDW line rupture by check valves (FDW-37 and 46) located in the East Penetration Room. FDW-37 and 46 serve as containment isolation valves.

2. FDW lines that penetrate the containment for purposes of SG wet layup recirc and/or SG water sampling are isolated on ES actuation by ES Channels 1 and 2 (FDW-103, 104, 105, 106, 107, and 108).

2.9 CBP Feed - Though no ES functions are served, FDW is important in the initial phases of plant cooldown and heatup until SG pressure is below 550 psig. (At this point CBP's are able to supply the SGs because of the lower discharge head required).

2.10 High Energy Lines - Feedwater lines located in confined spaces (i.e., penetration rooms) are isolated from normally occupied working spaces by high energy line doors due to high energies capable of being released should a FDW line rupture occur in one of these confined areas.

2.11 Main Steam Line Break Detection/Isolation System

A. Purpose: In the event of a Main Steam line (FDW line) rupture, limit RCS overcooling and prevent the RB design pressure (59 psig) from being exceeded. Recent analysis determined that without operator action, RB design pressure would be exceeded for a MSLB inside containment. Based on this analysis, the MSLB Detection/Isolation System was implemented to reduce operator burden in responding to a MSLB.

B. A recent modification was installed to add a safety related detection and isolation circuitry that upon detecting a Main Steam Line Break (MSLB) will complete the following:

1. Trip <u>both</u> Main FDWP's.

2. Inhibit auto-start or initiate an auto-stop (trip) of the TDEFWP (if switch is in AUTO).

3. Close the FDW Main and Startup Block valves.

a) FDW-31, 33, 40, and 42

b) The valves must be in AUTO for system to operate.

4. Close the FDW Main and Startup Control valves.
   a) FDW-32, 35, 41, and 44
   b) The valves can be in AUTO or MANUAL for system to operate.
      1) The FDW Control valves are pneumatically controlled valves and will close as long as control air is supplied to the valves.
      2) If Instrument Air is lost the FDW Control valves will fail "as is", this is acceptable for two reasons:
         (a) The FDW Block valves, Main and Startup, can CLOSE to isolate the SG's.
         (b) Unit operation cannot be maintained if the control function is lost to the Main FDW system, this requires an operator manual reactor trip.
         (c) If the FDW Block valves, Main and Startup, are closed the RB design pressure will not be exceeded.

C. The MSLB Detection and Isolation system is designed with two (2) independent trains that use a 2 out of 3 logic (one for each steam header) for system actuation. Either train that is actuated will isolate all Feedwater sources (excluding the MDEFDWP's and FDW-315 and 316) to both SG's.
   1. Actuation setpoint is 550 psig on two (2) out of three (3) pressure transmitters on either steam line.

      On Units 2 and 3, NSMs have been implemented to provide trip/ capability for each of the 6 analog detection channels associated with each isolation digital channels (Train A and B). Key switches for each analog channel are located in SG Level Control cabinets in the units' cable rooms. If one of the analog channels becomes inoperable, PT/0600/001 has guidance for tripping the channel (to satisfy TS requirements). Only one key is available for each digital channel (only one analog channel can be tripped at a time) and key cannot be removed unless switch in the OPERATE position. Bypass switches were also provided to allow for testing of the analog channels. Unit 1 will receive the same mod during the next refueling outage.
   2. The pressure signal requires two (2) seconds to seal-in.
      a) The 2 second time delay prevents instantaneous (erroneous) signal from unnecessarily isolating FDW from the SG's.

3. After the logic is satisfied and is sealed-in (2 second time delay has been satisfied), a signal to complete the following is generated:
   a) Trip both Main FDWP's

      This lowers the ΔP across Main and Startup Block valves and ensures the valves close.

   b) Inhibit auto-start or initiate an auto-stop (trip) of the TDEFWP
   c) CLOSE the Main and Startup Block valves (FDW-31, 33, 40, and 42).

      This isolates Main Feedwater to **BOTH** SG's.

4. Five (5) seconds after the actuation logic is satisfied a signal is sent to:
   a) CLOSE the Main and Startup Control valves (FDW-32, 35, 41, and 44).
   b) The 5 second time delay reduces the expected water hammer in the FDW line from the results of tripping the Main FDWP's and closing the FDW Control valves.

D. Circuitry/System Control
   1. Four (4) switches are located on UB1,
      a) MSLB INITIATION TRAIN 1A (ENABLE / DISABLE)
      b) MSLB INITIATE/NORMAL 1A
      c) MSLB INITIATION TRAIN 1B (ENABLE / DISABLE)
      d) MSLB INITIATE/NORMAL 1B
   2. Operating Procedure guidance gives the operator instructions to place the system in and out of service.
      a) The system is placed into service by placing both trains' switches in the **ENABLE**.
      b) The system is taken out of service by placing both trains' switches in the **DISABLE.**

         The system is placed into or removed from service at 650 psig Main Steam pressure.

   3. If a MSLB is indicated, OMP 1-18 directs the operator to perform Rule #6 (EOP) which will have the operator initiate both trains of MSLB circuit.

      Either Train A or B pushbutton will completely actuate the system. It only takes one channel to actuate.

34. 062AA203 001//T1G1//MEM 2.6/2.9/B/OC002301/SRO/OC
Plant conditions:

INITIAL CONDITIONS:

1. Unit 1, 2, and 3 reactor power = 100%
2. 3A LPSW pump is OOS

CURRENT CONDITIONS:

1. 3B LPSW pump suction inadvertantly closes

Which ONE of the following action(s), if any, is/are performed first?

A. Monitor LPSW loads and reduce as necessary.

B. Cross connect unit 1/2's LPSW system with unit 3's and start another LPSW pump at unit 1/2 as required.

C. Cross connect unit 3's LPSW system with the HPSW system.

D. No corrective actions are necessary for continued LPSW system operation.

Answer B

A. Incorrect - LPSW loads should be monitored and flow to components reduced as necessary if flow not restored by alternate unit
B. Correct - X-connection is done first when all LPSWPs are lost.
C. Incorrect - STep not performed unless flow can not be established from alternate unit.
D. Incorrect - 1 LPSWP per unit is required for normal operation.

K/A: 062AA203 (2.6/2.9)
T1G1, T1G1
Bank
Reference: Facility updated question bank 49 SSS051501 SSS051501

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 2.6/2.9
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

34. 062AA203 001

Plant conditions:

INITIAL CONDITIONS:

- Unit 1, 2, and 3 reactor power = 100%
- 3A LPSW pump is OOS

CURRENT CONDITIONS:

- 3B LPSW pump suction inadvertantly closes

Which ONE of the following action(s), if any, is/are performed **FIRST**?

A. Monitor LPSW loads and reduce as necessary.

B. Cross connect unit 1/2's LPSW system with unit 3's and start another LPSW pump at unit 1/2 as required.

C. Cross connect unit 3's LPSW system with the HPSW system.

D. No corrective actions are necessary for continued LPSW system operation.

Answer B

A. Incorrect - LPSW loads should be monitored and flow to components reduced as necessary if flow not restored by alternate unit
B. Correct - X-connection is done first when all LPSWPs are lost.
C. Incorrect - Step not performed unless flow can not be established from alternate unit.
D. Incorrect - 1 LPSWP per unit is required for normal operation.

K/A: 062AA203 (2.6/2.9)
T1G1, T1G1
Bank
Reference: Facility updated question bank 49 SSS051501 SSS051501

SRO

Highlighted the word "first" in the stem.

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 2.6/2.9
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

35. 062K402 001/T2G2///C/A 2.5/2.7/N/OC002301/RO/RFA
Which one of the following will initiate a switchyard isolation?

A. An undervoltage AND an underfrequency on the same two out of three phases on EITHER the red or yellow buses of the 230 KV switchyard. Either of two redundant channels of UV detection OR two redundant channels of UF detection.

B. An undervoltage AND an underfrequency on the same two out of three phases on BOTH the red or yellow buses of the 230 KV switchyard. BOTH redundant channels of UV detection AND two redundant channels of UF detection.

C. An undervoltage OR an underfrequency on the same two out of three phases on EITHER the red or yellow buses of the 230 KV switchyard. Either of two redundant channels of UV detection AND two redundant channels of UF detection.

D. An undervoltage OR an underfrequency on the same two out of three phases on BOTH the red and yellow buses of the 230 KV switchyard. Either of two redundant channels of UV detection OR two redundant channels of UF detection.

A) D

Reference: Lesson Plans Vol IX, OP-OC-EL-EPD , page 34 of 76.
EO - 15.1
K/A: 062K402 (2.5/2.7)
RO/SRO: BOTH
Level: C
Author: rfa

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	C/A 2.5/2.7
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

35. 062K402 001

Which ONE of the following statements describes the operation of the startup feeder breakers to TA and TB (6.9 kv) following a valid switchyard isolation and a subsequent resetting of the switchyard isolation logic?

The breakers will open upon actuation of...

A. both channels of Switchyard isolation and will reclose automatically if in AUTO.

B. either channel of Switchyard isolation and will reclose automatically if in AUTO.

C. both channels of Switchyard isolation and will only reclose MANUALLY.

D. either channel of Switchyard isolation and will only reclose MANUALLY.

A) A

A. Correct, it takes both trains of Switchyard isolation to actuate the tripping of the 7kV breakers and if the switchyard isolation signal is reset without taking the breakers to manual the breakers will reclose automatically.
B. Incorrect, it takes both trains.
C. Incorrect, the breaker will reclose in automatic.
D. Incorrect, it takes both trains of Switchyard isolation to trip the 7kV breakers.

Reference: Lesson Plans Vol IX, OP-OC-EL-EPD , page 34 of 76.
EO - 15.1
K/A: 062K402 (2.5/2.7)
RO/SRO: BOTH
Level: C
Author: rfa

RO

Do not understand last sentence of each alternative.
Suggest cognitive level = knowledge

Replaced with bank question EL292.

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	C/A 2.5/2.7
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

062K402

7. Thus, Switchyard Isolation can be initiated by:
   a) Undervoltage OR underfrequency on the same two out of three phases on BOTH the Red and Yellow Buses of the 230 KV switchyard.

      Either of two redundant channels of undervoltage detection or two redundant channels of underfrequency detection.

   b) 230 KV switchyard voltage < 227.4 KV for greater than 9 seconds AND ES 1 or 2 on any unit.
8. Automatic action on switchyard isolation.
   a) In general, a switchyard isolation will
      1) Isolate the 230 KV Yellow Bus.
      2) Establish a dedicated path from one Keowee Hydro unit to each unit's startup transformer via the Keowee Overhead Line and the 230 KV Yellow Bus.
      3) Start both Keowee Hydro units.
   b) Details of operation
      1) The following PCB's will open (if not already open).
         (a) PCB's 8, 9, 12, 15, 17, 21, 24, 26, 28 and 33
            (1) This isolates the Yellow Bus from all lines not related to the dedicated path and also isolates the Oconee unit's generator outputs from the 230 KV Yellow bus.
         (b) When all PCBs above are open, the logic for the "Switchyard Isolation Complete" (confirm) signal will be met. This signal will allow PCB-9, and ACB-1 or ACB-2 to reclose after the proper time delays.
            (1) If any one or more of the PCB's 8, 9, 12, 15, 17, 21, 24, 26, 28 and 33 fail to open, then a "Switchyard Isolation Complete" (confirm) signal will NOT be met. PCB-9, and ACB-1 or ACB-2 will NOT be allowed to reclose until the problem is corrected.
            (2) Refer to JPM NLO-046 (Manually Open PCB-17)[1]

2) The following PCB's will stay closed or close if not already closed.

   (a) PCB's - 18, 27, and 30.

   (b) This creates a path for one Keowee unit to feed through PCB 9 to the Yellow Bus and from the bus through PCB's 18, 27, and 30 to each Oconee unit's startup transformer.

3) Both Keowee units will emergency start.

   (a) Keowee generator breakers (ACB-1 for unit #1 and ACB-2 for unit #2) automatically trip to ensure separation of the applicable Keowee unit from the switchyard.

   (b) The unit tied to the underground feeder (ACB 3 or 4) will trip if unit is generating to the grid and reclose to supply power to CT4 and be available to supply power to the MFBs through the standby buses (SK breakers will close if ESG actuation or MFBMP has timed out and the SL breakers are not closed)

   (c) The Keowee unit not connected to the underground feeder will tie in to the 230 KV Yellow Bus through ACB 1 or 2 and PCB 9 and supply power to the startup transformers and therefore be available to supply power to the MFBs. ACB 1, 2 and PCB 9 each have 8.5 second time delays for closing.

4) A potential problem was identified in which overloading of the Keowee generator could occur due to the presence of operating RCP's during a postulated LOCA coincident with a Loss of Offsite Power (LOCA/LOOP).

   If the Keowee unit, not aligned to the underground feeder, supplies power to the startup transformers, the RCP's may not have tripped, as the total RCP undervoltage relay/breaker logic time delay was longer in duration than the ACB time delay prior to breaker reclosure.

   The LOCA loads on one Unit plus the hot S/D loads on the other two Units is equal to 20.6 MVA, while one Keowee Unit is capable of 87.5 MVA. However, the RCP's constitute a load of approximately 30 MVA for each Unit, and the combined LOCA, hot S/D, and RCP loads would have exceeded the capacity of a single Keowee Unit.

