1. Given the following:

   - A tube rupture in Steam Generator (SG) ‘A’ has been diagnosed.
   - The crew is performing the actions of E-3, “Steam Generator Tube Rupture”.
   - RCS pressure and SG ‘A’ pressure have been stabilized at 850 psig.
   - Subcooling is 65ºF.
   - Pressurizer level is being maintained at 54% with charging and letdown in service.
   - SG ‘A’ narrow range level is 68% and stable.
   - SG ‘B’ narrow range level is 10% and stable.
   - CST levels are at 35% and makeup to the CSTs CANNOT be established.
   - Management has directed that the cooldown and depressurization be conducted as quickly as possible.

What procedure will be used in this condition?

A. ECA-3.2, "SGTR With Loss of Reactor Coolant – Saturated Recovery Desired".

B. ES-3.1, "Post-SGTR Cooldown Using Backfill".

C. ES-3.2, "Post-SGTR Cooldown Using Blowdown".

D. ES-3.3, "Post-SGTR Cooldown Using Steam Dump".

Answer: D

SRO:

10CFR55.43(b)(5) - Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

COGNITIVE LEVEL:

Comprehensive 2DR - Determine the relationship between the current plant conditions and desired operation, and the procedure that addresses these issues.

K/A:

038AA2.07 – Ability to determine and interpret the following as they apply to a SGTR: Plant conditions, from survey of control room indications. SRO IMP 4.8.

OBJECTIVE:

RO4-04-LP029.007: DISCUSS the following items as they relate to ES-3.3, "Post-SGTR Cooldown Using Steam Dump":

a. Entry Conditions

RO4-04-LP029.009: Given a set of plant conditions RECOMMEND the appropriate procedural action to be taken while implementing ES-3.3, "Post-SGTR Cooldown Using Steam Dump".

REFERENCES:

E-3, Steam Generator Tube Rupture, Rev. 35, Step 47
BKG E-3, Steam Generator Tube Rupture, Rev 9
ES-3.3, Post-SGTR Cooldown Using Steam Dump, Rev. 19 Entry Condition
ECA-3.1, SGTR with Loss of Reactor Coolant Subcooled Recovery Desired, Rev 33
BKG ECA-3.1, SGTR with Loss of Reactor Coolant Subcooled Recovery Desired, Rev 8

SOURCE:

KNPP Bank RO4-04-LP029.002
2005 NRC Test question 79

JUSTIFICATION:

A INCORRECT	ECA-3.2 is warranted if pressurizer level cannot be maintained or if RCS subcooling cannot be maintained. These conditions do not exist.
B INCORRECT	ES-3.1 is the preferred transition if there is time allowable for cooldown with limited waste inventory. The primary benefit of this method is the limited secondary side contamination and waste.
C INCORRECT	ES-3.2 is an alternative method for cooldown time allowable while minimizing secondary side contamination. It is limited by the amount of blowdown flow that can be developed from the affected SG.
D CORRECT	ES-3.3 is the method which allow for the quickest cooldown and depressurization. The steam dumps provide the greatest capacity of the options listed.

2. According to the Applicable Safety Analysis section of Technical Specifications, which of the listed LCOs directly mitigates the adverse consequences of a Main Steam Line Break?

A. LCO 3.7.4 Two Steam Generator Power Operated Relief Valves lines shall be OPERABLE

B. LCO 3.7.3 Two Main Feedwater Isolation Valves, two Main Feedwater Regulating Valves and Main Feedwater Regulating Valves Bypass Valves shall be OPERABLE

C. LCO 3.3.2 Engineered Safety Feature Actuation System instrumentation for each Function in TABLE 3.3.2-1 shall be OPERABLE:

Function 3.a, Containment Isolation – Manual Initiation

D. LCO 3.3.2 Engineered Safety Feature Actuation System instrumentation for each Function in TABLE 3.3.2-1 shall be OPERABLE:

Function 5.b Feedwater Isolation – Steam Generator Water Level High-High

Answer: B

SRO:

10CFR55.43(b)(2) - Facility operating limitations in the technical specifications and their bases.

Cognitive Level:

Memory 1-B: Bases in technical specifications for LCO. Knowledge of the safety function for the LCO

K/A:

040G2.2.40 - Steam Line Rupture: Ability to apply technical specifications for a system. SRO IMP 4.7

Objective:

ROI-01-LPTS5.001 - Given a plant condition for Technical Specification related equipment, the operator will APPLY the correct LCO action statement based on understanding of the requirements bases and definitions.

Reference:

Technical Specification Bases
TS bases 3.7.4 Applicable Safety Analyses
TS bases 3.7.3 Applicable Safety Analyses
TS bases 3.3.2.3 Applicable Safety Analyses
TS bases 3.3.2.5 Applicable Safety Analyses

Source:

New

Justification:

A INCORRECT TS bases 3.7.4 Applicable Safety Analyses. The SG PORVS are not currently credited in the safety analysis for accident mitigation, obviating requirements for SG PORVs to support cooldown to residual heat removal entry conditions. Although not crediting SG PORVs for event mitigation, the SGTR event description includes a supplemental thermal hydraulic evaluation includes use of SG PORVs.

B CORRECT TS bases 3.7.3 Applicable Safety Analyses: The design bases of the MFIVs and MFRVs is established in the analyses for the Main Steam Line Break. Closure of the MFIVs or MFRVs and MFRV bypass valves and trip of the MFW pumps may be relied upon to terminate feedwater flow during a MSLB for the containment response analyses.

C INCORRECT TS bases 3.3.2.3 Applicable Safety Analyses, LCO and Applicability: Containment Isolation provides isolation of the containment and all process systems that penetrate the containment for the environment. This function is necessary to prevent or limit the release of radioactivity to the environment in event of a large break LOCA

D INCORRECT TS bases 3.3.2.5 Applicable Safety Analyses, LCO and Applicability: The primary function of the feedwater isolation signal is to stop the excessive flow of feedwater into the steam generator. This function is necessary to mitigate the effects of a high water level in the SGs which could result in carryover of water into the steam lines and excessive cooldown of the primary system

3. Given the following:

- The unit was operating at 100% Rated Thermal Power when the reactor tripped and Safety Injection (SI) initiated.
- The crew entered the EOP network and transitioned from E-0, “Reactor Trip or Safety Injection”, to E-1, “Loss of Reactor or Secondary Coolant”.
- Immediately after Resetting SI and Containment Isolation the site experienced a Loss of Off-Site Power.
- Parameters at the time of the Loss of Off-Site Power:

Parameter	Value	Trend
Containment Pressure	3 psig	Slowly Lowering
RCS Pressure	700 psig	Slowly Lowering
RWST Level	47%	Lowering
RCS Subcooling	0ºF	Stable
Pressurizer Level	0%	----------
SG ‘A’ Narrow Range Levels	8%	Rising Uncontrollably
SG ‘B’ Narrow Range Levels	0%	----------

What actions will the Unit Supervisor direct?

A. Manual starting of SI Pumps and isolation of feed flow to ‘A’ SG while continuing in E-1, “Loss of Reactor or Secondary Coolant”.

B. Transition to ES-0.0, “Rediagnosis”. During the performance of ES-0.0 direct isolation of feed flow to SG ‘A’ and initiation of SI using the pushbuttons.

C. Manual starting of SI Pumps then transition to E-3, “Steam Generator Tube Rupture”. After the transition to E-3 direct isolation of feed flow to SG ‘A’.

D. Initiation of SI using the pushbuttons then transition to E-0, “Reactor Trip or Safety Injection”, step 4. After the transition to E-0 direct isolation of feed flow to SG ‘A’.

Answer: C

SRO:

10CFR55.43(b)(5) - Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis 3-SPK: Analyze plant conditions to determine the correct procedure action and transition within the EOP network.

K/A:

056G2.4.6 - Loss of Off-Site Power: Knowledge of EOP mitigation strategies SRO IMP 4.7

Objective:

RO4-04-LP018.003 - Given a set of plant conditions RECOMMEND the appropriate procedural action to be taken while implementing E-1, Loss of Reactor or Secondary Coolant

References:

E-1, Loss of Reactor or Secondary Coolant, Rev 27
ES-0.0, Rediagnosis Rev 9
E-3, Steam Generator Tube Rupture Rev 35
OP-AP-104, Abnormal and Emergency Operating Procedures. Rev 2
ES-0.1, reactor Trip Response, Rev 29

Source:

New

Justification:

A INCORRECT — Foldout page in E-1 states for a SG level rising in an uncontrolled manner to manually start SI pumps for restoration of subcooling and PRZR level and then transition to E-3. Step 3 of E-1, which is a CAS step, states that a transition to E-3 is required if SG water level increases in an uncontrolled manner. In both cases Isolation of feed flow to A SG does not occur until after the transition to E-3. Manual starting of the SI pumps is directed by the note prior to E-1 step for resetting SI, E-1 Fold out Page for SI re-start criteria, and E-1 fold page for Ruptured SG.

B INCORRECT — Transition to ES-0.0 is allowed following completion of E-0 with Safety Injection initiated or required. The answer is incorrect because isolation of feed flow to the ruptured SG occurs in E-3 not ES-0.0. Re-establishing SI flow if in ES-0.0 requires going to E-0 Step 1

C CORRECT — Actions are consistent with the directions in the E-1 foldout page for a SG tube rupture. Manually Starting of SI pumps is required because of the Loss of Off-Site Power after SI Reset.

D. INCORRECT — The crew would not transition back to E-0 from E-1, and starting at step 4 in E-0 is a violation of OP-AP-104 since no direction is given to transition to E-0 and start at step 4. Plausible since in ES-0.1 if SI initiation is required directed to transition to E-0 step 4.

4. Given the following:

- The unit is at 100% Rated Thermal Power.
- A fault caused Bkr 15206 to open, de-energizing MCC 1-52B & MCC 1-52C.
- BRA-102, 125 VDC Bus, voltage is 125 VDC.
- The crew has verified power is available to the affected inverter(s) static switch(es).

DETERMINE the OPERABILITY status of Red Channel Instrument Bus I AND reason for the Operability Status?

