

Draft Submittal

**WATTS BAR JULY 2004 EXAM  
50-390/2004-301  
JULY 23, & JULY 26-30, 2004**

Draft SRO Written Exam

WATTS BAR NUCLEAR PLANT

**SENIOR REACTOR  
OPERATOR**

**NRC  
WRITTEN EXAM**

JULY 23, 2004

**REFERENCE COPY  
TVA**

Given the following plant conditions:

- Plant trip occurred from 100% power.
- The plant is stable at no-load temperatures and pressures.
- Chemistry has sampled the primary and secondary plants.

Which ONE of the following sets of chemistry parameters lists the minimum values that could result in exceeding offsite dose limits in the event a design basis accident occurred following the plant trip?

	Secondary Specific Activity	RCS Dose Equivalent I-131
A.	.265 $\mu$ ci/gm	.10 $\mu$ ci/gm
B.	2.65 $\mu$ ci/gm	1.0 $\mu$ ci/gm
C.	1.0 $\mu$ ci/gm	2.65 $\mu$ ci/gm
<b>D.</b>	.10 $\mu$ ci/gm	.265 $\mu$ ci/gm

The correct answer is D.

- A. Incorrect - All parameters are off **by** one decimal place. the examinee may have a misconception or confuse values with transient values used in the Technical Requirement for RCS chemistry parameters.

**B.** Correct - These are the correct values listed in Tech Specs for the given parameters.

C. Incorrect - All parameters are off by one decimal place and reversed.

D. Incorrect - parameters are reversed

#### REFERENCES:

Technical Specifications 3.4.16 and 3.7.14

10CFR55 41.7

Reactor Trip: Ability to maintain primary and secondary plant chemistry within allowable limits

RO - N/A SRO - 76

Reference: TIS 3.04

KIA value: 2.9

Level: 1

Tier/Grp: 3/3

K/A Number: ti 2.1.34

Last Used:

Source: NEW

SRO Only: YES

'Given the following plant conditions:

- A large LOCA has occurred.
- The operating crew has implemented FR-C.1, "Response to Inadequate Core Cooling".
- Core exit thermocouples are ~1225°F.
- RCP #1 and #3 are started.
- Annunciator 96-F, RCP VIBRATION MON DETECTED, goes into alarm and local verification indicates #1 RCP vibration is at 21 mils.
- Annunciator 99-C, RCP LWR BEARING TEMP HI, goes into alarm and the operator verifies that #3 RCP lower bearing temperature is 238°F.

Which ONE of the following would be the correct response to this condition?

- A. Stop both running RCPs
- B. Leave both RCPs running.
- C. Start any available RCP, then stop #1 RCP.
- D. Start any available RCP, then stop both running RCPs.

The correct answer is B.

- A. Incorrect- no pumps should be stopped after being started in FR-C.1 in response in rising incore temperatures > 1200°F. Examinee may think normal RCP trips should be considered.
- B. Correct- no pumps should be stopped after being started in FR-C.1 in response in rising incore temperatures > 1200°F.
- C. Incorrect - no pumps should be stopped after being started in FR-C.1 in response in rising incore temperatures > 1200°F. Normal operating conditions are not required to run RCPs under these conditions.
- D. Incorrect - no pumps should be stopped after being started in FR-C.1 in response in rising incore temperatures > 1200°F. Normal operating conditions are not required to run RCPs under these conditions.

REFERENCES:

FR-C.1; 3-OT-FRC000

10CFR55.41.7 / 45.5 to 45.8

015 RCP Malfunctions: G 2.4.45, ability to prioritize and interpret the significance of each annunciator or alarm.

RO-N/A SRO-77

Reference: AOI-24  
K/A value: 3.6  
Level: 2  
Tier/Grp: 1/1

K/A Number: 015 G 2.4.45  
Last Used:  
Source: NEW  
SRO Only: YES

Unit 1 has experienced a Reactor Trip and Safety Injection due to a steam generator tube rupture (SGTR) on S/G #1. E-3, "Steam Generator Tube Rupture", is in effect and the crew is about to commence a cooldown at maximum rate.

The following conditions exist:

- S/G #1 Level is 65% Narrow Range and RISING.
- RCS Tave is 557 degrees F and STABLE.
- PZR Pressure is 1950 psig.
- CONDENSER VACUUM LOW annunciator is LIT.
- Main Condenser Vacuum is 15 in. Hg and STABLE.
- #1 and #2 Condenser Circulating Water pumps have tripped.
- #3 and #4 Condenser Circulating Water pumps are running.