Additional controls were installed on PCB-9 to prevent this problem. This modification ensures that sufficient time has elapsed following a LOOP for existing logic to automatically trip the appropriate 7 KV switchgear breakers thus precluding the overloading problem. PCB-9 will automatically trip upon either External Grid Protection or when a degraded voltage signal initiates a switchyard isolate. PCB-9 will reclose after an 8.5 second time delay. The 8.5 second delay is based on adequate time for the 7 KV undervoltage logic and installed time delays to automatically trip RCP breakers.

Also, the redundant logic function, namely the present reclosure time delay for Keowee breakers ACB-1 and ACB-2 have been increased from .5 seconds to 8.5 seconds.

An additional problem associated with RCPs being powered from Keowee has been identified. After a Switchyard Isolation was been completed, should a Oconee Unit trip, its RCPs would be power from a Keowee Unit. To prevent this NSM 32983 was written. This NSM installed a signal to the 6900 V Feeder Breakers for TA & TB from CT-1, 2, & 3 that on receipt of the Switchyard Isolation signal, these two breakers would be tripped open or if already open to inhibit their closing.

Note: The Unit 1 and 2 only isolate from the 230 KV Yellow bus, not the 230 KV Red bus and NSM 32983 only trips the TA & TB Startup Source Breakers (not normally supply power to RCPs with Unit at Power). This should prevent spurious unit trips due to relay testing errors.

5) During a real fault condition which causes a Switchyard Isolation signal to be generated, several different scenarios could develop.

   (a) If the fault condition causing the undervoltage or underfrequency clears quickly, the units will likely remain on-line supplying power out the 230 KV Red bus.

   (b) If the undervoltage/underfrequency lasts several seconds, it is likely that PCBs 20 & 23 (Unit's 1 & 2 outputs to the 230 KV Red bus) will open due to line relaying sensing overcurrent conditions. Recall that $P=\sqrt{3} \cdot E \cdot I$. Therefore, if the same power is generated and voltage (E) decreases, current (I) increases. If this scenario develops, the unit could experience a Load Rejection then probably trip on a RPS RCS High Pressure Trip.

(c) Depending on how soon after the Switchyard Isolate signal was generated that the unit trips will determine how long the unit is without power following the trip.

Keowee may repower MFBs almost immediately through the SU Transformers if the 230 KV Yellow bus PCB-9 has already re-closed and Keowee up to about 90% voltage (high enough for normal closing logic of the "E" breakers). In order to prevent transfers between unsynchronized sources (SU transformer on Keowee and Unit Generator at time of trip), the "E" breaker logic was changed. On Units 1 and 2 the "E" breaker logic considers only the status of PCB-21 (for Unit 1) and PCB-24 (for Unit 2) when determining whether or not to do a rapid bus transfer following a trip. Therefore, since PCB-21 and 24 are open due to the Switchyard Isolation signal, the "E" breaker closing logic will go through $\approx$ 1 second time delay rather than a rapid closing. On Unit 3 a Switchyard Isolate logic path has been added to the "E" breaker logic to prevent a rapid transfer to a Keowee out of sync. Therefore, a loss of power of at least one second will always occur.

If the unit trips immediately upon switchyard isolation, the time required to repower the MFBs depends on how fast the Keowee Hydro unit connected to the overhead path takes to get up to about 90% voltage again (15 to 20 seconds nominally).

It may take several seconds (31) before a unit's MFB power is restored if its SU Transformer is inoperable. EPSL would require MFBs to be deenergized for 20 seconds, Load shed to initiate (another 1 sec) and the Standby Bus bkrs to close (another 10 seconds for a total of 31 sec). Relay Dept. has unofficially said PCBs 20 & 23 will remain closed 5 to 10 seconds under a sustained Switchyard Isolation condition before opening, therefore power could be restored within about 10 seconds of it's loss (swyd isolation + trip at 5 sec + another 10 for Keowee up to 90%).

e) A Red Bus Differential Lockout (either 230 KV or 525 KV) will not prevent the switchyards from supplying power to the Oconee Units.

1) Breaker-and-a-half arrangement.

2) Yellow Bus unaffected.

S. 230 KV or 525 KV Switchyard Yellow Bus Differential Lockout (Refer to Handout EPD-12)

1. A 230 KV or 525 KV Switchyard Yellow Bus Differential Lockout is the same as a Red Bus Lockout except:

a) Current transformers are on the Red Bus side of each PCB connected to the Yellow Bus.

b) Operation of relay 87BY will trip relay 86BY (Y for Yellow Bus instead of R) in the 230 KV switchyard.

c) PCB's 9, 12, 15, 18, 21, 24, 27, 30 and 33 will open.

d) Operation of the 87HBY relay will trip the 94BY relay in the 525 KV switchyard.

e) PCB's 56, 59, and 62 will open.

2. One additional consideration on the 230 KV Yellow Bus Differential Lockout is that while this lockout by itself will not prevent the switchyard from supplying the Oconee Units (Red Bus available), it would remove from service the TS 3.8.1 & 3.8.2 required overhead path from the Keowee Hydro units.

T. Switchyard Isolation (230 KV switchyard) (Refer to Handout EPD-13)

1. Switchyard isolation circuitry is provided to isolate the emergency power path from the Keowee Hydro units to the Oconee unit's Startup Transformers.

2. As described in the Design Basis Document for the 230V Switchyard system, isolation can occur as a result of either the External Grid Trouble Protection System (undervoltage or underfrequency on the 230 KV buses) or the Degraded Grid Voltage Protection System (Switchyard voltage low and an ES signal).

3. SLC 16.8.8 External Grid Trouble Protection System contains SR 16.8.8.1 for testing this Circuitry every 92 days.

4. External Grid Trouble Protection System's two channels of undervoltage detection
   a) Provides redundant protection.
   b) Six undervoltage relays (27 B) per channel, One per phase on each bus
   c) Each 27B relay will pick up at 62% undervoltage (approximately 164 KV).
   d) After a 5 second time delay, relay 27X will be actuated.
      1) The 27X relay will operate a local green light and a remote statalarm.
         (a) Local alarm is in relay house.
         (b) Remote statalarm is in Control Room on panel SA-15.
         (c) Remote statalarm reads "Channel 1 Undervoltage initiated". (or Channel 2)
   e) To insure that a true phase undervoltage has occurred, a contact from the "27X" Red Bus "X" phase and the 27X Yellow Bus "X" phase are connected in series to actuate another auxiliary relay (27X/RY).

      The "Y" and "Z" phase auxiliary relays are similarly connected.
   f) Contacts on the "27X/RY" relays are used to operate a local indicating lamp (in the relay house) and to initiate the main tripping relays (94).

      The 94 relays are arranged such that it takes at least two Red Bus phases AND the same two Yellow Bus phases to initiate a switchyard isolation.
   g) Switchyard isolation will be initiated by undervoltage on the same 2 out of 3 phases on both the Red and Yellow Buses by either channel one or channel two.
   h) The automatic actions which will occur on a switchyard isolation will be discussed later in this lesson plan.
5. External Grid Trouble Protection System's two channels of underfrequency detection.
   a) Arrangement is similar to undervoltage detection.
   b) Six underfrequency relays (81BL) per channel.
   c) 81BL relays pick up at 57 hertz after a 15 cycle time delay (approximately .25 seconds), 81BL relay actuates an 81X relay.
   d) The 81X relay will actuate a local green light and a remote statalarm.

1) Local alarm is in the relay house.

2) Remote statalarm is in Control Room on panel SA-15.

3) Remote statalarm reads "Channel 1 Underfrequency initiated". (or Channel 2)

e) An 81X relay on the X phase of both the Red and Yellow Buses are required to actuate the 81XRY relays.

f) Contacts on the 81X/RY relay are used to operate a local indicating lamp (in the relay house) and to initiate the main tripping relay (94).

g) These are the same 94 relays, which are operated by the undervoltage detection circuitry.

6. Degraded Grid Voltage Protection System

a) As a result of an electrical system study, it was discovered that during a LOCA event concurrent with a 230 KV switchyard low voltage condition, the unit experiencing a LOCA would be vulnerable to a total loss of power, (if the Keowee underground were to fail). This is because with the existing design, the startup source undervoltage relaying may not allow the startup source (E) breakers to close when 230 KV switchyard voltage is below 204 KV. But, the switchyard isolation circuitry, which must actuate for the overhead path to become available, has its undervoltage relaying set at approximately 164 KV. Therefore, for switchyard voltages between 164 KV and 204 KV, the unit experiencing a LOCA would have only the underground source automatically available. This violates the single failure criteria.

An NSM has been incorporated to the power switching logic to solve this problem. Three undervoltage relays to monitor 230 KV switchyard voltage are installed on the Three Phases of the Yellow Bus.

These relays, which are set to actuate at a 230 KV switchyard voltage of 227.4 KV will be connected in a two out of three configuration and will start redundant time delay relays upon sensing a two out of three undervoltage condition. The time delay relays will time out after 9 seconds. After these relays time out an ES 1 or 2 signal from any unit will initiate a Switchyard Isolation.

36. 062K404 002//T2G2//MEM 2.2/2.9/N/OC002301/SRO/RFA
Which one of the following is part of the correct set of events that will occur on a STAR relay actuation?

A. Initiate load shed and prevent closure of a startup breaker (E1 or E2) on to a faulted bus.

B. Initiate load shed and initiate transfer to standby.

C. Seek an alternate power source for the essential loads in the event the startup source is not available and prevent closure of a startup breaker (E1 or E2) on to a faulted bus.

D. Seek an alternate power source for the essential loads in the event the startup source is not available and initiate transfer to standby.

A) B

Reference: Lesson Plans Vol IX, OP-OC-EL-PSL , page 26 of 55.
EO - 6.3
K/A: 062K404 (2.2/2.9) (also on Q 29)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.2/2.9
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

36. 062K404 002
Which one of the following will occur on a STAR relay actuation?

A. Initiate load shed and prevent closure of a STANDBY breaker (S1 or S2) on to a faulted bus.

B. Initiate load shed and initiate transfer to STANDBY source.

C. Seek an alternate power source for the essential loads in the event the STARTUP source is not available and prevent closure of a STANDBY breaker (S1 or S2) on to a faulted bus.

D. Seek an alternate power source for the essential loads in the event the STANDBY source is not available and initiate retransfer to STARTUP source.

A) B
A. Incorrect, will not prevent S breaker from closing to a faulted bus.
B. Correct, it will Initiate load shed and initiate transfer to standby.
C. Incorrect, First part true but will not prevent S breaker from closing to a faulted bus.
D. Incorrect, Does not look at the standby source and will not initiate retransfer to startup.

Reference: Lesson Plans Vol IX, OP-OC-EL-PSL , page 26 of 55.
EO - 6.3
K/A: 062K404 (2.2/2.9) (also on Q 29)
RO/SRO: BOTH
Level: M
Author: rfa

SRO

All alternatives are correct
Modified stem for clarity
Changed alternatives to provide one correct answer:
"A" – changed breakers to standby breakers S1 & S2 to make alternative incorrect.
"B" - remains the same and is the correct answer.
"C" - changed breakers to standby breakers S1 & S2 to make alternative incorrect
"D" – changed startup source to standby source to make incorrect.
Updated answer explanations
Capped standby and startup

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 2.2/2.9
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

m) The red "Manually Bypassed" indication should only be on during testing, when the "Retransfer to SU Source Test Switch" is placed in the "ON" position.

n) The red lamps labeled "Channel A (B) Retransfer to SU Source Initiated by Channel A (B) Circ", simply indicate which circuit of the switching logic, A or B, produced a retransfer to the SU source. The two red lamps on the Unit 1 panels for 100KV Line Failure will indicate which circuit initiated a swap from CT-5 Fdrs to the Stby Buses, to CT-4, should CT-5 be supplying the Stby Buses and fail. Aux Relay RX, is the relay that will initiate closing of the CT-4 Bkrs (SK1 and SK2) to the Stby Buses on an ESG signal. RX is also energized by MFBMP actuation. This lamp, obviously, should normally be off.

o) The red lamp "ESG Channel 1 (2) Aux Relay RX, Coil Ckt Good" indicates that the relay is not faulty.

2.6 Startup Breaker Anti-Recycle Logic (STAR) (**PSL-14**)

A. Function

1. This logic has been provided to prevent the startup breakers (E1 & E2) from repeated closing and tripping during periods when the startup transformer is being supplied directly from a "faulty" Keowee Hydro unit. This condition could occur during a switchyard isolation. Under these conditions, if the Keowee unit is experiencing loading problems which result in normal voltage when unloaded and low voltage following load application, the anti-recycle transfer feature ensures a transfer to the standby source within one minute following the second under-voltage. STAR resets itself after the 1 minute window expires.

2. The STAR Relays are located in the Load Shed Cabinets in the Cable Room.

B. The STAR Relay energizes when: (**See OC-EL-PSL-14**)

1. 2 out of 3 phases of Startup source Under-voltage is detected.

AND

A second under-voltage is detected on the Startup bus within one minute of when voltage returned to normal from the initial under-voltage.

C. The STAR relays initiate Load Shed under the following conditions: (channel A shown)

1. All the following exists:

- $STAR_A$ Relay energize
- 2 out of 3 phases UV on Normal Bus
- 2 out of 3 phases UV on Startup Bus

OR

2. All the following exists:
   - $STAR_A$ Relay energized
   - N_1 Bkr. OPEN
   - E_1 Bkr. OPEN
   - UV on MFB1

D. The STAR relay cannot trip an operating unit unless one MFB has lost power from **BOTH** the Normal and Startup Buses, twice within one minute.

1. To prevent challenging this Load Shed circuit by actuating STAR, the operator should insure that power is maintained on the startup transformer for greater than two minutes following a de-energized condition when power is restored.