OPERABILITY Status	Reason
A. INOPERABLE	The fault has caused an INOPERABILITY of the Train 'A' safeguards battery which is a support system of the Red Channel Instrument Bus
B. INOPERABLE	The Red Channel Instrument Bus power is not supplied from an uninterruptible power source
C. OPERABLE	The fault has caused an INOPERABILITY of the Train 'A' safeguards battery which is not a support system of the Red Channel Instrument Bus
D. OPERABLE	The Red Channel Instrument Bus still has power

Answer: D

SRO:
10CFR44.53(b)(2) - Facility operating limitations in the technical specifications and their bases.

Cognitive Level:
Analysis 3-SPK: Using knowledge of the bases in TS for AC instrument bus operability, determine the OPERABLE status using the information given in the question.

K/A:
057AA2.15 - Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: That a loss of ac has occurred. RO/SRO IMP 3.8/4.1

Objective:
RO2-03-LP038.006 - Explain the basis for each of the Technical Specifications associated with the DC and Emergency AC Electrical Distribution System.

Reference:
TS bases 3.8.9
TS Bases 3.8.6
Drawing E-233
Drawing E-240

Source:
New

Justification:

A INCORRECT The fault has not caused an Inoperability of the station battery. This would occur when the bus voltage drops below the 2.07 volts per cell. 2.07 X 59 cells =122.13Vdc. Stem states bus voltage is 125Vdc.

B INCORRECT The Support/Supported structure for power systems is not applicable to buses as long as the bus has power.

C INCORRECT The fault has not caused an Inoperability of the station battery. This would occur when the bus voltage drops below the 2.07 volts per cell. 2.07 X 59 cells =122.13Vdc. Stem states bus voltage is 125Vdc.

D CORRECT All AC instrument buses are OPERABLE. as energized to their proper voltage. With MCC-52E still providing power to the inverter the Red Channel instrument bus remains energized to its proper voltage

5. Given the following:

    - The unit is in MODE 6.
    - A core re-load is in progress.
    - Emergency Diesel Generator B is out of service for maintenance.
    - RAT is out of service for maintenance.
    - The following annunciators simultaneously alarm:
        - 47034-C, SFGRD A or B Control Power Failure
        - 47901-B, Diesel Generator A Mech Lockout
        - 47092-B, Diesel Gen A Local Control.
        - 47093-A, Diesel Gen A Control Volt Low
        - 47101-A, BRA-102 DC Voltage Low
        - 47102-A, BRA-102 Feeder Bkr Undervoltage
        - 47103-A, BRA-104 Feeder Bkr Undervoltage
    - BRA-102 voltage is 0 VDC.
    - The Unit Supervisor has entered AOP-EDC-002, “Loss of Train A Safeguards DC Power”.
    - The current step in AOP-EDC-002 requires an evaluation of TS 3.8.10 Distribution Systems – Shutdown.

Using the provided references, DETERMINE which condition requires entry?

A. LCO 3.8.2 Condition A

B. LCO 3.8.3 Condition A

C. LCO 3.8.5 Condition A

D. LCO 3.8.8 Condition A

Answer: C

For Information Only

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources - Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown"; and

b. One diesel generator (DG) capable of supplying one train of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10.

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

--NOTE--

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	-------------------NOTE------------------- Enter applicable Conditions and Required Actions of LCO 3.8.10, with one required train de-energized as a result of Condition A. ---	
	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND A.2.3 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately Immediately
B. One required DG inoperable.	B.1 Suspend movement of irradiated fuel assemblies. AND B.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND B.3 Initiate action to restore required DG to OPERABLE status.	Immediately Immediately Immediately

For Information Only

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil and Lube Oil

LCO 3.8.3 The stored diesel fuel oil and lube oil shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

--NOTE--

Separate Condition entry is allowed for each DG.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more DGs with usable combined storage and day tanks fuel level < 32,888 gal and > 27,961 gal.	A.1 Restore fuel oil level to within limits.	48 hours
B. One or more DGs with lube oil inventory < 504 gal and > 432 gal.	B.1 Restore lube oil inventory to within limits.	48 hours
C. One or more DGs with stored fuel oil total particulates not within limit.	C.1 Restore fuel oil total particulates to within limits.	7 days
D. One or more DGs with new fuel oil properties not within limits.	D.1 Restore stored fuel oil properties to within limits.	30 days

For Information Only

Diesel Fuel Oil and Lube Oil
3.8.3

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition A, B, C, or D not met. OR One or more DGs with diesel fuel oil or lube oil not within limits for reasons other than Condition A, B, C, or D.	E.1 Declare associated DG inoperable.	Immediately

...tion Only

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources - Shutdown

LCO 3.8.5 One DC electrical power subsystem shall be OPERABLE to support one subsystem of the DC Electrical Power Distribution System required by LCO 3.8.10, "Distribution System - Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

--NOTE--

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required DC electrical power subsystem inoperable.	A.1 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	<u>AND</u>	
	A.3 Initiate action to restore required DC electrical power subsystem to OPERABLE status.	Immediately

For Information Only

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters - Shutdown

LCO 3.8.8 One inverter shall be OPERABLE to support the 120 VAC electrical distribution subsystem required by LCO 3.8.10, "Distribution Systems - Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable.	A.1 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	<u>AND</u>	
	A.3 Initiate action to restore required inverter to OPERABLE status.	Immediately

For Information Only

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems - Shutdown

LCO 3.8.10 The necessary portion of AC, DC, and AC instrument bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

---NOTE---

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or AC instrument bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	<u>AND</u>	

For Information Only

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate actions to restore required AC, DC, and AC instrument bus electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.4 Declare associated required residual heat removal subsystem(s) inoperable and not in operation.	Immediately

ation Only

Provided References:
LCO 3.8.2
LCO 3.8.3
LCO 3.8.5
LCO 3.8.8
LCO 3.8.10

SRO:
10CFR55.43(b)(1) – Conditions and limitations in the facility license

10CFR55.43(b)(2) – Facility operating limitations in the technical specifications and their bases

Cognitive Level:
Analysis 3-SPR: Use of references to determine which LCO conditions require entry based on given conditions. Analysis directed by procedure step in AOP-EDC-002

K/A:
058G2.1.20 – Loss of DC Power: Ability to interpret and execute procedure steps. SRO IMP 4.6

Objective:
ROI-01LPTS5.001 – Given a Plant Condition for Technical Specification related equipment, the operator will apply the correct LCO action statement based on understanding the requirements, bases, and definitions

RO2-03-LP038.007 - Explain the LCO operation, applicability and action requirements for the Technical Specifications associated with the DC and Emergency Distribution System

References:
AOP-EDC-002, Loss of Train A Safeguards DC Power.
Technical Specifications and Bases-
LCO 3.8.2, 3.8.3, 3.8.5, 3.8.8, 3.8.10
E-233, Circuit Diagram DC Aux and Emergency AC
E-238, Metering & Relaying 480V SWGR-Safeguard Buses & Associated 4160V Equipment Emergency Generators (Bus 52A)
E-1337, Schematic Diagram – Motor Control Center 1-52A Motor 1-110 (fuel oil transfer pump)
ARP-47103-A, BRA-104 Feeder Bkr Undervoltage, Rev 0
ARP-47102-A, BRA-102 Feeder Bkr Undervoltage, Rev 0
ARP-47101-A, BRA-102 DC Voltage Low, Rev 1
ARP-47093-A, Diesel Gen A Control Voltage Low, Rev 0
ARP-47092-B, Diesel Gen A Local Control, Rev 1
ARP-47091-B, Diesel Gen A Mech Lockout, Rev 0
ARP-47034-C, SFGRD A Or B Control Power Failure, Rev 1

Source:
New

Justification:

A INCORRECT	There is still one required offsite circuit OPERABLE. Plausible distracter because initial conditions of the RAT being out of service. The TAT is still OPERABLE.
B INCORRECT	Plausible if the Fuel Oil Transfer Pump loses power. Fuel transfer pump is powered from MCC 52A can still perform function.
C CORRECT	DC train A is required to support the DG 'A'. It is inoperable as indicated by 0 Vdc in stem.
D INCORRECT	With AC Bus energized, the Inverter still has power and is operable. The requirements for inverter operability are different in Mode 5 and 6 then Modes 1, 2, 3, & 4

6. Given the following:

- The unit was operating at 100% Rated Thermal Power when the reactor tripped and Safety Injection initiated.
- The crew entered the EOP network and transitioned from E-1, “Loss of Reactor or Secondary Coolant” to ES-1.3, “Transfer to Containment Sump Recirculation”.
- Upon Entry in ES-1.3 the Reactor Operator reports that Containment Wide Range Level is less than 2 feet and stable.

Which of the following procedural flow paths maintains adherence to and proper selection of the appropriate procedures for the given situation?

The Unit Supervisor will __(1)__ and __(2)__ .

A. (1) continue in ES-1.3, “Transfer To Containment Sump Recirculation”

(2) if Containment Wide Range Level is < 2 feet when RWST Level is $\leq$ 10% then transition ECA-1.2, “LOCA Outside of Containment”

B. (1) continue in ES-1.3, “Transfer To Containment Sump Recirculation”

(2) if Containment Wide Range Level is < 2 feet when RWST Level is $\leq$ 4% then transition ECA-1.1, “Loss of Containment Sump Recirculation”

C. (1) transition to ECA-1.1, “Loss of Containment Sump Recirculation”

(2) if the RHR pumps begin cavitating and minimum RCS injection flow cannot be maintained then transition to ECA-1.3, “Containment Sump Blockage”

D. (1) transition to ECA-1.1, “Loss of Containment Sump Recirculation”

(2) if the minimum RCS injection flow cannot be maintained then transition to FR-C.1, “Response to Inadequate Core Cooling”

Answer: C

SRO:

10CFR55.43(b)(5) - Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis 3-SPK - Using knowledge of the EOP network and actions to respond to Loss of containment sump recirculation select the appropriate procedural flow path.

K/A:

W/E11EA2.2 - Ability to determine and interpret the following as they apply to the Loss of Emergency Coolant Recirculation: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. SRO IMP 4.2

Objective:

RO4-04-LP022.022.002 - Summarize the purpose or bases of the following items as they relate to ECA-1.1 Loss of Emergency Coolant Recirculation.

References:

ES-1.3, Transfer To Containment Sump Recirculation, Rev 34
FR-C.1, Response to Inadequate Core Cooling, Rev 19
ECA-1.3, Containment Sump Blockage, Rev 10
ECA-1.1 Loss of Containment Sump Recirculation, Rev 27
ECA-1.2, LOCA Outside Of Containment, Rev 13

Source:

New

Justification:

A INCORRECT The crew should transition to ECA-1.1 because of Wide Range Containment Level being < 2 feet. The 10% RWST level is the level at which the crew would begin establishing containment sump recirculation with one train of ECCS equipment.