*Which one of these is correct?*

The following action is necessary to commence cooldown per E-3, "Steam Generator Tube Rupture":

*not correct*

- A. Take Steam Dumps to the Steam Pressure Mode and manually open Steam Dumps to commence cooldown.
- B. Take Steam Dumps to the Steam Pressure Mode, take both Steam Dump Control Selector Switches momentarily to Bypass Interlock, and then manually open Steam Dumps to commence cooldown.
- C. Commence cooldown by manually opening the intact S/Gs Atmospheric Reliefs to 100% demand.
- D. Take both Steam Dump Control Selector Switches momentarily to Bypass Interlock, and then manually open Steam Dumps to commence cooldown.

The correct answer is C

- A. Incorrect - Since Tave is 557°F student may believe that taking SDs to steam pressure mode will allow use. This would normally be the method of choice. Condenser vacuum will not permit SD use.
- B. Incorrect - Since Tave is 557°F student may believe that taking SDs to steam pressure mode will allow use. This would be the method of choice.
- C. Correct - The RNO in E-3 step 28 directs the use of PORV since the condenser is not available to accept SDs.
- D. Incorrect - Student may believe that the interlock for condenser vacuum may be bypassed and select this option.

REFERENCES:

Lesson plan 3-OT-EOP0300  
E-3 'S/G Tube Rupture'

10CFR.55.43.5/45.13

Ability to determine or interpret the following **as** they apply to a SGTR: Viable alternatives for placing plant in a safe condition when condenser **is** not available.

SRQ-78

Reference: 3-OT-EOP0300  
KIA value: 4.4  
Level: 2  
Tier/Grp: 1/1

K/A Number: 038 EA2.08  
Last Used:  
Source: RANK  
SRO Only: YES

Given the following plant conditions:

- Plant is operating at 100%.
- Annunciator 18-A, 125 DC VITAL CHGR/BATT II ABNORMAL goes into alarm.
- 1-EI-57-92, VIT BATT BD II AMPS, reading -75 amps above zero.
- Operating crew ensures the plant is stable and maintaining 100% power.

Which ONE of the following indicates the current status of the power supplies to 125V Vital Battery Board II?

- A. 125V Vital Battery Charger II is operating NORMALLY; 125V vital Battery II operating NORMALLY.
- B. 125V Vital Battery Charger II is FAILED; 125V vital Battery II operating NORMALLY.
- C. 125V Vital Battery Charger II is operating NORMALLY; 125V vital Battery II FAILED.
- D. 125V Vital Battery Charger II is FAILED; 125V vital Battery II FAILED.

The correct answer is B.

- A. *Correct*- amps on this indicator normally indicate slightly **less** than zero as the charger is inservice providing power to the battery board while charging the battery. **With** the alarm in and indicator indicating above zero the examinee should conclude that the charger is failed and the battery is supplying power **to** the battery board.
- B. *Incorrect* - amps on this indicator normally indicate slightly less than zero as the charger is inservice providing power to the battery board while charging the battery. **With** the alarm in and indicator indicating above zero the examinee should conclude that the charger is failed and the battery is supplying power to the battery board.
- C. *Incorrect* - amps on this indicator normally indicate slightly less than zero as the charger is inservice providing power to the battery board while charging the battery. **With** the alarm in and indicator indicating above zero the examinee should conclude that the charger is failed and the battery is supplying power to the battery board. If the fuse had blown the amps would be reading -zero.
- D. *Incorrect* - amps on this indicator normally indicate slightly less than zero as the charger is inservice providing power to the battery board **while** charging the battery. **With** the alarm in and indicator indicating above zero the examinee should conclude that the charger is failed and the battery is supplying power to the battery board. **With** both components failed amps indicator would read zero and the unit would trip due to secondary transients.

REFERENCES:

AOI-21.01; 3-OT-SYS057P

10CFR55 43.5 / 45.13

Ability to determine and interpret the following as they apply to the **Loss** of DC power: that a loss of dc power has occurred; verification that substitute power **sources** have come online.

RO - N/A SRO - 79

Reference: 3-OT-SYS057P

K/A value: 4.1

Level: 2

Tier/Grp: 3/3

K/A Number: 058 AA2.01

Last Used:

Source: NEW

SRO Only: YES

Given the following plant conditions:

- Unit operating at 100% power.
- ERCW system in normal alignment.
- ERCW headers 1A and 2A indicating LOW flow.
- The following annunciators are LIT:
  - "ERCW Header A Supply Pressure Low".
  - "IPS Valve and Strainer Room A Sump Level Hi".
  - "ERCW PMP A-A Discharge Pressure Low".
  - "ERCW PMP D-A Discharge Pressure Low".

Which ONE of the following describes what has occurred in the ERCW system?

- A. 'A' header pumps have tripped.
- B. Both 'A' header strainers need to be backwashed.
- C. '1A' header has ruptured upstream of the '1A' strainer**
- D. '1A' header has ruptured between the IPS and Auxiliary Bldg

The correct answer is C.