E. STAR will:

- TRIP the "E" breakers and block their closure
- initiate Transfer to Standby
- Initiate load shed

2.7 Standby Breaker Close Initiation (**PSL-15**)

062K404

A. Function

1. The Standby Breaker Close Initiation logic operates in the presence of a load shed signal to perform the following functions:

   a) Seek an alternate power source for the essential loads in the event the startup source is not available.

   b) Prevent closure of a startup breaker (E1 or E2) on to a faulted bus.

B. Power Supply

1. The control power for the re-transfer to startup logic and the "S" breaker close/trip logic comes from DIC (channel 1) and DID (channel 2). Prior to a mod both circuits were fed from a common 30 amp fuse block. With this arrangement, removing either circuit from service rendered the other inoperable. This mod will install an additional fuse block giving each circuit a separate power supply.

C. Standby Breaker Close Initiation Logic

The Standby Breaker Close (SBC) Initiation Logic requires the presence of a load shed signal before any of the logic paths can be satisfied (the test circuit is an exception). This requirement is imposed to insure that the standby transformers will not be overloaded. There are six main paths through the SBC logic, each serving a different function:

1. Logic path # 1

   a) Under-voltage is sensed on two out of three phases of the startup source (27EY). This logic path provides for the situation when an alternate power source for the essential loads is called for (Load Shed Signal), but the startup source is not available (under-voltage signal); therefore, the logic is satisfied to ultimately provide a signal to initiate closure of the standby breakers. A 10 second time delay ($SBC1_A$ and $SBC1_B$) is included in this logic path to allow time for voltage to appear at the startup source.

2. Logic path # 2

   a) With both "E" breakers open (52Sf) or NOT in the Operate (connect) Position (52Hf), and an under-voltage is present on both Main Feeder Busses ($27B1_1$ & $27B2_1$) and NO Retransfer to Start-up, the logic is satisfied to ultimately provide a signal to initiate closure of the Standby Breakers. The logic path provides for the situation when an alternate power source for the essential loads is called for (Load Shed) while normal voltage is present on the Start-up Source.

3. Logic path # 3

37. 063K302 001//T2G2//MEM 3.5/3.7/B/OC002301/SRO/OC
Unit 1 plant conditions:

1. Reactor power = 50%
2. 1KI inverter output voltage = 55 volts
3. The static transfer switch failed to swap the system output to A/C line
4. The ASCO transfer switch swaped to A/C line.

If a subsequent Turbine trip were to occur, the TBV's should control in which ONE of the following conditions?

Assume NO operator action

A. Manual and open

B. Manual and closed

C. Auto and open

D. Auto and closed

Answer B

A. Incorrect. Valves remain closed. Although KI is available, TBVs Baily's remain in hand.

B. Correct. On loss of KI power the valves swap to KU Hand and shift to manual. KI is restored by the ASCO transfer, but TBVs remain in manual and will not open on RX trip.

C. Incorrect. Auto power is available following ASCO transfer, but no operator action has been taken to place them in AUTO. Second part is correct, TBVs would open on Rx trip.

D. Incorrect, See "C" above for AUTO explanation. Also second part is incorrect because valves remain closed as they are still in manual.

K/A: 063K302 (3.5/3.7)
SRO - T2G1
Bank
Reference: Facility updated question bank 15 IC010701 IC010701
MEM

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.5/3.7
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

37. 063K302 001

Unit 1 plant conditions:

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A. Manual and open

B. Manual and closed

C. Auto and open

D. Auto and closed

Answer B

A. Incorrect. Valves remain closed. Although KI is available, TBVs Baily's remain in hand.

B. Correct. On loss of KI power the valves swap to KU Hand and shift to manual. KI is restored by the ASCO transfer, but TBVs remain in manual and will not open on RX trip.

C. Incorrect. Auto power is available following ASCO transfer, but no operator action has been taken to place them in AUTO. Second part is correct, TBVs would open on Rx trip.

D. Incorrect, See "C" above for AUTO explanation. Also second part is incorrect because valves remain closed as they are still in manual.

K/A: 063K302 (3.5/3.7)
SRO - T2G1
Bank
Reference: Facility updated question bank 15 IC010701 IC010701
MEM

SRO

No changes
Suggest cognitive level above knowledge

QUESTIONS REPORT

for 2002-301 RO-SRO-ONLY UTILITY COMMENTS R1

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.5/3.7
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

38. 064A302 001/T2G2///MEM 3.4/3.7/N/OC002301/RO/RFA
Which one of the following is the purpose for the 8.5 sec timer on the Keowee Hydro Unit?

A. It initiates a trip signal to the overhead breaker (ACB-1/2), after it times out, to ensure separation of the unit from the 230 KV grid.

B. It initiates a trip signal to the underground breaker (ACB 3/4), after it times out, if that unit was generating to the grid at the time the emergency start signal was generated.

C. It trips the RCPs, after it times out, on the affected unit.

D. It trips the emergency lockout relay, after it times out, on the affected unit.

A) C

Reference: Lesson Plans Vol IX, OP-OC-EL-KHG , page 26 of 33.
EO - 5
K/A: 064A302 (3.4/3.7) (This K/A is for EDG, however, Oconee has hydro-electric)
RO/SRO: BOTH
Level: M
Author: rfa

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 3.4/3.7
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

38. 064A302 001

After a switchyard isolation is initiated, which one of the following is the purpose for the 8.5 sec timer on the Keowee Hydro Unit?

A. Prevent closing of the Keowee overhead breaker (ACB-1/2), until timer has timed out, to ensure separation of the unit from the 230 KV red bus.

B. Prevent closing of the Keowee overhead breaker (ACB-1/2), until timer has timed out, to ensure all RCPS have tripped.

C. It initiates a trip signal to the underground breaker (ACB 3/4), after it times out, if that unit was generating to the grid at the time the emergency start signal was generated.

D. It initiates a trip signal to the underground breaker (ACB 3/4), until timer has timed out, if that unit was generating to the grid at the time the emergency start signal was generated.

A) C

After a SWYD isolation, the 8.5 sec timer ensures ACB 1/2 will not close whill ensure that all RCPs will have tripped due to a loss of power longer than 3 seconds.

Reference: Lesson Plans Vol IX, OP-OC-EL-KHG , page 26 of 33.
EO - 5
K/A: 064A302 (3.4/3.7) (This K/A is for EDG, however, Oconee has hydro-electric)
RO/SRO: BOTH
Level: M
Author: rfa

RO

No correct answer

Added switchyard isolation to stem to provide clarity.
Modified correct answer to more accurately reflect circuitry. "B" now correct answer.
Modified "D" alternative to balance question.

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 3.4/3.7
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

064A302

c) Starts an 8.5 second timer that must be timed out to give a permissive to close to PCB-9 if a Switchyard Isolation signal is present.

d) Initiates a trip signal to the underground breaker (ACB 3/4) if that unit was generating to the grid at the time the emergency start signal was generated.

e) Prevents operation of Speed Changer Motor for synchronizer speed adjust

f) Inhibits operation of the Auto Synchronizer

g) Inhibits operation of normal lockout

h) Initiates reject signal to the AGC (Automatic Generator Control - buttons at Keowee which allow Coordinator to control unit operation) (Note that this feature is not used anymore)

i) Wicket gates open to 50%. When turbine speed reaches 65 RPM, gates close to no load or an as needed position

   1) Turbine Gate Limit moves to 100%

j) Keowee unit tied to underground will be available to supply power as it accelerates to rated speed

k) Keowee Unit aligned to feed the 230 KV Switchyard will also accelerate to rated speed but will not tie into the switchyard unless the following conditions are met:

   1) Operator manually closes in ACB, or

   2) Switchyard Isolation initiates and switchyard is isolated from all sources of power (SYI complete), at which time the unit will automatically close its overhead breaker.

l) If a Keowee unit was generating to the grid when the emergency signal was initiated, then the possibility exists for the unit to overspeed. To prevent the overspeed condition from supplying safety related loads at ONS with a frequency that may damage the equipment, a permissive to close for frequency < 66 cycles must be satisfied. This applies to the overhead and underground ACBs as well as SK1/2 breakers.

3. Operator actions at Keowee for an Emergency Start

   a) Following an Emergency Start signal, if an in house power failure is indicated at Keowee (statalarms 2SA17 or 18/D-02, 1X/2X 600V supply failure) and no response is received from a Keowee Operator, an Oconee operator is dispatched to KHS.

   b) This occurs only if a Keowee operator cannot respond.

C. Shutdown from Oconee

1. Initial Conditions

a) Unit to be shutdown is in operation

2. Procedure

a) Simultaneously lower Speed Changer Motor and Auto Voltage Adjuster until all MWs and MVARS are off the machine. Do not drive MVARS "in the hole". Refer to OAC indication for indication of zero MWs and MVARS. Stopping Unit with generator "in the hole" causes pitting damage to generator breakers.

b) Turn Local Master to STOP and hold in STOP position for approximately five (5) seconds (insures all contacts of multi-contact switch have made good electrical contact)

c) Turn Master Selector to Auto

1) Shuts off AC HP Lift Oil Pump which helps prevent the unit from creeping

2) Closes Generator Cooling Water Valve

d) Verify Gate Position Indicator is at zero (0)

e) If started manually, turn the Unit Sync 230 KV selector to AUTO

f) Notify Keowee to place the LOCAL/REMOTE switch to LOCAL

D. Emergency Operation

1. Emergency Start

a) Manual

1) Unit 1, 2, 3 Control Room - Switches

2) Unit 1, 2, 3 Cable Room - Key Switches

b) Automatic

1) Engineered Safeguards Channel 1 or 2 Signal

2) MFBMP Signal

3) Switchyard Isolation Signal

2. Emergency Start - Actions

a) Closes Generator Field, Supply, and Field Flashing breakers at 0 RPM to begin building field sooner

b) Initiates a trip signal to the overhead breaker ACB-1/2 to ensure separation of the unit from the 230 KV grid

Additional controls were installed on PCB-9 to prevent this problem. This modification ensures that sufficient time has elapsed following a LOOP for existing logic to automatically trip the appropriate 7 KV switchgear breakers thus precluding the overloading problem. PCB-9 will automatically trip upon either External Grid Protection or when a degraded voltage signal initiates a switchyard isolate. PCB-9 will reclose after an 8.5 second time delay. The 8.5 second delay is based on adequate time for the 7 KV undervoltage logic and installed time delays to automatically trip RCP breakers.

Also, the redundant logic function, namely the present reclosure time delay for Keowee breakers ACB-1 and ACB-2 have been increased from .5 seconds to 8.5 seconds.

An additional problem associated with RCPs being powered from Keowee has been identified. After a Switchyard Isolation was been completed, should a Oconee Unit trip, its RCPs would be power from a Keowee Unit. To prevent this NSM 32983 was written. This NSM installed a signal to the 6900 V Feeder Breakers for TA & TB from CT-1, 2, & 3 that on receipt of the Switchyard Isolation signal, these two breakers would be tripped open or if already open to inhibit their closing.

Note: The Unit 1 and 2 only isolate from the 230 KV Yellow bus, not the 230 KV Red bus and NSM 32983 only trips the TA & TB Startup Source Breakers (not normally supply power to RCPs with Unit at Power). This should prevent spurious unit trips due to relay testing errors.

5) During a real fault condition which causes a Switchyard Isolation signal to be generated, several different scenarios could develop.

   (a) If the fault condition causing the undervoltage or underfrequency clears quickly, the units will likely remain on-line supplying power out the 230 KV Red bus.

   (b) If the undervoltage/underfrequency lasts several seconds, it is likely that PCBs 20 & 23 (Unit's 1 & 2 outputs to the 230 KV Red bus) will open due to line relaying sensing overcurrent conditions. Recall that $P=\sqrt{3} \cdot E \cdot I$. Therefore, if the same power is generated and voltage (E) decreases, current (I) increases. If this scenario develops, the unit could experience a Load Rejection then probably trip on a RPS RCS High Pressure Trip.

2) The following PCB's will stay closed or close if not already closed.

   (a) PCB's - 18, 27, and 30.

   (b) This creates a path for one Keowee unit to feed through PCB 9 to the Yellow Bus and from the bus through PCB's 18, 27, and 30 to each Oconee unit's startup transformer.

3) Both Keowee units will emergency start.

   (a) Keowee generator breakers (ACB-1 for unit #1 and ACB-2 for unit #2) automatically trip to ensure separation of the applicable Keowee unit from the switchyard.

   (b) The unit tied to the underground feeder (ACB 3 or 4) will trip if unit is generating to the grid and reclose to supply power to CT4 and be available to supply power to the MFBs through the standby buses (SK breakers will close if ESG actuation or MFBMP has timed out and the SL breakers are not closed)

   (c) The Keowee unit not connected to the underground feeder will tie in to the 230 KV Yellow Bus through ACB 1 or 2 and PCB 9 and supply power to the startup transformers and therefore be available to supply power to the MFBs. ACB 1, 2 and PCB 9 each have 8.5 second time delays for closing.

4) A potential problem was identified in which overloading of the Keowee generator could occur due to the presence of operating RCP's during a postulated LOCA coincident with a Loss of Offsite Power (LOCA/LOOP).

   If the Keowee unit, not aligned to the underground feeder, supplies power to the startup transformers, the RCP's may not have tripped, as the total RCP undervoltage relay/breaker logic time delay was longer in duration than the ACB time delay prior to breaker reclosure.