B INCORRECT The crew should transition to ECA-1.1 because of Wide Range Containment Level being < 2 feet. The 4% RWST level is the level at which the crew stops all pumps taking a suction from the RWST.

C. CORRECT The crew should transition to ECA-1.1 with report of Wide Range Containment Level being < 2 feet. The transition listed is one of two transitions into ECA-1.1. The transition to ECA-1.3 is a Continuous Action Step and Step 1. The other transition point is when containment sump recirculation is established return to procedure and step in effect (Foldout Page)

D INCORRECT The crew should transition to ECA-1.1 with report of Wide Range Containment Level being < 2 feet. FR-C-1 transition would be required for a Orange or Red path on Core Cooling. The parameters given do not support entry into FR-C.1

7. Which of the following identifies an accident that the RCS Specific Activity Technical Specification limits are based on, AND what action is requested during implementation of AOP-RC-003, "High Reactor Coolant Activity"?

	Accident	Action Requested
A.	Main Steam Line Break	Perform NF-AA-3004, “Fuel Integrity Monitoring”
B.	Loss Of Coolant Accident	Perform OSP-RCS-001, “Reactor Coolant Leak Rate Check”
C.	Steam Generator Tube Rupture	Perform EPIP-RET-03A, “Liquid Effluent Release Paths”
D.	Faulted and Ruptured Steam Generator	Perform CY-KW-059-003, “Primary to Secondary Leak Rate Data”

Answer: A

SRO:

10CFR55.43(b)(4) – Radiological hazards that may arise during normal and abnormal situations including maintenance activities and various contamination conditions

Cognitive Level:

Memory 1-P/B: Knowledge of Technical specification bases and procedure actions required in AOP-RC-003

K/A:

076AA2.02 - Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS. SRO IMP 3.4

Objective:

RO4-03-LPD-8.003 - In accordance with OP-KW-AOP-RC-003, “High Reactor Coolant Activity”, Summarize the operator actions necessary to respond to an increasing indication of elevated activity level is the RCS due to failed fuel elements and the TS limits and actions

RO2-01-LP363.008 - Explain the basis for each of the Technical Specifications associated with the Reactor Coolant System.

References:

TS Bases 3.4.16
OP-KW-AOP-RC-001, Reactor Coolant Leak, Rev 4
OP-KW-AOP-RC-003, High Reactor Coolant Activity, Rev 4
OP-KW-AOP-RC-004, Steam Generator Tube Leak, Rev 5

Source:

Modified –Watts Bar 2009 Initial License Exam Question 83

Justification:

A CORRECT Both the accident and request are correct

B INCORRECT LOCA is not an accident the basis of the LCO is based on. The Leak rate is requested in AOP-RC-001

C INCORRECT SGTR is a correct accident, but the request is for Fuel integrity monitoring. Wrong Request

D INCORRECT Not the accident in the bases the TS is based upon. Procedure is requested during SGTL procedure

8. Given the following:

- The unit is in MODE 6.
- Fuel is currently being offloaded from the core.
- NCL-FH-004, "Refueling Daily Checklist" has been completed.
- N-31 Source Range is selected and providing the audible count rate to the Control Room.
- N-32 Source Range audible count rate is NOT functional.

If the Control Room audible count rate provided by N-31 is lost, what action is required by Technical Specifications AND what is the basis for that action?

	Action	Basis
A.	Initiate actions to isolate unborated water sources	Without a direct method to monitor reactivity conditions in the Control Room suspend all actions with the potential of positive reactivity addition until the containment audible count rate is verified OPERABLE
B.	Initiate actions to isolate unborated water sources	Prompt and definite indication of any boron dilution is no longer provided with the loss of the audible count rate instrumentation
C.	Suspend all operations which will cause an RCS cooldown	Minimizing cooldown of the RCS will ensure positive, reactivity due to temperature changes will not be added
D.	Suspend all operations which will cause an RCS cooldown	Without a direct method to monitor reactivity conditions in the Control Room suspend all actions with the potential of positive reactivity addition until the containment audible count rate is verified OPERABLE

Answer: B

SRO

55.43(b)(7) – Fuel handling facilities and procedures.

Cognitive Level:

Comprehension 2-DR: Operator must assess the conditions and relationship of the number of audible indications. The actions and basis for the actions required by the assessed condition is then required.

K/A:

032G2.1.32: Loss of Source Range Nuclear Instrumentation. Conduct of Operations. Ability to explain and apply system limits and precautions. RO/SRO IMP 3.8/4.0

Objective:

RO2-05-LP048.007 – Explain the LCO and action requirements for the Technical Specifications associated with the Excore Nuclear Instrumentation System.

RO2-05-LP048.008 – Explain the basis for the Technical Specifications associated with the Excore Nuclear Instrumentation System.

Reference:

OP-KW-NCL-FH-004, Refueling Daily Checklist, Rev 2
Improved Technical Specifications, Sections 3.9.2
Improved Technical Specifications Bases, Sections 3.9.2
OP-KW-ORF-FH-001, KPS Refueling, Rev 14

Source:

New

Justification:

A	INCORRECT	Containment Audible count rate is never used to satisfy audible count rate indication as described in TS bases
B	CORRECT	This is the correct action based on TS and to be performed immediately. The basis is also out of TS
C	INCORRECT	This is not an action for audible count rate. MTC for the temperature range during refueling is negligible. Bases is correct for different core conditions
D	INCORRECT	Containment Audible count rate is never used to satisfy audible count rate indication as described in TS bases.

9. Given the following:

    - The unit is operating at 100% Rated Thermal Power.
    - SD-2A, SG 'A' PORV Isolation Valve, closed due seat leakage of SD-3A, SG 'A' PORV.
    - A common fault causes both Main Steam Isolation Valves to CLOSE.
    - The reactor fails to trip automatically.
    - All rods are inserted when the Operators successfully perform the RESPONSE NOT OBTAINED Actions for Step 1 of E-0, "Reactor Trip or Safety Injection".
    - After the immediate actions of E-0 are completed security reports steam on the east side of containment and no visible steam on the west side of containment.
    - Safety Injection has NOT automatically initiated.
    - After the completion of the immediate actions of E-0, the following plant parameters are noted by the operators:

Parameter	Value	Trend
RCS Pressure	2340 psig	Lowering
PRZR Level	55%	Stable
Loop 'A' RCS Hot Leg Temp	576ºF	Stable
Loop 'B' RCS Hot Leg Temp	576ºF	Stable
Loop 'A' RCS Cold Leg Temp	575ºF	Stable
Loop 'B' RCS Cold Leg Temp	552ºF	Very Slowly Lowering
SG 'A' pressure	1200 psig	Stable
SG 'B' pressure	1060 psig	Very Slowly Lowering
Containment Pressure	0.1 psig	Stable
RCS Void Fraction	< 0%	Stable
Both SG Narrow Range Levels	> 5%	Slowly Increasing

What procedure will the Unit Supervisor transition to in order to mitigate the conditions?

A. E-0, "Reactor Trip or Safety Injection"

B. FR-C.2, "Response to Degraded Core Cooling"

C. FR-C.3, "Response to Saturated Core Cooling"

D. FR-H.2, "Response to Steam Generator Overpressure"

Answer: D

SRO:

10CFR55.43(b)(5) - Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis 3-SPK: Analyze the conditions listed in the questions to determine what procedure to enter based on knowledge of CSF status trees.

K/A:

W/E13G.4.21 – Steam Generator Overpressure: Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. SRO IMP 4.6

Objective:

RO4-04-LP036.001 – Discuss the following items as they relate to FR-H.2, Response to Steam Generator Over Pressure.
b. Entry Conditions

References:

FR-0, Critical Safety Function Status Trees, Rev 1
E-0, Reactor Trip or Safety Injection, Rev 41

Source:

New

Justification:

A INCORRECT — The plant conditions do not require a Safety Injection, therefore, the immediate action steps direct monitoring of CSF status trees and transition to ES-0.1.

B INCORRECT — The entry condition for a yellow path requirements of inadequate subcooling, is not meet to enter FR-C.2. The entry conditions of CETs > 700ºF but less than 1200ºF, RXCPs running and Stable Void fraction are not met. The student has to calculate subcooling based on temperatures and pressure.

C INCORRECT — The entry conditions of subcooling and Void fraction are not met. The entry conditions of CETs > 700ºF but less than 1200ºF, and RXCPs running are not met. The student has to calculate subcooling based on temperatures and pressure.

D CORRECT — The entry conditions are met for FR-H.2, SG water levels >5%, and SG pressure > 1127 psig

10. Given the following:

    - The unit was operating at 100% Rated Thermal Power when a Large Break LOCA occurred
    - A common fault caused the TAT and Bus 5 to Lockout when the reactor tripped
    - The crew has entered the EOP network and is currently performing actions in E-1, “Loss of Reactor or Secondary Coolant”
    - Containment Pressure is 17 psig and lowering very slowly
    - SW Flow to CFCU ‘A’ 0 gpm
    - SW Flow to CFCU ‘B’ 0 gpm
    - SW Flow to CFCU ‘C’ 1600 gpm
    - SW Flow to CFCU ‘D’ 900 gpm
    - Containment Sump Wide Range Level is 8.0 ft and slowly trending up
    - RWST Level is 50% and slowly lowering
    - R-16, Containment Fan Cooling Unit Service Water Return, radiation monitor reads 350 cpm and trending up

Which procedure(s) will the Unit Supervisor direct?

A. Transition to FR-Z.2, “Response to Containment Flooding”

B. Continue in E-1 while concurrently implementing AOP-SW-001, “Abnormal Service Water System Operation”

C. Transition to ECA-1.3, “Containment Sump Blockage”, and perform ARP-47052-A, “Reactor Building Ventilation Abnormal”, in parallel with ECA-1.3

D. Perform AOP-EHV-007, “Loss of Off-Site Power”, while monitoring for parameters that indicate a required transition to ES-1.3,”Containment Sump Recirculation”

Answer: A

SRO:

10CFR55.43(b)(5) – Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

Cognitive Level:

Analysis 3-PEO: Operator must assess the plant conditions, prioritize this facts, and using the procedures chose the one that will mitigate any of the current situation, and ensure that entry condition for that procedure is met.