- A. Incorrect - All alarms except the sump high level would lead to this choice
- B. Incorrect - Strainer alarm would be lit for a clogged strainer. No sump alarm with high pressure.
- C. Correct - All alarms stated would be lit for this accident. Pressure indicator is located just upstream of the strainer.**
- D. Incorrect - Strainer Dp alarm would be lit all other conditions match except sump.

#### REFERENCES:

Lesson plan 3-OT-AOI1300  
AOI-13 Loss of ERCW

10CFR55.41.10/43.2/45.6

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

SRO-80

K/A changed to G 2.4.4 from AA2.01 based on feedback from Ron Aiello

Reference: 3-OT-AOI1300  
K/A value: 3.6  
Level: 2  
Tier/Grp: 1/1

K/A Number: 062 G 2.4.4  
Last Used:  
Source: BANK  
SRO Only: YES

Given the following plant conditions:

- Unit 1 has just entered Mode 5 with RHR Shutdown Cooling in Service
- RCS temperature is 195°F lowering slowly.
- 'D' C&SS air compressor is tagged out for maintenance.
- The following alarms are received simultaneously in the MCR:
  - 41-F, CONTROL AIR PRESS LO.
  - 42-E, C&SS AIR COMP SEQUENCER UNDERVOLTAGE

Which ONE of the following describes the effect of this malfunction, and the correct operator actions required.

- A. RHR Heat Exchanger Flow Control Valves FCV-74-16 & 28 will fail **OPEN** and cause RCS temperature to **DROP**. Manually load and unload running C&SS air compressor,
- B. RHR Heat Exchanger Flow Control Valves FCV-74-16 & 28 will fail **CLOSED** and cause RCS temperature to **RISE**. Manually load and unload running C&SS air compressor.
- C. RHR Heat Exchanger Flow Control Valves FCV-74-16 & 28 will fail **OPEN** and cause RCS temperature to **DROP**. Ensure all unloading solenoids manual valves **OPEN**.
- D. RHR Heat Exchanger Flow Control Valves FCV-74-16 & 28 will fail **CLOSED** and cause RCS temperature to **RISE**. Ensure all unloading solenoids manual valves **OPEN**.

The correct answer is A

- A. Correct - Flow control valves fail open on loss of non-essential air. AWI directs operators to manually load and unload compressors since loss of sequencer power has unloaded all remaining C&SS compressors.
- B. Incorrect - Student may be distracted by plant conditions, thinking that a mode change would occur if a slight heat-up was the result of valves failing closed.
- C. Incorrect - Solenoid valves in the open position would keep the compressors unloaded.
- D. Incorrect - Student may be distracted by plant conditions, thinking that a mode change would occur if a slight heat-up was the result of valves failing closed. Solenoid valves in the open position would keep the compressors unloaded.

REFERENCES:

Lesson Plan 3-OT-8011000  
AOI-10 'Loss of Control Air'  
ARI 41F/42E

10CFR55.43.5/45.13

Ability to determine and interpret the following as they apply to the **Loss** of Instrument Air: Cause and effect of low-pressure instrument air alarm.

**SRO-81**

Reference: 3-OT-AOI1000  
K/A value: 3.2  
Level: 2  
Tier/Grp: 1/1

K/A Number: 065 AA2.01  
Last Used:  
Source: NEW  
SRO Only: YES

Given the following plant conditions:

- The unit has sustained a main steam line break affecting all S/Gs.
- The operating crew is currently performing ECA-2.1, "**Uncontrolled Depressurization of All Steam Generators**".
- The operator has reduced AFW flow to minimum detectable flow to minimize the RCS cooldown.
- Local actions were successful in closing #3 S/G MSIV.
- Safety Injection termination criteria is NQT met.

The following conditions exist:

<u>S/G</u>	<u>Level</u>	<u>Pressure</u>
1	32% WR slowly DROPPING	320 psig and DROPPING
2	31% WR slowly DROPPING	370 psig and DROPPING
3	35% WR slowly RISING	380 psig and RISING
4	33% WR slowly DROPPING	320 psig and DROPPING

Which ONE of the following describes the required action and the reason for the action?

- A. Transition to E-2, "Faulted S/G Isolation", because there is an intact S/G available.
- 5. Transition to E-3, "Steam Generator Tube Rupture", because there is an unexplained RISE in S/G level.
- C. Transition to FR-H.1, "Loss of Secondary Heat Sink", because there is a RED condition on the Heat Sink Status Tree.
- D. Continue with ECA-2.1, "Uncontrolled Depressurization of All Steam Generators", because Safety Injection termination is NOT complete.

The correct answer is A.