   The LOCA loads on one Unit plus the hot S/D loads on the other two Units is equal to 20.6 MVA, while one Keowee Unit is capable of 87.5 MVA. However, the RCP's constitute a load of approximately 30 MVA for each Unit, and the combined LOCA, hot S/D, and RCP loads would have exceeded the capacity of a single Keowee Unit.

39. 064G2.1.12 001//T2G2//C/A2.9/4.0/B/OC002301/SRO/OC

Plant conditions:

1. All Oconee Units are operating at 100% RATED THERMAL POWER
2. Both KHUs were declared inoperable at 0800 on 2/5 due to suspected relay problems (CONSIDER AS UNPLANNED)
3. Standby buses were energized from a Lee Combustion Turbine at 0845 on 2/5
4. No additional electrical equipment is out of service

Which ONE of the following is the correct required time for restoring one KHU and its required emergency power path to OPERABLE status?

A. 1200 on 2/5

B. 2000 on 2/5

C. 0800 on 2/8

D. 2000 on 2/7

Answer B

K/A: 064G2.1.12 (2.9/4.0)
SRO - T3
Bank
Reference: Facility updated question bank 3 ADM010612 ADM010612
Condition I: UNPLANNED, I.3: 12 hours to restore one KHU and its required emergency power path to OPERABLE status. 0800 on 2/5 + 12 hours = 2000 on 2/5.

C/A

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	C/A2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

39. 064G2.1.12 001

Plant conditions:

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- Standby buses were energized from a Lee Combustion Turbine at 0845 on 2/5
- No additional electrical equipment is out of service

Which ONE of the following is the **MAXIMUM** allowed time for restoring one KHU and its required emergency power path to OPERABLE status?

SEE ATTACHMENT: TS 3.8.1 (AC Sources/Operating)

A. 1200 on 2/5

B. 2000 on 2/5

C. 0800 on 2/8

D. 2000 on 2/7

Answer B

K/A: 064G2.1.12 (2.9/4.0)
SRO - T3

Required reference: TS 3.8.1 (AC Sources/Operating)

Bank
Reference: Facility updated question bank 3 ADM010612 ADM010612
Condition I: UNPLANNED, I.3: 12 hours to restore one KHU and its required emergency power path to OPERABLE status. 0800 on 2/5 + 12 hours = 2000 on 2/5.

C/A

SRO

Modified stem by adding "...MAXIMUM allowed time..." to prevent "A" being selected as a conservative correct answer.
Attachment TS 3.8.1 AC Sources - Operating is required to answer this question.
Added TS reference to stem and answer explanation.

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

40. 068AK207 001/T1G1///MEM 33/3.4/N/OC002301/RO/CR
Given the following plant conditions:

Fire in the cable spreading room, the Control Room has been evacuated and transfer to the Remote Shutdown Panel has been completed.
Following the transfer, RCS pressure decreased to 1400# and initiated Engineering Safeguards.

Which one of the following identifies the starting status of the Keowee Emergency Generators for this scenario?

A. The Keowee Emergency Generators will auto start following a loss of all AC only.

B. Must be manually started at the Keowee Remote Shutdown Panel.

C. Should have started when the transfer switches transferred control to the Keowee Remote Shutdown Panel.

D. Should have auto started as a result of the Engineering Safegaurds actuation.

A. Local start is not required, auto start still functions.
B. Auto start still functions.
C. The transfer switch will not start the Keowee Emergency Generator.
D. CORRECT, ES actuates on low RCS pressure, AND this is the one circuit that ES will still actuate when control is transfered to the RSP.

Reference: Vol. IX, Keowee Hydro Generators.
(This K/A has to do with ED/G. However, Oconee use hydroelectric)

RO Tier:	T1G1	SRO Tier:	
Keyword:		Cog Level:	MEM 33/3.4
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

40. 068AK207 001

Given the following plant conditions:

- Fire in the cable spreading room, the Control Room has been evacuated (no time to take actions prior to leaving control room) and transfer to the Aux Shutdown Panel is in progess.
- During the transfer, RCS pressure decreased to 1400 psig and initiated Engineering Safeguards.

Which one of the following identifies the starting status of the Keowee Hydro Generators for this scenario?

A. The Keowee Hydo Generators will **ONLY** auto start following a loss of power to the Main Feeder Buses.

B. Can **ONLY** be manually started from the Oconee Control Room.

C. Should have started when the local/remote switches transferred Keowee control to the Oconee Control Room.

D. Should have auto started as a result of the Engineering Safeguards actuation.

A. Local start is not required, auto start still functions.
B. Auto start still functions.
C. The transfer switch will not start the Keowee Emergency Generator.
D. CORRECT, ES actuates on low RCS pressure, AND this is the one circuit that ES will still actuate when control is transfered to the RSP.

Reference: Vol. IX, Keowee Hydro Generators.
(This K/A has to do with ED/G. However, Oconee use hydroelectric)

RO

No correct answer
Operators will manually start KHU initially upon leaving CR, therefore, units would be running when ES occurred.
Changed stem to indicate no actions were performed prior to evacuating CR.
Replaced "emergency" with "hydro" for ONS nomenclature.
Modified A, B, & C alternatives to provide plausibility and ensure not correct answers.

RO Tier:	T1G1	SRO Tier:	
Keyword:		Cog Level:	MEM 33/3.4
Source:	N	Exam:	OC002301
Test:	RO	Misc:	CR

4. Subsequent Actions

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.1 __ Ensure Rx is tripped.	
4.2 __ Ensure both Keowee units emergency started.	
4.3 __ Open 1HP-24.	
4.4 Ensure the following notifications have been made: __ PA announcement of the required evacuation of CR __ Notify OSM to reference the following: • Emergency Plan • NSD-202 (Reportability)	

NOTE

Other APs, if needed, are available in the OSC.

4.5 __ Proceed to Unit 1 Auxiliary Shutdown Panel with this AP and EP/1 (EOP).	
4.6 __ **GO TO** Step 4.12.	

41. 069G2.1.12 001//T1G1//C/A 2.9/4.0/B/OC002301/SRO/OC
Unit 1 is in MODE 1 at 100% power.

- At 0430 on 4/2, 1A Reactor Building Spray train is declared inoperable.
- At 1800 on 4/8, 1B Reactor Building Spray train is declared inoperable.
- At 1845 on 4/8, 1A Reactor Building Spray train is restored to OPERABLE status.

Which ONE of the following describes the MAXIMUM time allowed by TS, including any applicable extension, to restore 1B Reactor Building Spray train to OPERABLE status?
Refer to ATTACHMENT TS 3.6.5 (RB Spray and Cooling Systems) .

A. 0430 on 4/9

B. 0430 on 4/10

C. 1800 on 4/15

D. 1800 on 4/16

Answer B

A. INCORRECT - Does NOT take the allowance for the additional 24 hours allowed per Section 1.3.
B. CORRECT - LCO 3.6.5 ACTIONS allows 7 days plus an additional 24 hours is allowed per Section 1.3.
C. INCORRECT - See above
D. INCORRECT - See above

K/A: 069G2.1.12 (2.9/4.0)
SRO - T1G1
Bank
Reference: Facility updated question bank 5 ADM020601 ADM020601
Ref: ITS 3.6

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

41. 069G2.1.12 001

Unit 1 is in MODE 1 at 100% power.

- At 0430 on 4/2, 1A Reactor Building Spray train is declared inoperable.
- At 1800 on 4/8, 1B Reactor Building Spray train is declared inoperable.
- At 1845 on 4/8, 1A Reactor Building Spray train is restored to OPERABLE status.

Which ONE of the following describes the MAXIMUM time allowed by TS, including any applicable extension, to restore 1B Reactor Building Spray train to OPERABLE status?

SEE ATTACHMENT: TS 3.6.5 (RB Spray and Cooling Systems)

A. 0430 on 4/9

B. 0430 on 4/10

C. 1800 on 4/15

D. 1800 on 4/16

Answer B

A. INCORRECT - Does NOT take the allowance for the additional 24 hours allowed per Section 1.3.
B. CORRECT - LCO 3.6.5 ACTIONS allows 7 days plus an additional 24 hours is allowed per Section 1.3.
C. INCORRECT - See above
D. INCORRECT - See above

K/A: 069G2.1.12 (2.9/4.0)
SRO - T1G1
Bank
Reference: Facility updated question bank 5 ADM020601 ADM020601
Ref: ITS 3.6

No changes

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 2.9/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

42. 072A403 001/T2G1///MEM 3.1/3.1/N/OC02301/RO/CR

Placing an RMG ratemeter module check source switch in the "CHECK SOURCE" position will provide which of the following indications in the control room?

A. No scale reading change on the detector, both warning and high alarm lights will be lit.

B. Up scale reading on the detector, warning and high alarm lights may or may not be lit.

C. Mid-scale reading on the detector, the warning alarm light will be lit.

D. Full scale reading on the detector, the high alarm light will be lit.

A. This checks the detector movement, the alarms would not light without meter movement.
B. CORRECT: This shows the detector response, and depending on the strength of the source it may actuate the warning or even the high alarms.
C. This will move based on the strength of the source and the warning may or may not be lit.
D. The movement may move to full scale, however, the warning light should also be lit, prior to the high alarm.

Reference: Vol 1, Radiation Indicating Alarms

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.1/3.1
Source:	N	Exam:	OC02301
Test:	RO	Misc:	CR

42. 072A403 001

Which ONE of the following is the purpose for performing a check source of an Area Radiation Monitor?

A. To perform a calibration of the monitor's output circuitry.

B. To verify the monitor's power source voltage is at the proper level.

C. To ensure the detector and its circuits respond to radiation.

D. To provide an output indication for adjustment of the alarm setpoints.

A) C

Reference: Vol 1, Radiation Indicating Alarms
RO

Not applicable to ONS, RIAs have been moved to a computer based system.
Replaced with ONS bank question RAD029

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.1/3.1
Source:	N	Exam:	OC02301
Test:	RO	Misc:	CR

43. 072K403 001/T2G1///MEM 3.2/3.6/B/OC002301/RO/OC
Concerning the Sorrento Radiation Monitoring System, which ONE of the following is correct?

The RM-80 ...

A. outputs directly to any associated interlock functions.

B. outputs directly to the control room view nodes.

C. will NOT function without the Transient Monitor System.

D. will NOT provide local indication of sample flow rate.

Answer A

A. Correct. Interlocks will operate even if Transient Monitor system computer is OOS.

B. Incorrect. Outputs to Transient Monitor System and then to View Nodes.

C. Incorrect. RM-80 will function with the Transient Monitor System OOS.

D. Incorrect. Does provide local indication of sample flow rate.

K/A: 072K403 (3.2/3.6)
RO - T2G1
Bank
Reference:
Facility updated question bank 28 RAD010702 RAD010702

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.2/3.6
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

43. 072K403 001

Concerning the Sorrento Radiation Monitoring System, which ONE of the following is correct?

The RM-80 ...

A. outputs directly to any associated interlock functions.

B. outputs directly to the control room view nodes.

C. will NOT function without the Transient Monitor System.

D. will NOT provide local indication of sample flow rate.

Answer A

A. Correct. Interlocks will operate even if Transient Monitor system computer is OOS.

B. Incorrect. Outputs to Transient Monitor System and then to View Nodes.

C. Incorrect. RM-80 will function with the Transient Monitor System OOS.

D. Incorrect. Does provide local indication of sample flow rate.

K/A: 072K403 (3.2/3.6)
RO - T2G1
Bank
Reference:
Facility updated question bank 28 RAD010702 RAD010702
RO

No changes

RO Tier:	T2G1	SRO Tier:	
Keyword:		Cog Level:	MEM 3.2/3.6
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

44. 073K101 001//T2G2//MEM 3.6/3.9/B/OC002301/SRO/OC
RIA-49, Reactor Building Gas, is in high alarm.

Which ONE of the following will automatically occur?

A. GWD-4, 5, 6, 7, 206, 207 and 217 will close.

B. PR-2, 3, 4 and 5 will close.

C. LWD-2 will close.

D. RIA 49A will come on scale.

Answer C

A. Incorrect. RIA-37 & 38 close these valves.

B. Incorrect. RIA-45 & 46 will close these valves.

C. Correct. High alarm actuates RB Evacuation alarm as well as closing LWD-2.

D. Incorrect. The switchover acceptance range setpoint is not tied to the High alarm setpoint (separate setpoints).

K/A: 073K101 (3.6/3.9)
SRO - T2G2
Bank
Reference: Facility updated question bank 27 RAD010203 RAD010203
MEM

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.6/3.9
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

44. 073K101 001

RIA-49, Reactor Building Gas, is in high alarm.

Which ONE of the following will automatically occur?

A. GWD-4, 5, 6, 7, 206, 207 and 217 will close.

B. PR-2, 3, 4 and 5 will close.

C. LWD-2 will close.

D. RIA 49A will come on scale.

Answer C

A. Incorrect. RIA-37 & 38 close these valves.

B. Incorrect. RIA-45 & 46 will close these valves.

C. Correct. High alarm actuates RB Evacuation alarm as well as closing LWD-2.

D. Incorrect. The switchover acceptance range setpoint is not tied to the High alarm setpoint (separate setpoints).

K/A: 073K101 (3.6/3.9)
SRO - T2G2
Bank
Reference: Facility updated question bank 27 RAD010203 RAD010203
MEM
SRO

No changes

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.6/3.9
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

45. 075A201 001//T2G2//MEM 3.0/3.2/B/OC002301/SRO/OC

Plant conditions:

1. 0804:00, All Oconee Units operating in MODE 1 at 100% RTP.
2. 0804:15, "CCW LAKE LEVEL LOW" stat-alarm actuates.
3. 0804:15, Forebay elevation indicates 796' and decreasing.
4. 0805:00, Dam Failure pushbuttons depressed on all units.