K/A:

W/E15EA2.2 – Ability to determine and interpret the following as they apply to the Containment Flooding: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. RO/SRO IMP 2.9/3.3

Objective:

RO4-01-LP043.001 – Discuss the following as they relate to FR-Z.2, Response to Containment Flooding

1. Entry Conditions

Reference:

AOP-RM-001, Abnormal Radiation Monitoring System, Rev 4
FR-Z.2, Response to Containment Flooding, Rev 7
AOP-SW-001, Abnormal Service Water System Operation, Rev 6
ECA-1.3, Containment Sump Blockage, Rev 10
ARP-47052-A, Reactor Building Ventilation Abnormal, Rev 0
AOP-EHV-007, Loss of Off-Site Power, Rev 0
E-1, Loss of Reactor or Secondary Coolant, Rev 27
ES-1.3, Containment Sump Recirculation, Rev 34
OP-AP-104, Abnormal and Emergency Operating Procedures. Rev 2
FR-0, Critical Safety Function Status Trees, Rev 1

Source:

New

Justification:

A CORRECT	Entry conditions to FR-Z.2 are met at this time. Containment pressure has to be less than 23 psig with elevated containment sump level, >7.25 feet.
B INCORRECT	Indications of flooding in containment. With abnormal SW flow to CFCU, an entry condition into AOP-SW-001. Entrance into AOP-SW-001 would be correct if there was not an ORANGE path on containment flooding which requires immediate transition to FR-Z.2
C INCORRECT	Transition to ECA-1.3 would be required after transition to ES-1.3 if establishment of containment sump recirculation was not possible; there are not any failures that would prevent establishment of containment sump recirculation.
D INCORRECT	With the RAT and Bus 1-4 available do not meet the entry conditions for AOP-EHV-007.

11. Given the following:

- Unit restart has commenced 16 hours after a spurious reactor trip
- Reactor Power is at 4% of Rated Thermal Power
- Tave is 547ºF being maintained by the steam dumps
- Pressurizer Pressure Control is in Automatic controlling pressure at 2235 psig
- PT-429, Red Channel Pressurizer Pressure, has FAILED HIGH
- The crew has implemented AOP-MISC-001, "Response to Instrument Failure"
- AOP-MISC-001 directs the Unit Supervisor to Refer to TS 3.3.1 and TS 3.3.2

LCO 3.3.1 The RPS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

Which instrumentation Function requires ENTRY into a LCO CONDITION AND what is the protection provided by this function?

	Function	Protection
A.	Low Pressure safety injection function.	Prevent exceeding RCS pressure safety limit.
B.	Overtemperature Delta -T reactor trip function.	Prevent exceeding DNBR limits.
C.	Pressurizer Low Pressure reactor trip function.	Prevent exceeding subcooling limits during MODE 1 operations.
D.	Pressurizer High Pressure reactor trip function.	Prevent exceeding the peak centerline fuel temperature limit specified in TS.

Answer: B

SRO:

10CFR55.43(b)(2) - Facility operating limitations in the technical specifications and their bases

Cognitive Level:

Comprehension: 2-DR Describing or recognizing relationships. The operator has to recognize the relationship between the failed instrument and technical specification action statement

K/A:

012A2.05 - Ability to (a) predict the impacts of the following malfunctions or operations on the RPS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Faulty or erratic operation of detectors and function generators. SRO IMP 3.2

Objective:

RO2-05-LP471.008 - Explain the basis for the Technical Specifications associated with the Reactor Protection System. SRO Objective

RO2-05-LP471.007 - Explain the LCO operation, applicability and action requirements for the Technical Specifications associated with the Reactor Protection System

References:

ARP-47022-A, Pressurizer Low Pressure SI, Rev 0
ARP-47031-C, Overtemp Delta-T Reactor Trip.
ARP-47031-B, Pressurizer Low Pressure Reactor Trip.
ARP-47032-B, Pressurizer High Pressure Reactor Trip.
OP-KW-AOP-MISC-001, Response to Instrument Failure
Technical Specifications

Drawings: High and Low Pressurizer Pressure Reactor Trips

XK-100-10, Analytical Part Flow – Reactor Coolant System
E-2038, Integrated Logic Drawing – Reactor Coolant System
XK-100-148, Logic Diagram Pressurizer Trip Signals
XK-100-1216, Reactor Protection System Schematic Diagrams

Drawings: OTDT

E-2042, Integrated Logic Diagram – Reactor Control and Protection Sys
E-2043, Integrated Logic Diagram – Reactor Control and Protection Sys
XK-100-1216, Reactor Protection System Schematic Diagrams
XK-100-147, Logic Diagram Primary Coolant System Signals

Drawings: Low Pressure SI

XK-100-10, Analytical Part Flow – Reactor Coolant System
XK-100-148, Logic Diagram Pressurizer Trip Signals
E-1635, Integrated Logic Diagram – Diesel Generator
E-2038, integrated Logic Drawing – Reactor Coolant System

Source

New

Justification

Pressurizer Low Pressure Reactor Trip:	Instruments P-429, P-430, P-431, P-449: Applicability Mode 1 greater than P-7 (10%). Required 4 Channels. 2 of 4 channels to trip < 1904 psig (LCO 3.3.1) Provides protection from violating DNBR
Pressurizer High Pressure Reactor Trip:	Instruments P-429, P-430, P-431. Applicability Mode1 & 2. Required 3 Channels. 2 of 3 channels to trip 2377 psig (LCO 3.3.1) Prevent exceeding COLR limits for the combination of temperature and pressure,
OTDT Reactor Trip:	Bistables 44907-0505 (RED), 44907-0506 (White), 44907-0507 (Blue), 44907-0508 (Yellow): Applicability Mode 1 and 2. Required 4 Channels. 2 of 4 greater than the calculated setpoint.(LCO 3.3.1) DNBR
Pressurizer Low Pressure SI	Instruments P-429, P-430, P-431. Applicability Mode 1, 2, & 3 when pressure $\geq$ 2000 psig. 2 of 3 < 1815 psig (LCO 3.3.2), SLB, LOCA, SGTR, Rod Cluster Ejection, Inadvertent opening of PORVs and safeties

A INCORRECT	Low Pressure Safety Injection function requires and entry into an action statement for LCO 3.3.2. Applicable Mode 1, 2, and 3 (greater than 200 psig) AND T.S bases stated that provides protection against a SLB - Not applicable for safety pressure limit.
B CORRECT	OTDT does require entry into action statement applicable in Mode 1 and 2 currently in Mode 2 (LCO 3.3.1) AND Subcooling has a relationship to DNBR, function does provide protection from violating DNBR.
C INCORRECT	Low pressure reactor trip function only applicable in Mode 1 (LCO 3.3.1) AND Does provide protection against DNBR which relates to HTP DNB
D INCORRECT	High pressure reactor trip function applicable Mode 1 and 2 (LCO 3.3.1) AND Does not prevent exceeding PCT, provides protection from overpressure

12. Given the following:

    - The plant was operating at 100% power when a Design Basis LOCA occurred.
    - A loss of Off-Site power occurred when the reactor tripped.
    - ATC reports that the expected return of Off-Site power is in 3 hours.
    - EDG ‘B’ failed to start.
    - Annunciator 47091-J, Bus 6 Lockout, is CLEAR.
    - ICS Pump ‘A’ is tagged out for planned maintenance.
    - All other ECCS equipment is functioning as expected.

What plant conditions are expected as a result of the above failures AND what procedure would be used to mitigate the failure of ICS?

	Plant Conditions	Procedure
A.	Containment temperature and pressure will rise above the auto ignition limits for hydrogen	NOP-RBV-003, “Post LOCA Hydrogen Control”, actions will lower hydrogen concentration by directing actions to dilute the containment hydrogen concentration
B.	Containment pressure will rise and there will be a potential loss of containment integrity	AOP-DGM-002B, “Abnormal Diesel Generator B Operation”, actions will restore power to Bus 6 by directing actions to start EDG ‘B’
C.	Containment temperature will exceed design values for adverse instrumentation	FR-Z.1, “Response to High Containment Pressure”, actions will reduce containment temperature and pressure by directing actions to vent containment to the atmosphere
D.	Airborne radiation levels in containment will be elevated	AOP-RM-001,”Abnormal Radiation Monitoring”, actions will reduce the release rate to the environment by directing actions to vent containment to the shield building

Answer: B

SRO:

10CFR55.43(b)(5) – Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis 3-PEO: Predict the outcome of the event. 3-SPK: Using knowledge of the procedures determine which procedure will mitigate the situation.

K/A:

013A2.01 – Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: LOCA. SRO IMP 4.8

Objective:

RO4-05-LP005.001 – Explain how DCRI events may affect the Core Cooling, Integrity, Containment, and Inventory Critical Safety Functions.

RO4-05-LP005.003 – Describe the initial trends of major primary and secondary parameters following a DRCI event.

RO4-04-LP018.002 – Given a set of plant conditions recommend the appropriate procedure action to be taken while implanting E-1 “Loss Reactor or Secondary Coolant”

References:

USAR 5.8.2, Rev 22.01
USAR 14.3, Rev 22.01
OP-KW-AOP-RM-001, Abnormal Radiation Monitoring System, Rev 5
OP-KW-NOP-RBV-003, Post LOCA Hydrogen Control, Rev 1
OP-KW-AOP-DGM-002B, Abnormal Diesel Generator B Operation, Rev 4
FR-Z.1, “Response to High Containment Pressure, Rev 20
EAL Chart, Rev 8
Technical Specification bases LCO 3.6.6
Technical Specification bases LCO 3.6.5

Source:

New

Justification:

A INCORRECT According to USAR 5.8.2: Although generation of hydrogen can follow a LOCA, the postulated hydrogen release from a design basis LOCA has been determined not to be risk significant because it is not large enough to lead to early containment failure. The risk associated with hydrogen combustion is beyond design basis (e.g., severe) accidents. 10CFR50.44 as revised September 16, 2003, eliminated the hydrogen release associated with a design basis LOCA. Question would ask for information in the SAMG

AND

NOP-RBV-003 does contain actions to dilute containment hydrogen concentration.

B CORRECT A Potential Loss of Containment is expected with the given failures. With a design basis LOCA containment pressure is expected initially to rise to a value greater than 23 psig. USAR Table 14.3.5-8 peak value with failure of one ICS pump 42.6 psig.