- A. **Correct** - rising pressure in #3 S/G indicates it has been isolated and is intact and per the CAUTION at the beginning of ECA3.1, when any intact S/G is isolated recovery actions should continue with E-2.
- B. incorrect - one S/G level is rising however it is due to apparent isolation of the S/G allowing pressure and level to recover.
- C. incorrect - AFW was reduced by operator action. FR-H.1 should NOT be entered per CAUTION prior to step 3 in ECA-2.1.
- D. incorrect - SI termination had not yet began, transition to E-2 is still allowable per the CAUTION prior to step 1 of ECA-2.2.

REFERENCE:

INPO Bank - Beaver Valley 12/01/2002

Lesson Plan 3-OT-ECA0201; ECA-2.1, "Uncontrolled Depressurization of All Steam Generators"

10 CFR 55 43.5 / 45.13

**Ability** to determine and interpret the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

RO - N/A SRO - 82

Reference: ECA-2.1  
K/A value: 4.0  
Level: 2  
Tier/Grp: 3

K/A Number: E12 EA2.1  
Last Used: 12/01/2002  
Source: BANK  
SRO Only: YES

003 G2.1.14 001

Given the following plant conditions:

- Unit is operating at 100% power.
- Bank D control rod H-12 drops.
- Reactor power has been reduced to less than 75% in accordance with AOI-2, "Malfunction of the Reactor Control System".
- Repairs have been made to the dropped rod.

Which ONE of the following identifies individuals that must be notified of the dropped control rod AND agree on a retrieval rate?

- A? Reactor Engineering and STA
- B. Reactor Engineering and Operations Duty Manager.
- C. Plant Manager and STA
- D. Operations Duty Manager and Plant Manager.

The correct answer is A.

- A. Correct, Both the Reactor Engineer and STA are required to be notified and agree on a retrieval rate per AOI-2
- B. Incorrect, Operations Duty Manager is required to be notified per AOI-2 but does not have to agree on a retrieval rate.
- C. Incorrect, Plant Manager is required to be notified per AOI-2 but **does** not have to agree on a retrieval rate.
- D. Incorrect, Operations Duty Manager and Plant Manager are required to be notified per AOI-2 but do not have to agree on a retrieval rate.

REFERENCES:

Lesson Plan 3-OT-AOI0200  
AOI-2

KA 003G.2.1.14 - Knowledge of system status criteria which require the notification of plant personnel: Dropped Control Rod

KO - N/A SRO - 83

Reference: AOI-2  
K/A value: 3.3  
Level: 1  
Tier/Grp: 1/2

K/A Number: 003 G2.1.14  
Last Used:  
Source: NEW  
SRO Only: YES

033 2.1.22 001

Unit 1 is at 4% power with a startup in progress. All systems are operating normally and the rod control system is in MANUAL when the following indications are received:

- NIS Intermediate Range Channel I (1-611-135) indicating offscale LOW
- Trip Status Light XX-55-5, Window 3, IR > P6, goes out.

Based on these indications, which ONE of the following actions will satisfy Tech Spec requirements?

- A. Maintain reactor power level below 5% until the IRM is restored to OPERABLE status.
- B. Maintain reactor power level below 10% until the IRM is restored to OPERABLE status.
- C. Raise reactor power to greater than 5% THERMAL POWER within 2 hours.
- D. Raise reactor power to greater than 10% THERMAL POWER within 2 hours.

The correct answer is D.

- A. Incorrect - Student may believe that a Mode change is not permitted unless both IRM are in service.
- B. Incorrect - Student may not want to exceed P-10 as a specified condition of LCO 3.0.4.
- C. Incorrect - T/S allows continued operation if power is raised to > 10% within 2 hours. Student may confuse the limit as the power level of the mode change.
- D. *Correct* - TIS allows continued operation if power is raised to > 10% within 2 hours.

REFERENCES:

Lesson plan 3-OP-TIS0302  
TIS 3.3.1  
AOI-4

10CFR55.43.5/45.13

Ability to determine Mode of Operation.

**SRQ-84**

Reference: 3-OT-T/S0301  
K/A value: 3.3  
Level: 2  
Tier/Grp: 112

KIA Number: 033 2.1.22  
Last Used:  
Source: **RANK**  
SRO Only: **YES**

Given the following plant conditions:

- During a surveillance test, a fuel oil fire occurred on 1A-A Diesel Generator.
- The incident commander reported that Fire Operations extinguished the fire and some damage is visible to ventilation ductwork located in the room.
- During the event the Shift Manager declared an Alert classification per the Radiological Emergency Plan (REP).

Which ONE of the following lists the minimum time for making notification to the NRC regarding this incident?

- A. 5 Minutes.
- B. 15 Minutes
- C. 1 Hour,
- D. 4 Hours.