Which ONE of the following is expected to occur next?

1,2,3 CCW 10 through 13 will ...

A. close **and** 1,2,3 CCW 20 through 25 remain as is. CCW 8 remains closed and CCW 9 opens.

B. close **and** 1,2,3 CCW 20 through 25 remain as is. CCW 8 opens and CCW 9 remains closed.

C. remain "AS IS" **and** 1,2,3 CCW 20 through 24 close. CCW 8 remains closed and CCW 9 opens.

D. will remain "AS IS" **and** 1,2,3 CCW 20 through 24 close. CCW 8 opens and CCW 9 remains closed.

Answer D

A Incorrect
CCW-8 will open. CCW-9 does not open until a CCW Pump is restarted.
B Incorrect
1,2,3 CCW-20 through 25 CLOSE.
C Incorrect
Condenser Discharge Valves CLOSE
D Correct

K/A: 075A201 (3.0/3.2)
SRO - T2G2
Bank
Reference: Facility updated question bank 22 STG031204 STG031204
MEM

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.0/3.2
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

45. 075A201 001

Plant conditions:

- 0804:00, All Oconee Units operating in MODE 1 at 100% RTP.
- 0804:15, "CCW LAKE LEVEL LOW" stat-alarm actuates.
- 0804:15, Forebay elevation indicates 796' and decreasing.
- 0805:00, Dam Failure pushbuttons depressed on all units.

Which ONE of the following is expected to occur **NEXT**?

Units 1,2,3 CCW 10 through 13 (CCW Pump Discharge) will ...

A. close **and** 1,2,3 CCW 20 through 25 (Waterbox Disch) remain as is. CCW 8 (Emergency CCW Discharge to Tailrace) remains closed and CCW 9 (Emergency CCW Discharge to Intake) opens.

B. close **and** 1,2,3 CCW 20 through 25 (Waterbox Disch) remain as is. CCW 8 (Emergency CCW Discharge to Tailrace) opens and CCW 9 (Emergency CCW Discharge to Intake) remains closed.

C. remain "AS IS" **and** 1,2,3 CCW 20 through 25 (Waterbox Disch) close. CCW 8 (Emergency CCW Discharge to Tailrace) remains closed and CCW 9 (Emergency CCW Discharge to Intake) opens.

D. will remain "AS IS" **and** 1,2,3 CCW 20 through 25 (Waterbox Disch) close. CCW 8 (Emergency CCW Discharge to Tailrace) opens and CCW 9 (Emergency CCW Discharge to Intake) remains closed.

Answer D

A Incorrect
CCW-8 will open. CCW-9 does not open until a CCW Pump is restarted.
B Incorrect
1,2,3 CCW-20 through 25 CLOSE.
C Incorrect
Condenser Discharge Valves CLOSE
D Correct

K/A: 075A201 (3.0/3.2)
SRO - T2G2
Bank
Reference: Facility updated question bank 22 STG031204 STG031204
MEM

SRO

Added valve noun names to stem and alternatives
Modified "C" and "D" alternatives to include valves 20 through 25 instead of 24.

added unit to stem

RO Tier:		SRO Tier:	T2G2
Keyword:		Cog Level:	MEM 3.0/3.2
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

46. 075A202 001/T2G2///MEM 2.5/2.7/B/OC002301/RO/OC
Plant conditions:

1. Unit 1 = MODE 1
2. Unit 2 = MODE 5
3. 2B CCW pump operating
4. Unit 3 = MODE 1

Which ONE of the following is correct if 2B CCW pump is secured?

A. 2CCW-26/28 and 2V-87/88 will remain in their current position

B. The CCW inlet line high point vent valves, 2CCW-26/28, will open

C. The continuous priming tank normal inlet control valve, 2V-87, will closes

D. The continuous priming tank emergency inlet control valve, 2V-88, will opens

Answer A

A. Correct: Valves remain "as is" due to CCWPs continuing to operate on Unit 3.
B. Incorrect: Open on first CCW pump start.
C. Incorrect: Correct if not CCW pump on Unit 2 or 3 operating or both CVP secured
D. Incorrect: Correct if not CCW pump on Unit 2 or 3 operating or both CVP secured

K/A: 075A202 (2.5/2.7)
RO - T2G2
Bank
Reference: Facility updated question bank question 33 STG040801 STG040801

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 2.5/2.7
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

46. 075A202 001

Plant conditions:

- Unit 1 = MODE 1
- Unit 2 = MODE 5
  - 2B CCW pump operating
- Unit 3 = MODE 1

Which ONE of the following is correct if 2B CCW pump is secured?

A. 2CCW-26/28 and 2V-87/88 will remain in their current position

B. The CCW inlet line high point vent valves, 2CCW-26/28, will open

C. The continuous priming tank normal inlet control valve, 2V-87, will closes

D. The continuous priming tank emergency inlet control valve, 2V-88, will opens

Answer A

A. Correct: Valves remain "as is" due to CCWPs continuing to operate on Unit 3.
B. Incorrect: Open on first CCW pump start.
C. Incorrect: Correct if not CCW pump on Unit 2 or 3 operating or both CVP secured
D. Incorrect: Correct if not CCW pump on Unit 2 or 3 operating or both CVP secured

K/A: 075A202 (2.5/2.7)
RO - T2G2
Bank
Reference: Facility updated question bank question 33 STG040801 STG040801

RO

No changes
Licensing decision significance?

RO Tier:	T2G2	SRO Tier:	
Keyword:		Cog Level:	MEM 2.5/2.7
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

47. 076AA202 001//T1G1//C/A 2.8/3.4/N/OC002301/SRO/CR
Given the following plant conditions:

0600 Plant at 100% power
0700 Plant at 80% power
1030 Chemistry sampled the RCS
1230 Chemistry analysis indicates:
Dose equivalent I-131 concentration is 1.5uCi/gm
RCS specific activity is 50 uCi/gm
Gross specific activity is < 100/E(bar)

Which of the following Tech Spec actions, if any, would be required?

A. Reduce RCS activity to less than the Tech Spec limit immediately or be in MODE 3 within 12 hours.

B. Reduce RCS activity to less than the Tech Spec limit within 4 hours or be in MODE 3 within 12 hours.

C. Reduce RCS activity to less than the Tech Spec limit within 48 hours or be in MODE 3 within 12 hours.

D. No action required, chemistry results are within the Technical Specification limits.

A. Actions are required but not immediately
B. Actions are required but more than 4 hours is allowed
C. CORRECT; See T.S. 3.4.11 condition A and B 48 hours or MODE 3 W/I 12 hours
D. Activity is outside of the TS limits

Reference: TS 3.4.11

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 2.8/3.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

47. 076AA202 001

Given the following plant conditions:

0600 Plant at 100% power
0700 Plant at 80% power
1030 Chemistry sampled the RCS
1230 Chemistry analysis indicates:
- Dose equivalent I-131 concentration is 1.5uCi/gm
- RCS specific activity is 50 uCi/gm
- Gross specific activity is < 100/E(bar)

Which one of the following Tech Spec actions, if any, would be required?

SEE ATTACHMENT: TS 3.4.11 (RCS Specific Activity)

A. Reduce RCS activity to less than the Tech Spec limit immediately or be in MODE 3 within 12 hours.

B. Reduce RCS activity to less than the Tech Spec limit within 4 hours or be in MODE 3 within 12 hours.

C. Reduce RCS activity to less than the Tech Spec limit within 48 hours or be in MODE 3 within 12 hours.

D. No action required, chemistry results are within the Technical Specification limits.

A. Actions are required but not immediately
B. Actions are required but more than 4 hours is allowed
C. CORRECT; See T.S. 3.4.11 condition A and B 48 hours or MODE 3 W/I 12 hours
D. Activity is outside of the TS limits

Required Reference: TS 3.4.11

SRO

Attachment TS 3.4.11, RCS Specific Activity required to answer question
Added TS reference to stem and answer explanation

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 2.8/3.4
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	CR

48. 076K105 001//T2G3//MEM 3.8/4.0/N/OC002301/SRO/RFA
Which one of the following statements is correct concerning the SSF D/G Service Water System with respect to diverting the D/G SW discharge to the yard drains during a Station Blackout?

A. Waiting no longer than ***1 hour 50*** minutes ensures operability of the SSF HVAC System by limiting the inlet temperature to the HVAC condensers to less than or equal 110 F until the submersible pump ***can be placed in operation at 3.5 hours.***

B. Waiting no longer than ***2 hours 5*** minutes ensures operability of the SSF HVAC System by limiting the inlet temperature to the HVAC condensers to less than or equal 110 F until the submersible pump ***is installed in 3.5*** hours.

C. Waiting at least ***1 hour 50*** minutes ensures that enough water will be retained in the unit ***1 CCW*** Intake piping to supply the SSF systems and the ASW Pump for all three units SG's until the submersible pump ***can be placed in operation at 3.5 hours.***

D. Waiting at least ***2 hours 5*** minutes ensures that enough water will be retained in the unit ***2 CCW*** Intake piping to supply the SSF systems and the ASW Pump for all three units SG's until the submersible pump ***is installed in 3.5 hours.***

A) B

Distractor analysis:

Waiting no longer than ***2 hours 5*** minutes ensures operability of the SSF HVAC System by limiting the inlet temperature to the HVAC condensers to less than or equal 110 F until the submersible pump ***is installed in 3.5 hours.***

Waiting at least ***1 hour 50*** minutes ensures that enough water will be retained in the unit ***2 CCW*** Intake piping to supply the SSF systems and the ASW Pump for all three units SG's until the submersible pump ***can be placed in operation at 3.5 hours.***

Reference: Book II of II, Vol 6, OP-OC-EAP-DGE, page 25 of 59.
EO - 8.3
K/A: 076K105 (3.8/4.0)
RO/SRO: Both
Level: C
Author: rfa

RO Tier:		SRO Tier:	T2G3
Keyword:		Cog Level:	MEM 3.8/4.0
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

48. 076K105 001

Which one of the following statements is correct concerning the SSF D/G Service Water System with respect to diverting the D/G SW discharge to the yard drains during a Station Blackout?

A. Waiting no longer than **1 hour 50 minutes** ensures operability of the SSF HVAC System by limiting the inlet temperature to the HVAC condensers to less than or equal 110°F until the submersible pump can be placed in operation at 3.5 hours.

B. Waiting no longer than **2 hours 5 minutes** ensures operability of the SSF HVAC System by limiting the inlet temperature to the HVAC condensers to less than or equal 110°F until the submersible pump is installed in 3.5 hours.

C. Waiting at least **1 hour 50 minutes** ensures that enough water will be retained in the **Unit 1** CCW Intake piping to supply the SSF systems and the ASW Pump for all three units SG's until the submersible pump can be placed in operation at 3.5 hours.

D. Waiting at least **2 hours 5 minutes** ensures that enough water will be retained in the **Unit 2** CCW Intake piping to supply the SSF systems and the ASW Pump for all three units SG's until the submersible pump is installed in 3.5 hours.

A) B

Distractor analysis:

Waiting no longer than ***2 hours 5*** minutes ensures operability of the SSF HVAC System by limiting the inlet temperature to the HVAC condensers to less than or equal 110 F until the submersible pump ***is installed in 3.5 hours.***

Waiting at least ***1 hour 50*** minutes ensures that enough water will be retained in the unit ***2 CCW*** Intake piping to supply the SSF systems and the ASW Pump for all three units SG's until the submersible pump ***can be placed in operation at 3.5 hours.***

Reference: Book II of II, Vol 6, OP-OC-EAP-DGE, page 25 of 59.
EO - 8.3
K/A: 076K105 (3.8/4.0)
RO/SRO: Both
Level: C
Author: rfa

SRO

Adjusted bolding in alternatives to highlight important facts.

RO Tier:		SRO Tier:	T2G3
Keyword:		Cog Level:	MEM 3.8/4.0
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

49. 076K121 001/T2G3///MEM 2.7/2.9/N/OC002301/RO/RFA
Which one of the following sets of signals will trip the SSF ASW PUMP breaker, OTS1-2, when the SSF OTS1 normal power supply breaker from B2T-4 is opened?

A. Either an ES channel 1 on any unit or a maximum **motor** bearing oil temperature of 160 degrees F.

B. Either a source undervoltage for > 30 seconds or a maximum **pump** bearing oil temperature of 160 degrees F.

C. Either an ES channel 1 on any unit or a Unit 2 channel "A" loadshed.

D. Either a source undervoltage for > 30 seconds or the full load current for the SSF auxiliary service water pump is 240 amps.

A) C

Reference: Lesson Plans Book 1 of 2 Vol V, OP-OC-EAP-SSF , page 39 of 83.
EO - 21
K/A: 076K121 (2.7/2.9)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 2.7/2.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

49. 076K121 001
Which one of the following is correct?

_____ will trip SSF OTS1 normal power supply breaker from B2T-4 which will _____.

A. Either an ES channel 2 on any unit **OR** a maximum **motor** bearing oil temperature of 160°F / trip OTS1-2 (SSF ASW PUMP) breaker.

B. Either a source undervoltage for > 30 seconds **OR** a maximum **pump** bearing oil temperature of 160°F / close OTS1-4 (SSF DIESEL GENERATOR) breaker.

C. Either an ES channel 1 on any unit **OR** a Unit 2 channel "A" loadshed / trip OTS1-2 (SSF ASW PUMP) breaker.

D. Either a source undervoltage for > 30 seconds **OR** the full load current for the SSF auxiliary service water pump is 240 amps / close OTS1-4 (SSF DIESEL GENERATOR) breaker.