AND

AOP-DGM-002B will direct manual starting of EDG ‘B’.

C INCORRECT Design conditions are not expected to be challenged.

AND

FR-Z.1 does not direct venting of containment. The procedures direct checking equipment running. Does not provide direction to restore power to equipment.

D INCORRECT The increase in radiation levels is correct. TS 3.6.6 LCO bases One Containment Spray Train is required to remove iodine from the containment atmosphere and maintain concentrations below those assumed in the safety limits during a Design Basis LOCA.

AND

AOP-RM-001 does not provide to direct venting of containment to the shield building. The procedure does direct ensuring charcoal filters for various systems are in service.

13. Given the following:

- The unit was operating at 100% Rated Thermal Power when the reactor automatically tripped and Safety Injection initiated.
- Off-Site power was lost at the same time the reactor trip breakers opened.
- Containment Pressure is 28 psig.
- Containment Radiation is 5.5 x10^5 R/Hr.

Based on the stated containment conditions, which of the following correctly states when the Unit Supervisor can direct stopping of Internal Containment Spray Pumps and be in compliance with station procedures?

The Unit Supervisor can direct stopping . . .

A. one ICS pump when containment pressure is $\leq$ 17 psig during the performance of E-1, “Loss of Reactor or Secondary Coolant”.

B. one ICS pump during the performance of ES-1.3, “Transfer to Containment Sump Recirculation”, with current containment conditions.

C. both ICS pumps during the performance of ECA-2.1, “Uncontrolled Depressurization of Both Steam Generators”, when containment pressure lowers to $\leq$ 23 psig.

D. both ICS pumps during the performance of ECA-3.1, “SGTR With Loss of Reactor Coolant Subcooled Recovery Desired”, when containment radiation levels lowers to $\leq$ 5.0 x10^5 R/Hr.

Answer: B

SRO:

10CFR55.43(b)(5) – Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis – 3-SPK: Using the conditions presented in the question determine what conditions can the ICS pumps be secured when performing a procedure.

K/A:

026A2.08 - Ability to (a) predict the impacts of the following malfunctions or operations on the CSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Safe securing of containment spray (when it can be done). SRO IMP 3.7

Objective:

RO02-01-LP023.005 - Explain the purpose of the following procedures used to govern the normal, abnormal, and emergency operation of the ICS System:

13. ES-1.3
14. E-1
16. ECA-2.1

RO4-04-LP032.005 - Given a set of plant conditions RECOMMEND the appropriate procedural action to be taken while implementing ECA-3.1, or ECA-3.2.

References:

ES-1.3, Transfer to Containment Sump Recirculation, Rev 34
E-1, Loss of Reactor or Secondary Coolant, Rev 27
ECA-2.1, Uncontrolled Depressurization of Both Steam Generators, Rev 29
ECA-3.1, SGTR with Loss of Reactor Coolant Subcooled Recovery Desired, Rev 33

Source:

New

Justification:

A INCORRECT IAW the procedure both ICS pumps can be stopped if containment pressure is less than 4 psig. 17 psig is a setpoint for Main Steam Isolation

B CORRECT IAW the procedure one ICS pump can is stopped regardless of containment conditions

C INCORRECT IAW the procedure both ICS pumps can be stopped if containment pressure is less than 4 psig. The conditions listed are in ECA-2.1. 23 psig is the setpoint for automatic of ICS

D INCORRECT IAW with the procedure both ICS pumps can be stopped when containment pressure reaches less than 4 psig. ICS pumps with caustic additive contribute to the reduction in radiation levels.

14. Given the following:

- During the performance of OSP-DGE-002A, “Diesel Generator Quarterly Availability Test”, SW-301A, Service Water Supply to A Diesel Generator, failed to OPEN automatically.
- An operator opened SW-301A locally upon Control Room direction.

Which of the following describes the status of LCO 3.8.1 & LCO 3.7.8?

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:
- Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and
- Two diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystems

LCO 3.7.8 Two Service Water (SW) trains shall be OPERABLE.

	LCO 3.8.1	LCO 3.7.8
A.	Met	Not Met
B.	Met	Met
C.	Not Met	Met
D.	Not Met	Not Met

Answer: C

OE:

This question is based on plant OE from EDG surveillance performed in 2008. CR106303 and OD000181.

SRO:

10CFR55.43(b)(2) - Facility operating limitations in the technical specifications and their bases.

Cognitive Level:

Analysis 3-SPR: Using the provided references and knowledge of the application and bases of Technical Specifications determine if meeting LCO 3.8.1 and LCO 3.7.8

K/A:

064G2.1.7 - Emergency Diesel Generator: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. SRO IMP 4.7

Objective:

RO2-03-LP42A.007 - Explain the LCO operation, applicability, and action requirements for each of the technical Specifications associated with the Emergency Diesel Generator System

References:

OSP-DGE-002A, Diesel Generator A Quarterly Availability Test, Rev 10
LCO 3.7.8 and bases
LCO 3.8.1 and bases
CR106303 SW-301A, SW from D/G 1A Heat Exchanger, Open Stroke time Increase
OD 000181 SW-301 open timing shows increase above reference value.
GNP-05.16.06 Validation of Time Dependant Operator Actions, Rev 10
OP-AP-102 operability Determination, Rev 6

Source:

New

Justification:

Note in SR 3.7.8.1 specifies that isolation of SW system flow to individual components does not render the SW system inoperable

OP-AA-102 Attachment 1 4.b: Any time a surveillance is performed and the acceptance criteria is not met, the LCO must be declared not met, and the applicable condition(s) or actions must be entered

A	INCORRECT	LCO 3.8.1 is not met LCO 3.7.8 is met
B	INCORRECT	LCO 3.8.1 is not met. LCO 3.7.8 is met.
C	CORRECT	LCO 3.8.1 is not met LCO 3.7.8 is met.
D	INCORRECT	LCO 3.8.1 is not met. LCO 3.7.8 is met. .

15. Given the following:

- The Unit is in MODE 4 following a refueling outage.
- It is desired to open the 36" Containment Purge/Vent RBV Valves.

Which of the following SHALL be done regarding the opening of the 36" Containment Purge/Vent RBV Valves?

A. State notification is required within one hour after opening the 36” RBV valves.

B. An effluent release report is required to be sent to the Department of Natural Resources (DNR) within 24 hours of cycling the 36” RBV valves.

C. The 36 inch purge and vent isolation valves are maintained closed in MODES 1, 2, 3, and 4 to ensure the containment boundary is maintained.

D. An exception to the conditions listed on Kewaunee’s Air Pollution Control Operation Permit must be submitted 24 hours prior to opening of the 36” RBV valves.

Answer: C

SRO:

10CFR55.43(b)(4) - Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

Cognitive Level:

Memory 1-P - Recall of procedure steps and cautions related to the required notification for Opening the 36" Purge/Vent Valves.

K/A:

103G2.4.30 - Containment: Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the state, the NRC or the transmission system operator. SRO IMP 4.2

Objective:

RO2-04-LP018.001 - Describe the function/purpose, design basis, and operating characteristics of the Reactor Building Ventilation System.

Reference:

NOP-RBV-002 - Reactor Building Vent System Cold Operation and Making Releases. (Precautions and Limitations 4.9, When RCS is greater than 200ºF, NRC notification is required prior to opening 36" RBV Valves.), Rev 3

GNP-11.04.04 - Reportability Determination, Rev 11

ODCM – Offsite Dose Calculation Manual, Section 2.1.7

Air Pollution Control Operation Permit

Source:

New

Justification:

A INCORRECT Not a one hour notification listed in the GNP-11.08.04

B INCORRECT ODCM section 2.1.7 for non routine discharge locations have to be included in the monthly, quarterly and annual reports

C CORRECT Per the TS Bases 3.6.3 the 36 inch valves are not to be opened in modes 1, 2, 3, & 4 to show protection for designed bases accidents.

D INCORRECT Not part of the conditions of the permit.

16. Given the following:

- The unit is at 100% Rated Thermal Power
- Current RCS boron concentration is 740 ppm
- Control Board IRPI meter for Rod G11 indicates ZERO
- The ROD BOTTOM light for Rod G11 is NOT LIT
- Rod G11 was verified at the proper Control Bank height using incore moveable detectors 1 hour ago
- The IRPI channel for Rod G11 is determined to be INOPERABLE
- The reactor spuriously trips and no other events occur

Which of the following actions will the Unit Supervisor direct?

A. De-energizing of the Rod Drive MG sets prior to transitioning from E-0, “Reactor Trip or Safety Injection”.

B. Emergency boration will be established using AOP-CVC-001, “Emergency Boration”, during performance of the EOPs.

C. Initiate Safety Injection to establish shutdown boron concentration as directed in the actions of FR-S.1, “Response to Nuclear Generation/ATWS”.

D. Verification of rod G-11 fully inserted into the core using AOP-CRD-001, “Abnormal Rod Drive System”, prior to transitioning from the EOPs to the GOPs.

Answer: B

SRO:

10CFR55.43(b)(5) - Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis 3-SPK: The operator must realize that the IRPI channel is inoperable, therefore the indication and rod bottom light are not be used, ES-0.1 use either of these indications, so that will cause the entry into AOP-CVC-001, where this information must be applied to reach the correct answer.

K/A:

014A2.05 – Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Reactor trip. SRO IMP 4.1

Objective:

RO4-04-LPD004.002 – Summarize the purposes or basis of the following items as they relate to ES-0.1, Reactor Trip Response

2. All procedure steps
3. Procedure Transitions

RO4-04-LPD004.006 – List the operator actions associated with AOP-CVC-001, Emergency Boration.

Reference:

OP-KW-AOP-CRD-001, Control Rod Drive System Malfunction, Rev 4
ES-0.1, Reactor Trip Response, Rev 29
OP-KW-AOP-CVC-001, Emergency Boration, Rev 4
E-0, Reactor Trip or Safety Injection, Rev 41
Technical Specifications 3.1.1, 3.1.4, 3.1.7

Source:

Modified, KPS Master Bank

Justification:

A	INCORRECT	De-energizing the Rod Drive MG sets is only required in the immediate actions of E-0 if the reactor is not shutdown. See C for explanation of reactor shutdown with a stuck rod.
B	CORRECT	After Transitioning from E-0 upon completion of the immediate actions, direction is given to emergency borate for any rods not fully inserted.
C	INCORRECT	Transition to FR-S.1 is not expected with one stuck rod due to the design criteria of being able to shutdown the reactor with the most reactive control rod fully withdrawn at the most reactive time in core life.
D	INCORRECT	Not listed as a requirement to transition to GOPs from ES-0.1.