The correct answer is C

- A. Incorrect - SED is required to notify the ODS of a REP declaration within 5 minutes. NRC notification is required within 1 hour.
- B. Incorrect - Site Emergency Director is required to make the REP declaration within 15 minutes. MRC notification is required within 1 hour.
- C. *Correct*- declaration of any REP emergency class requires a 1-hour notification for the NRC Operations Center.
- D. Incorrect - declaration of any REP emergency class requires a 1-hour notification for the NRC Operations Center. 4 hour reports are also immediate reports to the NRC.

REFERENCES:

SPP-3.5, "Regulatory Reporting Requirements"; Radiological Emergency Plan

10CFR55 43.5 145.1 ■

Plant fire on site: Knowledge of which events related to system operations/status should be reported to outside agencies.

RO - N/A SRO - 85

Reference: SPP-3.5  
K/A value: 3.6  
Level: 1  
Tier/Grp: 1/2

K/A Number: 067 G2.4.30  
Last Used:  
Source: NEW  
SROOnly: YES

Given the following plant conditions:

- Unit 1 is in mode 1.
- 1-SI-30-701, "Containment ~~isolation~~ Valve Local Leak Rate Test Purge Air" is in progress.
- The report to the Unit ~~SRO~~ shows that penetration X-6, 1-FCV-30-50 Inboard Purge CIV has failed the local leak rate test. Leakage is in excess of the administrative limit.
- The failure of the Purge CIV has elevated overall containment leakage to >.25% as verified by 1-SI-0-700, "Primary Containment Total Leak Rate".

Which ONE of the following is the <sup>contain</sup> most limiting action required for this condition? (use references provided)

- A. Within 1 hour, return the containment to an operable status
- B. Within 4 hours, return the valve to an operable status or isolate the penetration.
- C. Within 6 hours, be in mode 3 and mode 5 within the next 36 hours.
- D. Within 24 hours, return the valve to an operable status or isolate the penetration.

The correct answer is A.

- A. Correct - T/S action 3.6.1 requires total containment leakage to be **less** than .25% or the containment is considered inoperable.
- B. Incorrect - LCO 3.6.3.B requires isolation within 4 hours for a penetration with two isolation valves. This does not pertain to purge valves.
- C. Incorrect - LCQ 3.6.3.F and 3.6.1B both require this shutdown if the penetration can not be isolated.
- D. Incorrect - LC03.6.3.E allows 24 hours to isolate a purge path if leakage is in excess of limits.

REFERENCES:

Lesson plan 3-OT-T/S0306  
T/S 3.6.3

10CFR55.43.5/45.13

Ability to determine **and** interpret the following as they **apply** to the boss of containment  
Integrity: Loss of Containment Integrity.

SRO-86

**Reference:** 3-OT-T/S0306  
**KIA value:** 1.3  
**Level:** 1  
**Tier/Grp:** 1/2

**K/A Number:** 069 AA2.01  
**Last Used:**  
**Source:** NEW  
**SRO Only:** YES

Given the following plant conditions:

- A major plant transient has occurred.
- Si and Phase 'B' have actuated.
- The operating crew is monitoring inadequate core cooling entry requirements,
- RCS pressure on the RVLIS - ICCM display is reading 2400 psig.
- Both Pressurizer PORVs are closed.
- The controlling PZR pressure instruments are reading 150 psig lower than the RVLIS - ICCM display.

As Core Exit Thermocouple temperatures RISE, which ONE of the following describes the impact on the Subcooling Margin Monitor (ICCM)?

Train 'A' subcooling indication will be \_\_\_\_\_

- A. Accurate and slowly RISING.
- B. Inaccurate and slowly RISING.
- C. Accurate and slowly LOWERING
- D. Inaccurate and slowly LOWERING

The correct answer is C.

- A. Incorrect - WR RCS pressure instrument is part of the Post Accident monitoring system and should be accurate. ~~As~~ temperature rises, subcooling with lower.
- 5. *Correct* - WR RCS pressure instrument is part of the Post Accident monitoring system and should be accurate. As temperature rises, subcooling with lower.
- C. Incorrect - WR RCS pressure instrument is part of the Post Accident monitoring system and should be accurate. ~~As~~ temperature rises, subcooling with lower.
- D. Incorrect - WR RCS pressure instrument is part of the Post Accident monitoring ~~system~~ and ~~should~~ be accurate. As temperature rises, subcooling with lower.

REFERENCES:  
Lesson plan 3-OT-SYS068F

10CFR55 43 5145.13

Ability to determine and interpret the following as they apply to an Inadequate Core Cooling: Subcooling Margin.

SRO-87

Reference: 3-OT-SYS068F  
K/A value: 4.9  
Level: 2  
Tier/Grp: T1/G2

K/A Number: 074EA2.01  
Last Used:  
Source: NEW  
SRO Only: YES

Given the following plant conditions:

- The plant is at 100% power.
- All Control Systems are in AUTOMATIC.
- PZR level control is selected to LT-68-339 and 335
- 1-LT-68-335 failed LOW.