A) C

Reference: Lesson Plans Book 1 of 2 Vol V, OP-OC-EAP-SSF , page 39 of 83.
EO - 21
K/A: 076K121 (2.7/2.9)
RO/SRO: Both
Level: M
Author: rfa

RO

All correct answers. Stem worded to indicate signal that trips ASW breaker. This breaker is not tripped by any of the signals in the alternatives. Reworded stem and alternatives to provide "C" as correct answer.

RO Tier:	T2G3	SRO Tier:	
Keyword:		Cog Level:	MEM 2.7/2.9
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

07621

Limits and Precautions--ASW System

1. The SSF Auxiliary Service Water System for all three (3) Units shall be declared inoperable whenever Unit 2's CCW Inlet Pipe is unwatered.

2. Do not operate the SSF Auxiliary Service Water Pump (ASW PUMP) with any individual unit's auxiliary service water supply valves (1, 2, 3CCW-268 or 1, 2, 3CCW-287) open, except under actual emergency conditions, as it is normally unacceptable to pump lake water into the steam generators.

3. Any one of the following signals will automatically trip OTS1-1 (SSF OTS1 Normal Power Supply Breaker from B2T-4):

   3.1 Source Undervoltage for >30 seconds.

   3.2 ES Channel 1 on any unit.

   3.3 Unit 2 Channel A Loadshed.

4. OTS1-2 (SSF ASW PUMP Breaker) is automatically tripped when OTS1-1 (SSF OTS1 Normal Power Supply Breaker from B2T-4) is opened. OTS1-2 (SSF ASW PUMP Breaker) can be reclosed after OTS1-4 (SSF D/G Breaker) is closed to supply OTS1 from the D/G.

5. When the SSF ASW PUMP is started remotely from the SSF Control Room, it cannot be stopped locally from the SSF Pump Room.

6. Do Not close CCW-310 (SSF ASW PUMP Return Block) because it will isolate the SSF ASW PUMP minimum flow loop. This minimum recirculation line is provided to prevent "dead heading" the ASW PUMP during a pump start.

7. Maximum motor bearing oil temperature is 160°F.

8. Maximum pump bearing oil temperature is 160°F.

9. Full load current for the SSF Auxiliary Service water pump is 240 amperes.

10. ASW flow of >180 gpm to a single Unit's SG's or ASW flow to all 3 Unit's meets the ASW Pump minimum flow requirements. If SSF ASW Pump flow is below the minimum flow requirements, CCW-267 (ASW P Return) must be throttled to establish 600 gpm flow as read on the ASW Pump Flow gauge (D/G Control Panel).

11. If CCW-292 (SSF ASW Suction Isolation) or CCW-266 (SSF ASW Pump Supply) are closed, the ASW PUMP must be vented after these valves are reopened to ensure ASW PUMP operability.

50. A04AA11 001/T1G2///C/A 3.5/3.3/B/OC002301/RO/OC
Unit 1 conditions:

INITIAL CONDITIONS:

1. Reactor power = 100%

CURRENT CONDITIONS:

1. Spurious Turbine/Generator Trip
2. CT-1 Transformer lockout
3. 1T Transformer lockout
4. 1A and 1B OTSG S/U levels = 35" and increasing
5. CETCs = 548°F and decreasing

Which ONE of the following describes the correct operator action?

A. Take manual control of 1FDW-315 and 316 (EFDW Control Valves), and reduce XSUR levels to 30" to prevent overcooling.

B. Throttle OTSG feedwater flow as required to minimize cooldown until a level of 240" XSUR is reached.

C. Take manual control of 1FDW-35 and 44 (Main FDW Control Valves), and reduce OTSG levels to 25" SUR to stop overfeed.

D. Throttle OTSG feedwater flow as required to minimize cooldown until a level of 50% Operating Range is reached.

Answer B

A. Incorrect - Manual control of 315/316 is necessary but level should be established to 240" since RCPs were tripped on the loss of electrical.
B. Correct – Required to prevent overcooling / pump/header flow limits being exceeded.
C. Incorrect - This would be a correct statement if Main FDW was available and RCPs are operating.
D. Incorrect - The first part of the statement is true concerning throttle feedwater but level requirements are 240" XSUR not 50% OR.

K/A: A04AA11 (3.5/3.3)
T1G2, T1G2
Bank
Reference: Facility updated question bank 47 CF023402 CF023402
CF-EF OBJ# 34 (37)

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	C/A 3.5/3.3
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

50. A04AA11 001

Unit 1 conditions:

INITIAL CONDITIONS:

- Reactor power = 100%

CURRENT CONDITIONS:

- Spurious Turbine/Generator Trip
- CT-1 Transformer lockout
- 1T Transformer lockout
- 1A and 1B OTSG S/U levels = 35" and increasing
- CETCs = 548°F and decreasing

Which ONE of the following describes the correct operator action?

A. Take manual control of 1FDW-315 and 316 (EFDW Control Valves), and reduce XSUR levels to 30" to prevent overcooling.

B. Throttle OTSG feedwater flow as required to minimize cooldown until a level of 240" XSUR is reached.

C. Take manual control of 1FDW-35 and 44 (Main FDW Control Valves), and reduce OTSG levels to 25" SUR to stop overfeed.

D. Throttle OTSG feedwater flow as required to minimize cooldown until a level of 50% Operating Range is reached.

Answer B

A. Incorrect - Manual control of 315/316 is necessary but level should be established to 240" since RCPs were tripped on the loss of electrical.
B. Correct – Required to prevent overcooling / pump/header flow limits being exceeded.
C. Incorrect - This would be a correct statement if Main FDW was available and RCPs are operating.
D. Incorrect - The first part of the statement is true concerning throttle feedwater but level requirements are 240" XSUR not 50% OR.

K/A: A04AA11 (3.5/3.3)
T1G2, T1G2
Bank
Reference: Facility updated question bank 47 CF023402 CF023402
CF-EF OBJ# 34 (37)

RO

No changes

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	C/A 3.5/3.3
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

51. A06AK21 001//T1G1//MEM 3.8/3.8/B/OC002301/SRO/OC
Which ONE of the following describes the correct input signal to the Auxiliary Shutdown Panel?

RCS pressure indication at the Auxiliary Shutdown Panel...

A. is selected via SASS from RPS Channel A or E.

B. originates from Train A ICCM pressure transmitter.

C. originates from ES Channel A or C pressure via amphonol.

D. is selected by Median select from RPS Channel A, B, or E.

Answer D

A. Incorrect - This used to be correct before the new ICS mod. SASS output no longer feeds the ASDP.
B. Incorrect - ASDP indication is not from ICCM, ICCM is a WR signal
C. Incorrect - ASDP is a NR signal; ES is a WR signal and the anphonel feeds several different shared indication/controls
D. Correct - The new ICS modification changed this instrment feed to the ASDP by providing median select protection for the instrumentation.

K/A: A06AK21 (3.8/3.8)
T1G1, T1G1
Bank
Reference: Facility updated question bank 11 IC196 IC196

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.8/3.8
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

51. A06AK21 001

Which ONE of the following describes the correct input signal to the Auxiliary Shutdown Panel?

RCS pressure indication at the Auxiliary Shutdown Panel...

A. is selected via SASS from RPS Channel A or E.

B. originates from Train A ICCM pressure transmitter.

C. originates from ES Channel A or C pressure via amphonol.

D. is selected by Median select from RPS Channel A, B, or E.

Answer D

A. Incorrect - This used to be correct before the new ICS mod. SASS output no longer feeds the ASDP.
B. Incorrect - ASDP indication is not from ICCM, ICCM is a WR signal
C. Incorrect - ASDP is a NR signal; ES is a WR signal and the anphonel feeds several different shared indication/controls
D. Correct - The new ICS modification changed this instrment feed to the ASDP by providing median select protection for the instrumentation.

K/A: A06AK21 (3.8/3.8)
T1G1, T1G1
Bank
Reference: Facility updated question bank 11 IC196 IC196

SRO

No changes

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	MEM 3.8/3.8
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

52. A07AK33 001//T1G3//MEM 3.6/3.2/N/OC002301/SRO/RFA
Which one of the following contains time critical operator actions associated with turbine building flooding procedure AP/1,2,3/A/1700/010?

A. Locate and isolate the flooding and initiate appropriate valve operations to control the flooding.

B. Locate and isolate the flooding and de-energize flooded electrical components.

C. Make up to the elevated water storage tank and initiate appropriate valve operations to control the flooding.

D. Make up to the elevated water storage tank and de-energize flooded electrical components.

A) C

Reference: Book II of II, Vol 6, OP-OC-EAP-TBF, page 9 of 24.
EO-3
K/A: AO7AK33 (3.6/3.2)
RO/SRO: Both
Level: M, PSA
Author: rfa

RO Tier:		SRO Tier:	T1G3
Keyword:		Cog Level:	MEM 3.6/3.2
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

52. A07AK33 001

Plant conditions:

- Turbine Building Flood is in progress.

Which ONE of the following is correct?

Long term core cooling should be established using _____ because _____.

A. Station ASW / HPI pumps may become inoperable due to loss of pump cooling

B. Station ASW / LPI/HPI piggyback may not be available due to loss of LPSW

C. HPI Forced Cooling / SGs will be damaged by using raw lake water

D. HPI Forced Cooling / the BWST can be supplemented by SFP inventory

A) B

A. Incorrect, HPI pumps will not lose pump cooling because it is backed up by EWST.

B. Correct, with a possible loss of LPSW the RBES cannot be cooled in LPI/HPI piggyback.

C. Incorrect, HPI F/C is not the preferred method because of the possible loss of LPSW and inability to cool RBES.

D. Incorrect, HPI F/C is not the preferred method because of the possible loss of LPSW and inability to cool RBES.

Reference: Book II of II, Vol 6, OP-OC-EAP-TBF, page 9 of 24.
EO-3
K/A: AO7AK33 (3.6/3.2)
RO/SRO: Both
Level: M, PSA
Author: rfa

SRO

A & C correct
Provide ONS substitute
Replaced with ONS bank EAP220501

RO Tier:		SRO Tier:	T1G3
Keyword:		Cog Level:	MEM 3.6/3.2
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

2. Presentation

Unit Status

AP/10 is being used in parallel with this tab.

AP/10, Turbine Building Flood, attempts to stop the flooding by stopping all CCW pumps and isolating the CCW piping. Other actions included in the AP:

- *Locate and isolate flooding*
- *Temporarily Charging the HPSW System*
- *De-energizing flooded electrical components*
- *Isolation of SSW to CCW pumps*

INSTRUCTOR NOTE: Two identified "Time Critical Operator Actions" associated with Turbine Building Flooding.

1. ***Initiate appropriate valve operation to control turbine building flooding within 20 minutes.***
2. ***Makeup to elevated water storage tank (using a fire truck via a hose connected to a hydrant) within 4 hours of event initiation.***

NOTE

Feeding to 95% O.R. in Step 1 supercedes guidance in Rule 6 (SG Feed Control), Table 4.

2.1 While maintaining $T_{ave} \geq 532°F$, initiate feeding SGs to 95% O.R. at maximum possible rate using <u>all</u> available feedwater sources.

The intent of this step is maximizing the amount of secondary inventory in the SG, as quickly as possible, in anticipation of loosing all secondary pumps. This guidance supercedes guidance in Rule 6 (SG Feed Control), Table 4. T_{ave} is maintained $\geq 532°F$ to ensure adequate SDM until a cooldown plateau is determined based on plant conditions. (This is done at step 26.)

2.2 Minimize Pzr level ≥ 80".

The purpose of this step is to reduce PZR level in anticipation of loosing heat transfer and the RCS heating up resulting in increasing PZR level.

NOTE

RCP 1A1 provides the best Pzr spray.

2.3 Reduce operating RCPs to one.

Reduces heat input into the RCS.

53. E05EK11 001//T1G1//C/A 3.8/3.8/B/OC002301/SRO/OC
Question 10 PNS142201 PNS142201

Unit 1 has been stabilized following an overcooling transient and the following conditions exist:

1· Tavg 550°F
2· RCS Pressure 2000 psig
3· Pressurizer Level 250 inches
4· Pressurizer Temperature 610°F
5· Pressurizer Heaters Energized

Which ONE of the following describes the PRESENT state of the pressurizer?

The pressurizer is _____ for the current RCS pressure and the _____ maintaining RCS pressure.

A. saturated / pressurizer heaters are

B. subcooled / pressurizer heaters are

C. saturated / compressed steam bubble in the pressurizer is

D. subcooled / compressed steam bubble in the pressurizer is

**** THIS IS A BANK QUESTION - UTILITY VERIFY PLAUSIBILITY *****

**** PERFORM ON SIMULATOR ****

Answer D

A. Incorrect - the pressurizer is not saturated.
B. Incorrect - the pressurizer is not saturated and the heaters will not increase pressure until saturated conditions are achieved.
C. Incorrect - the pressurizer is not saturated.
D. Correct - the pressurizer is not saturated and the steam bubble in the pressurizer is temporarily maintaining RCS pressure artificially above its true saturation point for the pressurizer temperature.

K/A: E05EK11 (3.8/3.8)
SRO - T1G1
Bank
Reference: Facility updated question bank 10 PNS142201 PNS142201

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.8/3.8
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

53. E05EK11 001

Unit 1 has been stabilized following an overcooling transient and the following conditions exist:

- Tavg = 550°F
- RCS Pressure = 2000 psig
- Pressurizer Level = 250 inches and slowly increasing
- Pressurizer Temperature = 610°F
- Pressurizer Heaters Energized

Which ONE of the following describes the PRESENT state of the pressurizer?