17. Given the following:

- The unit is operating at 100% Rated Thermal Power.
- Annunciator 47064-Q, Cond Storage Tanks Level High/Low, is LIT due to both tanks being low.
- LCO 3.7.6 Condition A “CSTs inoperable” has been entered due to the low level in the Condensate Storage Tanks (CSTs).

Using the provided reference of 3.7.6 Condensate Storage Tanks (CSTs), which of the following will satisfy Required Action A.1

Verify that…

A. Service Water Pumps are available and SW supply to AFW pump Valves are OPEN.

B. Service Water Trains are OPERABLE and able to supply water to the AFW pumps.

C. Makeup Water Plant started, filling the CSTs as necessary to clear the CST Low level alarm.

D. Reactor Makeup Storage Tank and one Reactor Makeup Water Pump are available to supply water to the CSTs to provide water for the AFW Pumps.

Answer: B

For Information Only

3.7 PLANT SYSTEMS

3.7.6 Condensate Storage Tanks (CSTs)

LCO 3.7.6 The CSTs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CSTs inoperable.	A.1 Verify by administrative means OPERABILITY of backup water supply.	4 hours <u>AND</u> Once per 12 hours thereafter
	<u>AND</u>	
	A.2 Restore CSTs to OPERABLE status.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	B.2 Be in MODE 4, without reliance on steam generator for heat removal.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.6.1 Verify usable volume in the CSTs is ≥ 41,500 gal.	12 hours

Provided Reference:

TS 3.7.6

OE

2005, filled the Steam Generators with Service Water due to the CSTs being declared inoperable, there for all three AFW pumps were declared inoperable; the fix was to open the SW valves to make the trains of AFW operable. During the cooldown, Steam Generator pressure became less than Service Water pressure, and SW flowed into the Steam Generators.

SRO

55.43(b)(2) – Facility operating limitations in the technical specifications and their bases.

Cognitive Level:

Analysis 3-SPR: Using reference and knowledge of Technical Specification Bases determine acceptable actions.

K/A:

056G2.1.32: Condensate System. Conduct of Operations. Ability to explain and apply system limits and precautions. RO/SRO IMP 3.8/4.0

Objective:

RO2-02-LP003.008 – Explain the bases for the Technical Specifications associated with the Condensate and Air Removal System

Reference:

ARP-47064-Q, Condensate Storage Tanks Level High/Low, Rev.11
Improved Technical Specifications, Section 3.7.6
Improved Technical Specifications Bases, Section 3.7.6
Improved Technical Specifications Bases, Section 3.7.8

Source:

Modified, Palisades 2009 NRC Initial License Exam Question 93

Justification:

A INCORRECT This is not correct, the SW system is OPERABLE, but there is no requirement for the supply valves for SW to the AFW pumps to be open. This distracter is based on previous OE.

B CORRECT This is the correct answer. Operability of the backup feedwater supply must include verification that the flow paths from the backup water supply to the AFW pumps are operable, and the associated SW trains are operable.

C INCORRECT The verification of the backup water supply is SW, not makeup. Makeup is used to normally fill the CSTs

D INCORRECT The verification of the backup water supply is SW, not Reactor Makeup Storage Tanks. Reactor Makeup Water system can procedurally be used to refill the CSTs.

18. Given the following:

- The unit was operating at 100% Rated Thermal Power when the Reactor tripped and Safety Injection initiated due to a Tube Rupture in Steam Generator (SG) ‘A’.
- SG ‘A’ N-16 monitor was indicating Off-Scale HIGH prior to the Reactor trip
- A Loss of Off-Site Power occurred when the Reactor tripped.
- The crew is performing the actions of E-0, “Reactor Trip or Safety Injection”.
- Just prior to taking the Main Steam Dump Control Mode Selector Switch to RESET then STM PRESS, the following indications are noted:

Parameter	Value	Trend
Pressurizer Pressure	1140 psig	Stable
Pressurizer Level	0 %	---------
Loop ‘A’ RCS Cold Leg WR Temp	483ºF	Slowly Lowering
Loop ‘B’ RCS Cold Leg WR Temp	484ºF	Slowly Lowering
Containment Pressure	0.3 psig	Stable
SG ‘A’ Narrow Range Level	2%	Slowly Rising
SG ‘B’ Narrow Range Level	0 %	---------
SG ‘A’ Pressure	800 psig	Slowly Lowering
SG ‘B’ Pressure	800 psig	Slowly Lowering
AFW Flow Header ‘A’	120 gpm	Slowly Rising
AFW Flow Header ‘B’	110 gpm	Slowly Rising

- After the Main Steam Dump Control Mode Selector Switch is taken to STM PRESS, the Balance of Plant Operator reports that SD5A1, Main Steam Header ‘A’ Atmos Steam Dump, is OPEN.
- Manual Control of HC-484, Steam Dump Pressure Controller failed to close SD5A1.

What action and procedural flow path will the Unit Supervisor direct?

(Directions and Actions are performed in order listed)

A. 1. Close Main Steam Isolation and Bypass Valves, MS-1A, MS-1B, MS-2A, & MS-2B
   2. Continue in E-0, “Reactor Trip or Safety Injection”
   3. Transition to E-3. “Steam Generator Tube Rupture” to isolate SG ‘A’

B. 1. Immediately isolate feed water flow to SG ‘A’
   2. Continue in E-0, “Reactor Trip or Safety Injection”
   3. Transition to E-2, “Faulted Steam Generator Isolation”, to isolate steam flow from SG ‘A’

C. 1. Continue in E-0, “Reactor Trip or Safety Injection”
   2. Transition to E-3, “Steam Generator Tube Rupture”, to isolate feed flow to SG ‘A’
   3. Transition to E-2, “Faulted Steam Generator Isolation”, to isolate steam flow from SG ‘A’

D. 1. Continue in E-0, “Reactor Trip or Safety Injection”
   2. Transition to E-2, “Faulted Steam Generator Isolation”, to isolate steam flow from SG ‘A’
   3. Transition to ECA-3.1, “Steam Generator Tube Rupture With Loss of Reactor Coolant – Subcooled Recovery Desired”

Answer: A

SRO:

10CFR55.43(b)(5) – Assessment of facility conditions and selection of appropriate procedures during normal, abnormal and emergency situations.

Cognitive Level:

Analysis 3-SPK: Analyze plant conditions and based on the analysis determine the correct actions

K/A:

041AA2.02: Steam Dump System (SDS) and Turbine Bypass Control. Ability to (a) predict the impacts of the following malfunctions or operations on the SDS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Steam valve stuck open. RO/SRO IMP 3.6/3.9

Objective:

RO4-04-LP002.009 – Given a set of plant conditions recommend the appropriate procedural action to be taken while implementing E-0

Reference:

E-0, Reactor Trip or Safety Injection Rev 41
OPERM-203 Flow Diagram Main Aux Steam and Steam Dump
E-1626 integrated Logic Diagram Main Steam & Steam Dump System
E-2, Faulted Steam Generator Isolation, Rev 23
E-3, Steam Generator Tube Rupture, Rev 35
ECA-3.1, SGTR with Loss of Reactor Coolant Subcooled Recovery Desired, Rev 33

Source:

New

Justification:

A CORRECT Initiation of main steam isolation will stop steam flow from SD5A1. The crew would then continue in E-0 until transitioning to E-3 because of the SGTR indications. E-3 will direct isolation of feed flow and steam flow from SG 'A".

B INCORRECT Isolation of feedwater flow to SG 'A' is not correct at this time as SG level is less than 5%. The crew would not have transition to E-2 if completed the required step to initiate main steam isolation during the step listed in the stem. The main steam isolation will isolate the leaking valve.

C INCORRECT If the steam generator was faulted and ruptured, the correct procedural flow path is transition to E-2 then E-3.

D INCORRECT Actions performed in E-0 would isolate the steam flow. If the crew transitioned to E-2, actions contained within would isolate the steam flow as well. Transition to ECA-3.1 is from E-3 not E-2.

19. Which of the following is an administrative requirement associated with fuel movement?

A. A Senior Reactor Operator is required to be in the refueling area to supervise fuel movement.

B. A Senior Reactor Operator is assigned to oversee the evolution to meet the ICCE category 2 requirements.

C. A dedicated reactivity Senior Reactor Operator is required to be stationed in the Control Room during fuel movement.

D. Changes to the refueling plan are required to be reviewed by a Senior Rector Operator within two months of execution.

Answer: A

SRO:
10CFR55.43(b)(7) - Fuel Handling facilities and procedures.

Cognitive Level:
Memory 1-P: Knowledge of administrative requirements as they apply to Senior Reactor Operators during fuel movement.

K/A:
2.1.40 - Knowledge of refueling administrative requirements. SRO IMP 3.9

Objective:
RO2-01-LP053.005 - Explain the purpose of the following procedures used to govern normal, abnormal, and emergency operation during refueling:

Reference:
NF-KW-RRF-014, Fuel Movement During A Refueling Outage Rev 5, Section 4.7
GNP-02.07.01, Refueling Operations – Logkeeping, Watchstanding and Shift Turnover, Rev 3, Section 6.3.1
NCL-FH-014, Refueling Daily Checklist, Rev 3
OP-AP-300, Reactivity Management, Rev 10
OP-AA-106, Infrequently Conducted or Complex Evolutions, Rev 4

Source:
New

Justification:

A CORRECT — The refueling daily checklist 5.1.12 Verify Senior Reactor Operator in refueling area to observe fuel movements.

B INCORRECT — OP-AA-106 section 3.2.3 Assigns a Senior operations Manager to oversee the test or evolution. RRF-014 Section 3.13 Requirements for a category 1 ICCE have been established IAW OP-AA-106

C INCORRECT — RRF-014 section 4.6 A Refueling Engineer representative shall be stationed in the control room during all fuel loading evolutions to maintain and evaluate sub criticality. Not a responsibility of the dedicated reactivity SRO as defined in OP-AP-300 5.2.8

D INCORRECT — Per OP-AP-300 Changes to the refueling plan are required to be reviewed by operations within 3 weeks of execution. The review does not have to be performed by a Senior Reactor Operator

20. Which of the following is NOT one of the criteria which must be met in order to permit a deviation from license conditions or Technical Specification as allowed by 10 CFR 50.54(x) , "Conditions of Licenses"?