Which ONE of the following describes the corrective actions required by procedure to mitigate this failure and why?

- A✓ Isolate charging in accordance with AOI-20, "Malfunction of Pressurizer Level Control System", because the instrument failure caused letdown to isolate.
- B. Place charging valve controller, 1-HIC-62-93 in MANUAL and restore level to program in accordance with AOI-20, "Malfunction of Pressurizer Level Control System", because the instrument failure caused 1-FCV-62-93, Charging Flow Control, to go OPEN.
- C. Isolate charging in accordance with AOI-3, "Malfunction of Reactor Makeup Control" because the instrument failure caused letdown to isolate.
- D. Place charging valve controller, 1-HIC-62-93 in MANUAL and restore level to program in accordance with AOI-3, "Malfunction of Reactor Makeup Control", because the instrument failure caused 1-FCV-62-93, Charging Flow PZR Level Control, to go OPEN.

The correct answer is A

- A. Correct - letdown will isolate due to the instrument channel failing low, therefore charging will be isolated in order to minimize thermal transients on the regenerative heat exchanger. AOI-20, "Malfunction of Pressurizer Level Control System" provides response to this failure.
- B. incorrect - charging flow controller would not cause the charging flow control valve to open since another channel provides it's control. Charging must be isolated in any case since letdown isolated due to the instrument failure. AOI-20, "Malfunction of Pressurizer Level Control System" provides response to this failure.
- C. Incorrect - letdown will isolate due to the instrument channel failing low, therefore charging will be isolated in order to minimize thermal transients on the regenerative heat exchanger. However, AOI-3 is not the correct procedure and the examinee may confuse the two AOIs.
- D. Incorrect - charging flow controller would not cause the charging flow control valve to open since another channel provides it's control. Charging must be isolated in any case since letdown isolated due to the instrument failure. However, AOI-3 is not the correct procedure and the examinee may confuse the two AOIs.

REFERENCES:

Lesson Plan 3-OT-AOI02000  
AOI-20

10CFR55 41.5 145.5 145.3 145.5

Ability to (a) predict the impacts of the following malfunction or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Isolation of letdown/makeup.

KO - N/A SRO - 88

Reference: SYS068C  
K/A value: 3.7  
Level: 2  
Tier/Grp: 3

K/A Number: 004 A2.07  
Last Used:  
Source: NEW  
SRO Only: YES

Given the following plant conditions:

- An 'Appendix R' fire has been declared in zones 142/143 (Aux Bldg el.737)
- Appendix C.36 of AOI-30.2. 'Fire Safe Shutdown has been implemented.
- A NOTE states that MCR will need to coordinate with operators locally to perform selected actions for a controlled plant cooldown.
- Instrument air has been lost and an NAUO has been dispatched to align backup nitrogen to the AFW LCVs.

Which ONE of the following describes how the TDAFW subsystem will be controlled to provide adequate heat sink for plant cooldown?

- A. Pump speed varied with Trip and Throttle valve
- B. adjustments on LCVs (Level Control Valves) at the Valve.
- C. Adjustments on LCV Pressure regulators at backup nitrogen station.
- D. Adjustments on LCVs from the control room after backup nitrogen aligned

The correct answer is C.

- A. Incorrect - AOI-30.2 does not provide direction to control T&T valve. This would be effective in controlling level if used.
- B. Incorrect - AOI-30.2 does not use local valve adjustments. This would be effective in controlling level if used.
- C. *Correct* - Nitrogen backup is in place for Appendix R considerations and is the method directed by AOI-30.2 for control of TDAFW subsystem.
- D. incorrect - Nitrogen backup is available for use during Appendix R events however when it is aligned control *is* by local means only. Examinee may think that after nitrogen is aligned control is restored to the control room just as though instrument air is available

REFERENCES:

Lesson plan 3-OT-AOI3000

10CFR55.43.5/45.13

Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Automatic control malfunction.

SRO-89

Reference: 3-OT-AOI3000  
KIA value: 3.4  
Level: 2  
Tier/Grp: 2/1

KIA Number: 061 A2.05  
Last Used:  
Source: NEW  
SRO Only: YES

--

'--

~

With the plant at 100% power the following annunciators are LIT:

- 79-A, CCS HX A 1-RM-90-124 LIQ RAD HI.
- 237-D, RCP THRM BAR RET HDR TEMP HI.
- 237-C, RCP THRM BAR REP FLOW LO.

Which ONE of the following identifies the correct procedure that should be entered to mitigate this event?