The pressurizer is _____ for the current RCS pressure and the _____ maintaining RCS pressure.

SEE ATTACHMENT: EOP Encl. 5.18 (P/T Curves)

A. saturated / pressurizer heaters are

B. subcooled / pressurizer heaters are

C. saturated / compressed steam bubble in the pressurizer is

D. subcooled / compressed steam bubble in the pressurizer is

**** THIS IS A BANK QUESTION - UTILITY VERIFY PLAUSIBILITY *****

**** PERFORM ON SIMULATOR ****

Answer D

A. Incorrect - the pressurizer is not saturated.
B. Incorrect - the pressurizer is not saturated and the heaters will not increase pressure until saturated conditions are achieved.
C. Incorrect - the pressurizer is not saturated.
D. Correct - the pressurizer is not saturated and the steam bubble in the pressurizer is temporarily maintaining RCS pressure artificially above its true saturation point for the pressurizer temperature.

Required Attachment: EOP Encl. 5.18 (P/T Curves)

K/A: E05EK11 (3.8/3.8)
SRO - T1G1
Bank
Reference: Facility updated question bank 10 PNS142201 PNS142201

SRO

Either steam tables or EOP enclosure 5.18, P/T Curves required to answer question
Added EOP attachment to stem
Added pressurizer slowly increasing to stem to ad validity to the question.

RO Tier:		SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 3.8/3.8
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

54. E08EK22 001/T1G2///MEM 4.0/4.0/N/OC002301/RO/RFA
Which one of the following is the reason why post LOCA boron dilution valves are opened following a LOCA?

A. To limit localized boric acid concentrations.

B. To enhance long-term core cooling.

C. To prevent the moderator temperature coefficient from going positive.

D. To allow for RCS cooldown where injection flow only is required for cooling.

A) A

Reference: Book II of II, Vol 6, OP-OC-EAP-E31, page 11 of 11.
EO-4
K/A: E08EK22 (4.0/4.0)
RO/SRO: Both
Level: M
Author: rfa

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	MEM 4.0/4.0
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

54. E08EK22 001

Which one of the following is the reason why post LOCA boron dilution valves are opened following a LOCA?

A. To limit localized boric acid concentrations in the core.

B. To limit localized boric acid concentrations in the RB Emergency Sump.

C. To prevent the moderator temperature coefficient from going positive.

D. To allow for RCS cooldown where injection flow only is required for cooling.

A) A

Reference: Book II of II, Vol 6, OP-OC-EAP-E31, page 11 of 11.
EO-4
K/A: E08EK22 (4.0/4.0)
RO/SRO: Both
Level: M
Author: rfa

RO

A & B correct
"B"- boron buildup will cause decreased heat transfer in the core...therefore making this a correct answer.
Modified "A" to specify "core"
Modified "B" to match "A" with RBES instead of core.

RO Tier:	T1G2	SRO Tier:	
Keyword:		Cog Level:	MEM 4.0/4.0
Source:	N	Exam:	OC002301
Test:	RO	Misc:	RFA

55. E13EA22 001//T1G3//C/A 3.8/4.0/B/OC002301/SRO/OC
Unit 2 conditions:

1. Reactor power = 68%
2. The 2B2 RCP has been secured for 3 days (vibration problems)
3. ICS in MANUAL with I&E performing CRD Power Supply checks
4. Group 2 Rod 7 API position changes to read 42% withdrawn.
5. Group 2 Rod 4 API position changes to read 82% withdrawn.
6. Group 2 remaining rods are at 100% withdrawn.
7. Reactor power indications support Quadrant Power Tilt changes.

Which ONE of the following is the correct operator response?

A. Verify Shutdown Margin (SDM) exists as specified in the COLR within one hour or initiate boration to achieve SDM as specified in the COLR within one hour AND be in MODE 3 in 12 hours.

B. Restore at least one of the misaligned rods to alignment within 1 hour then declare the remaining misaligned rod inoperable and take actions for the inoperable rod.

C. Commence manual power reduction to less than 45% Full Power.

D. Manually trip the reactor.

Answer D

A. Incorrect, the actions described are those required by ITS 3.1.4 however there are more restrictive requirements in the Dropped Rod AP.
B. Incorrect, Restoring a rod to alignment is an acceptable option only when there is ONE rod misaligned per ITS 3.1.4.
C. Incorrect, the actions described are the correct actions for ONE misaligned rod per the Dropped Rod AP.
D. Correct, Guidance given in the Dropped Control Rod AP.

K/A: E13EA22 (3.8/4.0)
T1G3, T1G3
Bank
Reference: Facility updated question bank 51 IC022101 IC022101

RO Tier:		SRO Tier:	T1G3
Keyword:		Cog Level:	C/A 3.8/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

55. E13EA22 001

Unit 2 conditions:

- Reactor power = 68%
- The 2B2 RCP has been secured for 3 days (vibration problems)
- ICS in MANUAL with I&E performing CRD Power Supply checks
- Group 2 Rod 7 API position changes to read 42% withdrawn
- Group 2 Rod 4 API position changes to read 82% withdrawn
- Group 2 remaining rods are at 100% withdrawn
- Reactor power indications support Quadrant Power Tilt changes

Which ONE of the following is the correct operator response?

A. Verify Shutdown Margin (SDM) exists as specified in the COLR within one hour or initiate boration to achieve SDM as specified in the COLR within one hour AND be in MODE 3 in 12 hours.

B. Restore at least one of the misaligned rods to alignment within 1 hour then declare the remaining misaligned rod inoperable and take actions for the inoperable rod.

C. Commence manual power reduction to less than 45% Full Power.

D. Manually trip the reactor.

Answer D

A. Incorrect, the actions described are those required by ITS 3.1.4 however there are more restrictive requirements in the Dropped Rod AP.
B. Incorrect, Restoring a rod to alignment is an acceptable option only when there is ONE rod misaligned per ITS 3.1.4.
C. Incorrect, the actions described are the correct actions for ONE misaligned rod per the Dropped Rod AP.
D. Correct, Guidance given in the Dropped Control Rod AP.

K/A: E13EA22 (3.8/4.0)
T1G3, T1G3
Bank
Reference: Facility updated question bank 51 IC022101 IC022101

SRO

No changes

RO Tier:		SRO Tier:	T1G3
Keyword:		Cog Level:	C/A 3.8/4.0
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

56. G2.1.12 001//T3//MEM 2.9/4.0/N/OC002301/SRO/RFA
Which one of the following is the correct example of an EXCEPTION to TS LCO 3.0.4 where a limited completion time is provided to allow restoration of inoperable equipment?

A. The LCO is only applicable in Mode 1 with power >/= 15%.

B. The LCO would only require a power reduction to < 15%.

C. Mode changes made to comply with required actions or as part of a shutdown of the unit.

D. The required actions to be taken are specified in the support system LCO.

A) C

REFERENCE REQUIRED: A portion of TS

Reference: Lesson Plans Vol IX, OP-OC-ADM-ITS , page 16,17 of 25.
EO - 3
K/A: G2.1.12 (2.9/4.0)
RO/SRO: SRO
Level: M
Author: rfa

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.9/4.0
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

56. G2.1.12 001

The following conditions exist on Unit 1:

- MODE 1 at 100% RATED THERMAL POWER
- 1CS-5 (Component Drain Pump Suction) and 1CS-6 (Component Drain Pump Suction) have been determined to be inoperable due to not meeting their stroke times.

Which ONE of the following ACTIONS is the MINIMUM required for this condition?

SEE ATTACHMENT: TS 3.6.3 (Containment Isolation Valves)

A. Isolate the affected penetration flow path within one (1) hour.

B. Isolate the affected penetration flow path within four (4) hours.

C. Enter LCO 3.0.3 immediately and be in MODE 3 in twelve (12) hours.

D. Place Unit 1 in MODE 5 within (40) hours.

A) A

A. CORRECT - PER Condition B ITS 3.6.3
B. Incorrect - 2 isolation valves
C. Incorrect - SPEC has required actions
D. Incorrect - only if completion times are not met and used 4 hours

REFERENCE REQUIRED: ITS 3.6.3

Replaced with ONS bank question ADM010302.

Reference: Lesson Plans Vol IX, OP-OC-ADM-ITS , page 16,17 of 25.
EO - 3
K/A: G2.1.12 (2.9/4.0)
RO/SRO: SRO
Level: M
Author: rfa

SRO

Did not understand question.
Replace with ONS question
Suggest cognitive level above knowledge

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.9/4.0
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

D. When in an LCO 3.0.3 condition, the plant may be operating outside the bounds of the safety analysis and must be placed in a MODE where the subject equipment or parameter is not critical to plant safety. The times specified to reach each lower MODE are from the time of discovery and allow for a controlled, orderly shutdown within the maximum cooldown rate and include 1 hour to prepare for the shutdown.

E. If compliance to the original LCO is restored, completion of the requirements of LCO 3.03 is not required.

Example: If an LCO were only applicable in MODE 1 when ≥ 15% power, entry into LCO 3.0.3 would only require a power reduction to < 15% power.

F. Exceptions to LCO 3.0.3 are provided because a reduction in operating MODE may not always be conservative or would not provide proper remedial measures.

Example: Specification 3.7.11, Spent Fuel Pool Water Level - If the LCO and Required Actions cannot be met in MODES 1, 2, or 3 there is no safety benefit to be gained by placing the unit in a shutdown condition.

4.4 LCO 3.0.4

A. LCO 3.0.4 prevents entry into a MODE or condition unless all LCOs applicable in that MODE or condition are met without reliance on ACTIONS. Exceptions to this requirement include:

1. Conditions in which a Required Action allows continued operation for an unlimited period of time. Such Required Actions establish conditions that meet the intent of the LCO.

Example: Specification 3.6.2, Containment Air Locks

B. Some LCOs specify an exception to LCO 3.0.4 where a limited Completion Time is provided to allow restoration of inoperable equipment.

1. Mode changes made to comply with Required Actions or as part of a shutdown of the unit are exempted from the LCO 3.0.4 limitation.
2. The provisions of LCO 3.0.4 are applicable in MODEs 1, 2, 3, and 4 and the specified conditions in these applicabilities. LCO 3.0.4 is only applicable when entering MODE 4 from MODE 5, MODE 3 from MODE 4, etc.
3. Exceptions to LCO 3.0.4 are stated in the individual specifications and may apply to all ACTIONS or specific Required Actions.

4.5 LCO 3.0.5

A. In many cases inoperable equipment must be returned to service to allow for testing the OPERABILITY of redundant equipment or to test the subject equipment following repair to determine its OPERABILITY.

Examples:

- The restoration of a logic channel from the tripped condition to allow testing of another channel.
- The opening of an automatic isolation valve that is required to be closed by a Required Action in order to measure its stroke time.

B. LCO 3.0.5 provides an exception to LCO 3.0.2 that allows for the use of administrative controls to return equipment to service in the above conditions

C. This eliminates the need to violate the Technical Specifications in order to return equipment to service for Operability verification of the subject equipment or other equipment. The time allowed for this activity is limited to only that absolutely necessary to perform the SR and does not provide time to perform troubleshooting or corrective maintenance.

4.6 LCO 3.0.6

A. When a support system with a separate TS LCO is declared inoperable and affects supported equipment, the supported equipment is also considered inoperable. This concept is referred to as "cascading".

B. LCO 3.0.6 provides an exception to LCO 3.0.2 for support systems that have an LCO specified in the Technical Specifications with the intent of eliminating the confusion and unnecessary actions associated with entering multiple LCOs due to "cascading" effects. (LCO 3.0.6 does not apply to support systems that do not have a TS LCO. For non-technical specification systems, structures, and components (SSC) cascading must be utilized when the non-technical specification SSC inoperability results in the inoperability of the TS system.)

C. The Required Actions to be taken are specified in the support system LCO. The Required Actions of the supported system's specification do not have to be entered, but the supported system is technically inoperable.

57. G2.1.19 001/T3///M 3.0/3.0/B/OC002301/RO/OC
Plant conditions:

INITIAL CONDITIONS:

1. Reactor power = 75%

CURRENT CONDITIONS:

1. A load reject occurs.
2. Reactor power is decreasing
3. Pressurizer subcooled

When looking at a Unit "Pressure vs. Temperature" or P/T screen, which ONE of the following correctly describes the indication you would observe?

The yellow point would...

A. turn cyan and move down and left on the P/T screen.

B. turn cyan and "SUBCOOLED PZR" would appear on the lower right hand corner of the screen.

C. stay yellow and "SUBCOOLED PZR" would appear on the lower right hand corner of the screen.

D. stay yellow and move to the left and up on the P/T screen.

Answer D

K/A: G2.1.19 (3.0/3.0)
RO - T3
Bank
Reference:
Facility updated question bank 37 SF100701 SF100701

RO Tier:	T3	SRO Tier:	
Keyword:		Cog Level:	M 3.0/3.0
Source:	B	Exam:	OC002301
Test:	RO	Misc:	OC

57. G2.1.19 001

Plant conditions:

INITIAL CONDITIONS:

– Reactor power = 75%

CURRENT CONDITIONS:

– A load rejection occurs
– Reactor power is decreasing
– Pressurizer subcooled

When looking at a Unit "Pressure vs. Temperature" or P/T screen, which ONE of the following correctly describes the indication you would observe?

The yellow point would...