A. Immediate action is required.

B. Departure is necessary to protect public health and safety.

C. Performing an equivalent action would result in severe equipment damage.

D. No action consistent with license condition or Technical Specification which provides equivalent protection is apparent.

Answer: C

SRO:

10CFR55.43(b)(1) - Condition and limitation in the facility license.

Cognitive Level:

Comprehension 2-RW: The operator must hold the knowledge of the requirements of 10 CFR 50.54(x) and reword it to chose the correct choice.

K/A:

2.1.20 - Conduct of Operations: Ability to interpret and execute procedure steps. RO/SRO IMP 4.6/4.6

Objective:

RO4-01-LPA09.004 – Given a major procedure step, explain the process/purpose for, and the requirements associated with the flowing:

4. AD-AA-102, Procedure use and Adherence

Reference:

10 CFR 50.54(x), Conditions of Licenses

AD-AA-102, Procedure use and Adherence, Rev 2

Source:

Bank Master LXR Bank

Justification:

A INCORRECT 10 CFR 50.54(x) states “that when this action is immediately needed“.

B INCORRECT 10 CFR 50.54(x) states “needed to protect the public health and safety“.

C CORRECT 10 CFR 50.54(x) does not state that if performing an equivalent action would result in severe equipment damage. It does refer to equivalent action is not immediately apparent, but not that an equivalent action that would stop equipment damage.

D INCORRECT 10 CFR 50.54(x) states “and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent“.

21. Given the following:

- The unit is at 100% Rated Thermal Power.
- Containment Fan Coil Unit (CFCU) 'A' is INOPERABLE for maintenance.
- Internal Containment Spray Pump 'A' is INOPERABLE for maintenance.
- Plant Electricians request Bus 1-61 be removed from service for maintenance.
- Upon SRO review, the Electricians' request is denied

Using the attached references, DETERMINE the reason for the denial?

A. De-energizing Bus 1-61 will result in a Loss of Safety Function for Containment Cooling.

B. Both Containment Spray Trains may only be out of service provided that all CFCU's are OPERABLE.

C. Tech Specs do not provide a required action for de-energizing Bus 1-61 and would require a LCO 3.0.3 entry.

D. Per PRA configuration control guidelines, only one SSC affecting PRA risk may be removed for maintenance at a time.

Answer: A

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray and Cooling Systems

LCO 3.6.6 Two containment spray trains and two containment cooling trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 84 hours
C. One containment cooling train inoperable.	C.1 Restore containment cooling train to OPERABLE status.	7 days
D. One fan coil unit in both containment cooling trains inoperable.	D.1 Restore one containment cooling train to OPERABLE status.	72 hours
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours

For Information Only

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two containment spray trains inoperable. <u>OR</u> Two containment cooling trains inoperable for reasons other than Condition D.	F.1 Enter LCO 3.0.3.	Immediately

Only

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, DC, and AC instrument bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

--NOTE--

When one or more electrical power distribution subsystems are inoperable solely due to the room cooler being non-functional, entry into associated ACTIONS may be delayed for up to 24 hours provided the associated room temperature is monitored and maintained within the design environmental requirements and the electrical power distribution subsystems in the other train are OPERABLE.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystems inoperable.	--------------------NOTE------------------- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," for DC sources made inoperable by inoperable power distribution subsystems. --- A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status.	 8 hours
B. One or more AC instrument buses inoperable.	B.1 Restore AC instrument bus(es) to OPERABLE status.	2 hours
C. One DC electrical power distribution subsystem inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours

For Information Only

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours
E. Two or more electrical power distribution subsystems inoperable that result in a loss of safety function.	E.1 Enter LCO 3.0.3.	Immediately

...ion Only

Provided Reference:
TS 3.8.9 & TS 3.6.6

SRO:
10CFR55.43 (b)(1) - Conditions and limitation in the facility license.
10CFR55.43 (b)(2) - Facility operating limitations in the technical specification and their bases

Cognitive Level:
Comprehension 2-RI: Recognizing the impact to plant operability based on system interaction between ICS and electrical distribution.

K/A:
2.2.36 - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting condition of limiting conditions for operations. SRO IMP 4.2

Objective:
RO2-01-LP023.007: Explain the LCO Operation, applicability and action requirements for the Technical Specifications associated with the ICS System.

References:
E-240, Circuit Diagram – Circuit Diagram 4160V and 480V Power Sources Sh1, Rev AX
Tech. Spec. 3.6.6, 3.8.9

Source:
2009 ILT EXAM - SRO EXAM

Justification:

A CORRECT Per Technical Specification 3.6.6 condition A, one containment spray train may be out of service for 72 hours provided the opposite containment spray train is OPERABLE. Bus 1-61 is the power supply for ICS Pump B and CFCU C and D , thus removing Bus 1-61 from service would result in both ICS Pumps and 3 of 4 CFCU's inoperable. This would result in a loss of Safety Function for Containment Cooling.

B INCORRECT Tech Spec 3.6.6 Containment Spray and Cooling Systems, allows for one Containment Spray Train to be inoperable in combination with one CFCU in both trains. This is a plausible distracter because of the allowance to remove from service various combinations of ICS Pumps and CFCU's.

C INCORRECT Tech Spec 3.8.9 allows the removal from service of 480V bus 1-61 for 8 hours in MODES 1-4. This is a plausible distracter because the inoperabilities identified in the stem with the addition of Bus 1-61 would require entry into LCO 3.0.3. However LCO 3.0.3 entry is required by TS 3.6.6 condition F.

D INCORRECT The total number of SSC's removed for maintenance is based on overall CDF and LERF risk color for the combination of total equipment assumed to be unavailable, not a predefined number of pieces of equipment. PRA risk is evaluated prior to removing equipment from service.

22. During the use of NOP-SER-001, “Control Room Sequential Event Recorder” to disable an SER point, when MUST a 10CFR50.59 Review required to be performed?

When . . .

A. the disabled SER point is described in the KPS USAR.

B. directed to disable the SER point during the performance of a maintenance procedure.

C. disabling the SER point because the affected annunciator/sensor circuit is malfunctioning.

D. disabling the SER point is a reasonable step in repairing or troubleshooting the affected circuit.

Answer: A

SRO:

10CFR55.43(b)(3) – Facility licensee procedures required to obtain authority for design and operating changes in the facility.

Cognitive Level:

Knowledge 1-P: Procedure steps and cautions

K/A:

2.2.43 – Equipment Control. Knowledge of the process used track inoperable alarms. RO/SRO IMP 3.0/3.3

Objective:

RO4-04-LPD02.001 – Outline the procedure flow path from 100% to 68% power in accordance with OP-KW-GOP-206, Shutdown from Full Power to 35% Power, to include the following:

5. Calculating Reactivity Adjustments
6. Controlling Reactivity with Boron and or Rods
7. Reducing Turbine Load
8. Balancing HD Pump Speed

Reference:

OP-KW-NOP-SER-001, Control Room Sequential Event Recorder, Rev 0

Source:

New

Justification:

A CORRECT Precaution 4.1.3, At a minimum, a 10CFR50.59 Applicability Review and Pre-Screening must be completed for all disabled **SER point described or credited in the KPS USAR** which are not maintenance activities.

B INCORRECT Precaution 4.1.3, At a minimum, a 10CFR50.59 Applicability Review and Pre-Screening must be completed for all disabled SER point described or credited in the KPS USAR ***which are not maintenance activities*****.**

C INCORRECT Precaution 4.1.2, SER points dispositioned as Maintenance Activities shall meet the following criteria: **The affected Annunciator/senor circuit is malfunctioning.** Disabling the annunciator is a reasonable step in repairing or troubleshooting the affected circuit.

D INCORRECT Precaution 4.1.2, SER points dispositioned as Maintenance Activities shall meet the following criteria: The affected Annunciator/senor circuit is malfunctioning. **Disabling the annunciator is a reasonable step in repairing or troubleshooting the affected circuit.**

23. Given the following:

- The unit is in MODE 4 with a startup in progress following a refueling outage.
- Steam Generator Blowdown is in Mode I, and was initiated 18 hours ago.
- Chemistry Reports that confirmed and validated samples for 'A' & 'B' Steam Generator Total Gamma Activities are $8x10^{-6}$ µci/ml and $2.8x10^{-5}$ µci/ml respectively.
- Previous Steam Generator samples for both were < $1x10^{-6}$ µci/ml Total Gamma Activity.
- R-19, Steam Generator Blowdown Monitor, has been constant at 7.02E1 cpm for the past 4 days.

What actions should the Unit Supervisor direct in response to the rise in activity of the Steam Generators?

A. Secure Blowdown to stop the release to Auxiliary Building standpipe

AND

Enter AOP-RC-004, "Steam Generator Tube Leak", when Chemistry reports Primary to Secondary leak rate is > 5 gpd

B. Switch Blowdown to Startup Mode II to align blowdown liquid to the Steam Generator Blowdown Tanks

AND

Enter AOP-RHR-002, "Shutdown Loss of Coolant Accident"

C. Maintain Blowdown Mode I and direct Steam Generator Sampling for R-19 out of service per the requirements of the Offsite Dose Calculation Manual

AND

Enter AOP-RC-004B, "POST SG Tube Leak Cooldown Using Blowdown", when Chemistry reports Primary to Secondary leak rate is > 1 gpd

D. Switch Blowdown to Mode III to remove the activity from the blowdown liquid prior to discharging it to the Auxiliary Building standpipe

AND

Enter E-1, "Loss of Reactor or Secondary Coolant"

Answer: A

SRO:

10CFR55.43(b)(4) - Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

Cognitive Level:

Analysis 3-SPK: From the given plant conditions determine correct actions

K/A:

2.3.11 – Radiological Controls: Ability to control radiation releases. SRO IMP 4.3

Objective:

RO2-01-LP045.001 – Describe the function/purpose, design and operating characteristic of the radiation monitoring system.

RO2-02-LP07A.005 – Explain the purpose of the following procedures used to govern normal, abnormal and emergency operation of the SGBT system: NOP-BT-001, NOP-BT-004.