- A. AOI-6, "Small Reactor Coolant System Leak".
- B. AOI-15, "Loss of Component Cooling Water".
- C. AOI-24, "Reactor Coolant Pump Malfunction"
- D. AOI-31, "Abnormal Release of Radioactive Material".

The correct answer is B.

- A. Incorrect - AOI-6 would be entered for a small RCS leak however interpretation of the alarms provided should indicate to the examinee that the leak auto isolated the thermal barrier. AOI-15 ensures this action.
- B. *Correct*- AOI-15 directs action to mitigate leaks into the CCS including the thermal barrier.
- C. Incorrect - AOI-24 normally addresses problems with RCPs. Examinee may incorrectly transition to this procedure due to the problem with the RCP thermal barrier
- D. Incorrect - AOI-31 addresses release fo radioactive material. Examinee may incorrectly transition to this procedure due to the radiation monitor alarm.

Reference:

3-OT-AOI1500; AOI-15  
ARI 179-A  
ARI 237-B, D

10CFR55 41.20 / 43.2 / 45.13

Process Radiation Monitoring System: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

RO - N/A SRO - 90

Reference: AOI-15  
K/A value: 4.3  
Level: 1  
Tier/Grp: 3

K/A Number: 073 G 2.4.4  
Last Used:  
Source: NEW  
SRO Only: YES

Given the following plant conditions:

- Unit is operating at 100% power.
- ERCW Supply Header Temperatures:
  - 1A - 84.5 °F
  - 2A - 85.5 °F
  - 1B - 85.6 °F
  - 2B - 84.9 °F

Which ONE of the following identifies the entry requirements of Technical Specification 3.7.9, Ultimate Heat Sink?

- A. Since none of the temperatures are above the TS limit: no entry is required
- B. Since only one temperature per train is above the TS limit; no entry is required
- C. Since two of the four temperatures are above the TS limit; entry is required.
- D. Since the average temperature is above the TS limit; entry is required

The correct answer is D.

- A. Incorrect, The temperature limit is 85 degrees, requires the applicant to know the entry requirement of the LCO.
- B. Incorrect, applicant may incorrectly assume the UHS limit is trained since the LCO for ERCW Tech Spec 3.7.8 is trained.
- C. Incorrect, applicant may incorrectly assume the UHS limit is similar to instrumentation Tech Spec for number of channels required to be operable
- D. Correct, The average of the four ERCW supply headers is used to determine the **UHS** temperature.  $(84.5 + 85.5 + 85.6 + 84.9) / 4 = 85.125$  The Tech Spec limit for UHS is 85 °F.

REFERENCES:

Lesson Plan 3-OT-SYS067, 3-OT-TIS0307  
T/S 3.7.9  
1-SI-0-2B-01

10 CFR 55 43.2 / 45.13  
KA 076 G2.2.22 - Service Water: Knowledge of limiting conditions for operations and safety limits.

RO - N/A SRQ - 91

Reference: 3-OT-T/S0307  
K/A value: 4.1  
Level: 1  
Tier/Grp: 2/1

K/A Number: 076 G2.2.22  
Last Used:  
Source: NEW  
SRO Only: YES

Given the following plant conditions:

- Unit is operating at 100% power
- 1-HIC-62-93, Charging Flow PZR Level Control, is in automatic
- 1A-A CCP trips on overcurrent

Which ONE of the following identifies the effect this will have on 1-FCV-62-93 and the correct procedural direction?

- A. Valve will OPEN and PZR level will RISE. Immediately start 1B-B CCP per AOI-20, Malfunction of the PZR Level Control System.
- B. Valve will OPEN but PZR level will DROP. Realign charging and letdown per AOI-20, Malfunction of the PZR Level Control System.
- C. Valve will CLOSE but PZR level will RISE. Immediately start 1B-B CCP per SOI-62.01, CVCS, Charging and Letdown.
- D. Valve will CLOSE and PZR level will DROP. Realign charging and letdown per Sol-62.02, CVCS, Charging and Letdown.

The correct answer is B

- A. Incorrect, 1-FCV-62-93 will open but PZR level will drop vs. rise. Examinees may think that if immediate actions are taken to isolate letdown that PZR level will rise. The immediate start of 1B-B CCP is not allowed by AOI-20. Examinee may mistake this with a precaution in SOI-62.01 that allow immediate start of the available pump, but all criteria are not met to allow this.
- B. Correct, 1-FCV-62-93 will open and PZR level will drop. After the operator takes immediate actions to isolate letdown the SRO should enter AOI-20 to start the 1B-B CCP and reestablish charging and letdown.
- C. Incorrect, 1-FCV-62-93 will open but PZR level will drop vs. rise. Examinees may think that if immediate actions are taken to isolate letdown that PZR level will rise causing valve to close. The immediate start of 1B-B CCP is allowed by SOI-62.01, but all criteria is not met to allow immediate start.
- D. Incorrect, 1-FCV-62-93 will not close but PZR level will drop. Although Sol-62.01 does contain steps to reestablish charging and letdown the SWO should enter AOI-20.