A. turn cyan and move down and left on the P/T screen.

B. turn cyan and "SUBCOOLED PZR" would appear on the lower right hand corner of the screen.

C. stay yellow and "SUBCOOLED PZR" would appear on the lower right hand corner of the screen.

D. stay yellow and move to the left and up on the P/T screen.

Answer D

K/A: G2.1.19 (3.0/3.0)
RO - T3
Bank
Reference:
Facility updated question bank 37 SF100701 SF100701
RO

No changes

RO Tier:	T3	**SRO Tier:**	
Keyword:		**Cog Level:**	M 3.0/3.0
Source:	B	**Exam:**	OC002301
Test:	RO	**Misc:**	OC

58. G2.1.26 001//T3//C/A 2.2/2.6/N/OC002301/SRO/RFA
Which one of the following statements is correct if the turbine generator's running isolated phase bus cooling fan trips?

A. The return duct damper automatically closes so that the return air is forced through the emergency damper instead of returning to the fan suction. The standby fan will NOT automatically start. Generator operation above 16,000 amps load is permitted but limited.

B. The return duct damper is manually closed so that the return air is forced through the emergency damper instead of returning to the fan suction. The standby fan will automatically start. Generator operation above 16,000 amps load is NOT permitted.

C. Generator operation above 16,000 amps load is NOT permitted. The standby fan will automatically start.

D. The standby fan will NOT automatically start. Generator operation above 16,000 amps load is permitted but limited.

A) D

Distractor Analysis:

If a running isolated phase bus cooling fan trips, The standby fan will NOT automatically start. An operator must start the fan manually from the panel. Generator operation above 16,000 amps load is limited to 30 minutes.

Following a loss of the isolated phase bus cooling system HX RCW cooling flow, with the cooler OOS, the emergency exhaust damper is manually opened. The return duct damper is also manually closed so that the return air is forced through the emergency damper instead of returning to the fan suction.

Reference: Lesson Plans Book II of II, Vol III, OP-OC-STG-IPBC , page 10 of 10.
EO - 3
K/A: G2.1.26 (2.2/2.6) This is a stretch but I believe it fits
RO/SRO: SRO
Level: C (Involves procedures and system knowledge)
Author: rfa

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	C/A 2.2/2.6
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

58. G2.1.26 001
Which one of the following statements is correct if the turbine generator's running isolated phase bus cooling fan trips?

A. The standby fan **will NOT** automatically start. The return duct damper automatically closes so that the return air is forced through the emergency damper instead of returning to the fan suction. Generator operation above 16,000 amps load is permitted but limited.

B. The standby fan **will** automatically start. The return duct damper is manually closed so that the return air is forced through the emergency damper instead of returning to the fan suction. Generator operation above 16,000 amps load is **NOT** permitted.

C. The standby fan **will** automatically start. Generator operation above 16,000 amps load is **NOT** permitted.

D. The standby fan **will NOT** automatically start. Generator operation above 16,000 amps load is permitted but limited.

A) D

Distractor Analysis:

If a running isolated phase bus cooling fan trips, The standby fan will NOT automatically start. An operator must start the fan manually from the panel. Generator operation above 16,000 amps load is limited to 30 minutes.

Following a loss of the isolated phase bus cooling system HX RCW cooling flow, with the cooler OOS, the emergency exhaust damper is manually opened. The return duct damper is also manually closed so that the return air is forced through the emergency damper instead of returning to the fan suction.

Reference: Lesson Plans Book II of II, Vol III, OP-OC-STG-IPBC , page 10 of 10.
EO - 3
K/A: G2.1.26 (2.2/2.6) This is a stretch but I believe it fits
RO/SRO: SRO
Level: C (Involves procedures and system knowledge)
Author: rfa

SRO

Re-arranged individual parts of alternatives for balance. No changes other than cosmetic
Modified "C" alternative to match "D" by moving last part up front.
Suggest cognitive level = knowledge

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	C/A 2.2/2.6
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

59. G2.2.12 001//T3//MEM 3.0/3.4/B/OC002301/SRO/OC
Unit 2 plant conditions:

1. Unit is shutdown
2. RCS temp = 185°F.
3. At 2000 on 3/19 it is discovered that the last performance of SR 3.1.1.1 (required once per 24 hours in modes 3,4, and 5) occurred at 0800 on 3/18.

Which ONE of the following is a Required TS action?

A. Immediately enter LCO 3.0.3.

B. Initiate boration by 2015 on 3/19.

C. Perform SR 3.1.1.1 prior to 0200 on 3/21.

D. Perform SR 3.1.1.1 prior to 2000 on 3/20.

Answer D

D. Correct

K/A: G2.2.12 (3.0/3.4)
SRO - T3
Bank
Reference: Facility updated question bank 2 ADM010611 ADM010611
Per SR 3.0.3, due to a missed surveillance, the lesser of 24 additional hours or the specified frequency time is allowed to complete the surveillance.
MEM

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.0/3.4
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

59. G2.2.12 001

Unit 2 plant conditions:

- Unit is shutdown
- RCS temp = 185°F.
- At 2000 on 3/19 it is discovered that the last performance of SR 3.1.1.1 (required once per 24 hours in modes 3, 4, and 5) occurred at 0800 on 3/18.

Which ONE of the following is a Required TS action?

SEE ATTACHMENTs: TS 3.1.1 (Shutdown Margin)
TS 3.0 (Surveillance Requirment Applicability)

A. Immediately enter LCO 3.0.3.

B. Initiate boration by 2015 on 3/19.

C. Perform SR 3.1.1.1 prior to 0200 on 3/21.

D. Perform SR 3.1.1.1 prior to 2000 on 3/20.

Answer D

D. Correct

Required ATTACHMENT: TS 3.1.1 (Shutdown Margin) and TS 3.0 (Surveillance Requirment Applicability)

K/A: G2.2.12 (3.0/3.4)
SRO - T3
Bank
Reference: Facility updated question bank 2 ADM010611 ADM010611
Per SR 3.0.3, due to a missed surveillance, the lesser of 24 additional hours or the specified frequency time is allowed to complete the surveillance.
MEM

SRO

T.S 3.0, Surveillance Requirement Applicability required to answer question.
Added attachment to stem and answer explanation
Suggest cognitive level above knowledge (application of TS)

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 3.0/3.4
Source:	B	Exam:	OC002301
Test:	SRO	Misc:	OC

60. G2.4.29 001//T3//MEM 2.6/4.0/N/OC02301/SRO/RFA

Which one of the following event classifications is correct during an ATWS?

A. If the Control Rods CAN be manually tripped OR if DSS has inserted Groups 5-7, then the event will be classified as an ALERT (based solely on the ATWS).

B. If the Control Rods CANNOT be manually tripped OR DSS has NOT inserted Groups 5-7, then the event will be classified as an SAE.

C. If the Control Rods CAN be manually tripped OR if DSS has inserted Groups 5-7, then the event will be classified as an SAE (based solely on the ATWS).

D. If the Control Rods CANNOT be manually tripped AND DSS has NOT inserted Groups 5-7, then the event will be classified as an ALERT.

A) A

Distractor analysis:

If the Control Rods CAN be manually tripped OR if DSS has inserted Groups 5-7, then the event will be classified as an ALERT (based solely on the ATWS).

If the Control Rods CANNOT be manually tripped AND DSS has NOT inserted Groups 5-7, then the event will be classified as an SAE (based solely on the ATWS).

Reference: Book II of II, Vol 6, OP-OC-EAP-UNPP, page 13 of 19.
EO-12
K/A: 2.4.29 (2.6/4.0)
RO/SRO: SRO Only
Level: M
Author: rfa

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.6/4.0
Source:	N	Exam:	OC02301
Test:	SRO	Misc:	RFA

60. G2.4.29 001

Which one of the following event classifications is correct during an ATWS?

SEE ATTACHMENT: RP/1000/01 (Emergency Classification)

A. If the Control Rods CAN be manually tripped OR if DSS has inserted Groups 5-7, then the event will be classified as an ALERT (based solely on the ATWS).

B. If the Control Rods CANNOT be manually tripped OR DSS has NOT inserted Groups 5-7, then the event will be classified as an SAE.

C. If the Control Rods CAN be manually tripped OR if DSS has inserted Groups 5-7, then the event will be classified as an SAE (based solely on the ATWS).

D. If the Control Rods CANNOT be manually tripped AND DSS has NOT inserted Groups 5-7, then the event will be classified as an ALERT.

A) A

Required ATTACHMENT RP/1000/01 (Emergency Claification)

Distractor analysis:

If the Control Rods CAN be manually tripped OR if DSS has inserted Groups 5-7, then the event will be classified as an ALERT (based solely on the ATWS).

If the Control Rods CANNOT be manually tripped AND DSS has NOT inserted Groups 5-7, then the event will be classified as an SAE (based solely on the ATWS).

Reference: Book II of II, Vol 6, OP-OC-EAP-UNPP, page 13 of 19.
EO-12
K/A: 2.4.29 (2.6/4.0)
RO/SRO: SRO Only
Level: M
Author: rfa

SRO

Attachment RP/1000/01, Emergency Classification required to answer question. Answer requires referencing enclosure 4.4, Loss of Shutdown Functions.
Suggest cognitive level above knowledge

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.6/4.0
Source:	N	Exam:	OC02301
Test:	SRO	Misc:	RFA

61. G2.4.42 001

The OSM has declared an Alert. After complete staffing for the emergency situation, the OSM will turn over the role of Emergency Coordinator to the _____ who is stationed in the _____.

A. Station Manager / Operational Support Center

B. Station Manager / Technical Support Center

C. Superintendent of Operations / Operational Support Center

D. Superintendent of Operations / Technical Support Center

A) B

A. Incorrect - Wrong location
B. Correct
C. Incorrect - Wrong person and location
D. Incorrect - Wrong person

Reference: Lesson Plans Book 1 of 2 Vol V, OP-OC-EAP-SEP , page 12 of 53.
EO - 1.11
K/A: G2.4.41 (2.3/3.7)
RO/SRO: SRO
Level: M
Author: rfa

SRO

"B" not correct, community relations are not required for activation

Question not applicable to SRO license position
Changed stem wording to EOF "activation"

Replaced with ONS question

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.3/3.7
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

61. G2.4.42 001//T3//MEM 2.3/3.7/N/OC002301/SRO/RFA
Which one of the following contains the correct group of people that are to be located in the EOF following its establishment?

A. Chemistry, radiological assessment, EOF director.

B. Radiological assessment, offsite communications, community relations.

C. EOF director, maintenance, access & control.

D. Radiation protection, Chemistry, Operations interface.

A) B

Reference: Lesson Plans Book 1 of 2 Vol V, OP-OC-EAP-SEP , page 13 of 53.
EO - 1.11
K/A: G2.4.41 (2.3/3.7)
RO/SRO: SRO
Level: M
Author: rfa

RO Tier:		SRO Tier:	T3
Keyword:		Cog Level:	MEM 2.3/3.7
Source:	N	Exam:	OC002301
Test:	SRO	Misc:	RFA

K. **Operational Support Center (OSC)** The Operational Support Center is the place designated for Site craft support personnel to report in an emergency situation.

1. An Operational Support Center has been established in the office are located in the Unit 3 Control Room.
2. Personnel from the following groups will provide support to the OSC:

Chemistry	Engineering (Electrical)
Radiation Protection	Power Delivery (as req'd)
SPOC	Commodities & Facilities
Maintenance	Security
Work Control	OPS Duty Person
Non-Licensed Operators	

3. The Operational Support Center has shielding and ventilation that would protect the area from radioactivity. Breathing equipment and protective clothing are available to the Operational Support Center should any craftsman/technician be required to perform a task or function in an area that would require protective clothing and breathing apparatus.
4. The alternate OSC is located in room 316A of the Oconee Office Building. All personnel assigned to report to the OSC will assist in setting up this alt. OSC. The Maintenance SPOC has the lead in getting the setup completed.

L. **Emergency Operations Facility (EOF)** The Emergency Operations Facility is the facility utilized for direction and control of all emergency and recovery activities with emphasis on the coordination of offsite activities such as dispatching mobile emergency monitoring teams, communications with local, State and Federal agencies, and coordination of corporate and other outside support.

1. The Emergency Operations Facility has been established in Clemson.
2. Personnel assigned to the Emergency Operations Facility will include the following:

EOF Director	Access & Control
Operations Interface	Commodities & Facilities
Radiological Assessment	Offsite Communications
	Community Relations

J. **Technical Support Center (TSC)** The Technical Support Center is utilized for evaluation of plant status by knowledgeable personnel in support of operations during an emergency situation. Accident assessment and mitigation strategy are two of the prime goals of this center.

1. The Technical Support Center is located in the office area inside the Unit 1&2 Control Room. This area has the same ventilation and shielding as the Control Room enabling plant management and supporting technical and engineering personnel to evaluate plant status and support short-term operations in conjunction with the Emergency Operations Facility action plans.
2. The Technical Support Center shall have the capability to display and transmit plant status to those individuals who are knowledgeable of and responsible for engineering and management support of the reactor operations in the event of an accident and those persons who are responsible for the management of the accident.
3. Upon activation, this facility will provide the main communication link between the plant, Operational Support Center, the Nuclear Regulatory Commission, and the Emergency Operations Facility.
4. The Technical Support Center is staffed by plant management and technical personnel.
5. The alternate TSC is located in Room 316 of the Oconee Office Building. All personnel assigned to report to the TSC will assist in setting up this alt. TSC. The Maintenance SPOC has the lead in getting the setup completed.