Reference:

OP-KW-AOP-RM-001, Abnormal Radiation Monitoring, Rev 5
N-RM-45, Normal Radiation Monitoring System, Rev 59
OP-KW-NOP-BT-001, Steam Generator Blowdown Treatment System, Rev 6
OP-KW-NOP-BT-004, Steam Generator Blowdown Mode III Operation, Rev 0
OP-KW-AOP-RC-004, Steam Generator Tube Leak Procedure, Rev 5
KW-MANUAL-ODCM, Offsite Dose Calculation Manual, Rev 12
OP-KW-AOP-RC-001, Reactor Coolant Leak, Rev 4
OP-KW-AOP-RC-004B, POST SG Tube Leak Cooldown Using Blowdown, Rev 6
OP-KW-AOP-RHR-002, Shutdown Loss of Coolant Accident, Rev 5
OP-KW-AOP-RHR-001, Abnormal Residual Heat Removal System Operation, Rev 4
E-1, Loss of Reactor or Secondary Coolant, Rev 27

Source:

New

Justification:

A CORRECT R-19 not reading normally. AOP-RM-001 direct securing R-19 per N-RM-45. N-RM-45 directs to either secure blowdown or initiate sampling requirements per the ODCM. Do not meet the requirements to enter AOP-RC-004 until chemistry reports that tube leakage exceed 5 gpd. For this to be calculated requires comparison of tritium of RCS to SG and there has to be at least one day in-between the RCS sample and the SG sample to ensure equilibrium conditions.

B INCORRECT Entry conditions into AOP-RHR-002 are not met at this time. The crew could chose to goto AOP-RHR-001, which could transition them to AOP-RHR-002.

C INCORRECT Maintaining Mode I blowdown is acceptable if sampling is performed in accordance with ODCM. Procedure is incorrect. AOP-RC-004B is entered from AOP-RC-004

D INCORRECT MODE III blowdown is used when there is activity in SG but the discharge is directed to the monitor tanks. Maintaining Mode I blowdown is acceptable if sampling is performed in accordance with ODCM. Procedure is incorrect. E-1 is only entered from EOP network

24. Given the following:

- The unit is in MODE 6
- Fuel movement suspended for shift turnover
- Refueling cavity level is 23 ft above the reactor vessel flange
- Decay heat removal is provided by RHR
- RCS Pressure is at atmospheric
- RHR suction temperature is 110ºF
- ‘A’ RHR Pump is running
- RHR/CVC spectacle flange is OPEN
- RHR-210, RHR/CVC Inlet Isolation, is OPEN
- RHR-211, RHR/CVC Outlet Isolation, is OPEN

3 minutes later the following is noted:

- 47031-Q, Containment Sump A Level Hi alarms followed by 47031-P, Containment Sump A Level Hi-Hi alarms
- The Refueling SRO reports to the Control Room, the refueling cavity level is visibly lowering

Which procedure will the Unit Supervisor enter to perform actions which to MITIGATE this condition?

A. AOP-RC-002, "Abnormal Refueling Water Level".

B. AOP-RHR-002, "Shutdown Loss of Coolant Accident".

C. AOP-FH-001, “Loss of Reactor Cavity Inventory During Fuel Movement”.

D. AOP-MDS-001, "Abnormal Operation of Miscellaneous Drains and Sumps".

Answer: C

SRO:

10CFR55.43(b)(5) – Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

Cognitive Level:

Comprehension 3-SPK: The operator assesses the plant condition, and solves the problem of which procedure will provide the action to mitigate the current situation.

K/A:

2.4.11 – Emergency Procedures/Plan. Knowledge of abnormal condition procedures. SRO IMP 4.2

Objective:

RO2-05-LP034.005 – Explain the purpose of the following procedures used to govern the normal, abnormal, and emergency operation of the Residual Heat Removal System:

9. AOP-RHR-002, Shutdown Loss of Coolant Accident

Reference:

OP-KW-AOP-RC-002, Abnormal Refueling Water Level, Rev 1
OP-KW-AOP-RHR-002, Shutdown Loss of Coolant Accident, Rev 5
OP-KW-AOP-FH-001, Loss of Reactor Cavity Inventory During Fuel Movement, Rev 2
OP-KW-AOP-MDS-001, Abnormal Operation of Miscellaneous Drains and Sumps, Rev 4
NCL-FH-004, Daily Refueling Checklist, Rev 3

Source:

Modified, ROI-04-EX004

Justification:

A INCORRECT — The entry condition is “unexpected level DEVIATION between Refueling water level and other indication of RCS level” no information that conforms this is given in the question stem. Cannot be entered directly from plant conditions.

B INCORRECT — The entry condition is "MODE 5 or 6 with the reactor vessel head on and a LOCA as indication by either uncontrolled decrease in PZR level or uncontrolled decrease in RCS subcooling while on RHR. Cannot be entered directly from plant conditions.

C CORRECT — The entry conditions are "decreasing water level in reactor cavity, and annunciators 47031-P/Q. Can be entered from these plant conditions

D INCORRECT — This procedure is used deal with flooding, high sump levels, or RHR pump seal leakage, not for dealing with high containment sump levels.

25. Given the following:

- The unit is in MODE 3.
- 1053 Fire Works Smoke Detector alarm is received for Safeguards Alley area.
- 1054 The Shift Manager receives a report from the Nuclear Security Shift Supervisor that at 1052 there was a security condition that does not involve a HOSTILE ACTION occurred when an unauthorized person was apprehended exiting Safeguard Alley.
- 1056 AFW Pump 'A' trips.
- 1057 The NAO reports a fire in the AFW Pump 'A' area and visible damage to the AFW Pump 'A'.
- 1107 Report from the Fire Brigade Leader of "The fire is out" is communicated to the Control Room.

Using the provided reference, DETERMINE which of the following classification and maximum time meets the requirements of the Emergency Plan.

Classification of _(1)_ at time _(2)_ .

A. (1) Site Area Emergency per HS4.1
(2) 1107

B. (1) Unusual Event per HU2.1
(2) 1108

C. (1) Alert per HA4.1
(2) 1111

D. (1) Alert per HA2.1
(2) 1112

Answer: D

		GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Hazards	Fire or Explosion	None	None	FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown ☐ HA2.1 OP HSB HSD ISD CSD REF DEF FIRE or EXPLOSION in any of the following areas (Table H-1) **AND** Affected safety system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment needed for safe shutdown	FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection ☐ HU2.1 OP HSB HSD ISD CSD REF DEF FIRE in buildings or areas contiguous to any Table H-1 Safe Shutdown/VITAL Area not extinguished within 15 minutes of control room notification or verification of a control room alarm
	Toxic and Flammable Gas	None	None	Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown ☐ HA3.1 OP HSB HSD ISD CSD REF DEF Report or detection of toxic gases within or contiguous to a Safe Shutdown/VITAL AREA (Table H-1) in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH) ☐ HA3.2 OP HSB HSD ISD CSD REF DEF Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or contiguous to a Safe Shutdown/VITAL AREA (Table H-1)	Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant ☐ HU3.1 OP HSB HSD ISD CSD REF DEF Report or detection of toxic or flammable gases that has or could enter the site area boundary in amounts that can affect NORMAL PLANT OPERATIONS ☐ HU3.2 OP HSB HSD ISD CSD REF DEF Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event
	Security	HOSTILE ACTION resulting in loss of physical control of the facility ☐ HG1.1 OP HSB HSD ISD CSD REF DEF A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions ☐ HG1.2 OP HSB HSD ISD CSD REF DEF A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in the Spent Fuel Pool	HOSTILE ACTION within the PROTECED AREA ☐ HS4.1 OP HSB HSD ISD CSD REF DEF A HOSTILE ACTION is occurring or has occured within the PROTECTED AREA as reported by Security Supervision	HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat ☐ HA4.1 OP HSB HSD ISD CSD REF DEF A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLED AREA as reported by Security Supervision ☐ HA4.2 OP HSB HSD ISD CSD REF DEF A validated notification from NRC of an airliner attack threat within 30 minutes of the site	Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant ☐ HU4.1 OP HSB HSD ISD CSD REF DEF A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the Security Supervision ☐ HU4.2 OP HSB HSD ISD CSD REF DEF A credible site specific security threat notification ☐ HU4.3 OP HSB HSD ISD CSD REF DEF A validated notification from NRC providing information of an aircraft threat

Table H-1 Safe Shutdown/VITAL Areas

- Shield Building (Reactor Building)
- Auxiliary Building
- Safeguards Alley
- Diesel Generator Rooms (includes "A" Diesel Room to Screen House Tunnel)
- Screenhouse/Forebay
- Technical Support Center Basement
- Control Room
- Control Room AC Equipment Room
- Relay Room
- Safeguards Battery Rooms

Provided Reference:
EAL Chart portion for Hazards “Fire/Explosion, Security and Table H-1

SRO:
10CRF55.43(b)(5) – Assessment of facility condition and selection of appropriate procedures during normal, abnormal, and emergency situations.

Cognitive Level:
Analysis 3-SPR: Plant conditions must be assessed and an outcome must be predicted using a reference

K/A:
2.4.27 – Emergency Procedures/Plan. Knowledge of "fire in the plant" procedures. SRO IMP 3.9

Objective:
EPI-01-LP011.001 – Identify the responsibilities of the Shift Crew in the Control Room under the Emergency Plan

Reference:
EPIP-AD-02, Emergency Class Determination
Emergency Action Level Matrix
Emergency Action Level Technical Bases Document

Source:
New

Justification:

A INCORRECT — The classification of HS4.1 incorrect due to the following: No Report of a Hostile Action.

B INCORRECT — 1108-15=1053, at that time the smoke detector activated, this is a possible event for classification for a fire.
The classification of HU2.1, confirms the clock starts with a VALID fire detection system alarm, and the fire lasts 15 minutes, which it does not, so this is incorrect.

C INCORRECT — 1107-15=1052, this is the time the unauthorized person was apprehended by security. The classification is based on reports from security times, not the event times.
The classification of HA4.1, is also incorrect due to the following: no sabotage device, no standoff attack, and no security event that persists greater than 30 minutes and increases in severity.

D CORRECT — 1112-15=1057, at that time the report of fire and damage to a safety system came in this is a valid start time.
The classification of HA2.1, requires two things a fire in the Safe Shutdown Vital area, time the fire lasts is NOT a requirement AND show degraded performance or a personnel report of Visible Damage to equipment needed for safe shutdown. There is a caveat for safety system parameter indication showing degraded performance; a trip with no other conditions does not support degraded performance.