REFERENCES:

Lesson Plan 3-OT-AOI2000  
AOI-20  
SOI-62.01

10 CFR5541.5143.5145.3145.13

KA 011A2.04 - Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions: Loss of two or three charging pumps.

RO - N/A SRO - 92

Reference: AOI-20  
K/A value: 3.7  
Level: 2  
Tier/Grp: 22

K/A Number: 011 A2.04  
Last Used:  
Source: NEW  
SRO Only: YES

Given the following plant conditions:

- Unit is operating at 100% power.
- There is NO movement of irradiated fuel in progress.
- 1-RM-90-102, Spent Fuel Pit Area Radiation Monitor, Green, Amber and Red lights are NOT LIT.
- The following annunciators are LIT:
  - 84-D, SFP 0-RM-90-102/103 INST MALF.
  - ~~184-B~~.SFP 0-RM-90-102/103 RAD HI.

Which ONE of the following describes the the entry requirements into Technical Specification 3.3.8, ABGTS Actuation Instrumentation, and the directions that should be given to the operator for the Auxiliary Building Gas Treatment system? (use attached reference)

- A. Entry into LCO is required; ~~Direct~~ operator to ensure automatic ABGTS actuation occurs.
- B. Entry into LCQ is required, ~~but~~ ~~Automatic~~ ABGTS actuation does NOT occur.
- C. Entry into LCO is NOT required; ~~Direct~~ operator to ensure automatic ABGTS actuation occurs.
- D. Entry into LCO is NOT required, ~~but~~ ~~Automatic~~ ABGTS actuation does NOT occur.

The correct answer is C.

- A. Incorrect, Entry into the LCO is only required during movement of irradiated fuel, ABGTS does start
- B. Incorrect, Entry into the LCO is only required during movement of irradiated fuel, ABGTS does start but applicant may be confused since a power failure to the rate meter will cause alarm lights on the monitor to be out.
- C. *Correct*, Entry into the LCO is not required and ABGTS does start
- D. Incorrect, Entry into the LCO is not required but ABGTS does start, applicant may be confused since a power failure to the rate meter will cause alarm lights on the monitor to be out.

REFERENCES:

Lesson Plan 3-OT-SYS090A  
ARI-184-B AND 184-D

10 CFR 55 43.5 / 45.12

KA 072G2.4.48 Area Radiation Monitoring System: Ability to interpret control room indications to verify the status and operation of the Area Radiation Monitoring system. and understand how operator actions and directives affect plant and system conditions:

RO - N/A SRO - 93

Reference: 3-OT-SYS090A  
K/A value: 3.8  
Level: 2  
Tier/Grp: 2/2

K/A Number: 072 G2.4.48  
Last Used:  
Source: NEW  
SRO Only: YES

G 2.1.13 001

Nuclear Security has determined that a specific credible insider threat exists

Which ONE of the following describes the compensation measure taken for the operating crew, and the individual responsible to authorize implementation as directed by SPP-1.3 "Plant Access and Security".

- A. Operations personnel will obtain an armed security escort for entry into vital areas, as authorized by the Shift Manager.
- B. Operations personnel will obtain an armed security escort for entry into vital areas, as authorized by the Site Security Manager.
- C. Operations personnel will implement a two-person line of sight rule for entry into vital areas, as authorized by the Shift Manager.
- D. Operations personnel will implement a two-person line of sight rule for entry into vital areas, as authorized by the Site Security Manager.

The correct answer is C.

- A. Incorrect - Security escort is not required for this event. A more serious threat to the plant may require this comp measure, and Students may confuse the requirements. Shift manager authorization is correct.
- B. Incorrect - Security escort is not required for this event. A more serious threat to the plant may require this comp measure, and Students may confuse the requirements. Site Security Manager authorization is incorrect. Students may choose Site Security Manager due to this high level event.
- C. Correct - This is as directed by SPP-1.3
- D. Incorrect - Site Security Manager authorization is incorrect. Students may choose Site Security Manager due to this high level event.

REFERENCES:

SPP-1.3, 'Plant Access and Security' p. 25

10CFR55.41.10/43.5/45.9/45.10

Knowledge of facility requirements for controlling vital / controlled access

SRO-94

Reference: SPP-1.3  
K/A value: 2.9  
Level: 1  
Tier/Grp: 3

K/A Number: G 2.1.13  
Last Used:  
Source: NEW  
SRO Only: YES

G 2.1.34.001

Chemistry reports that reactor coolant pH is outside its allowable limit. The shift chemist recommends action be taken to reduce the Lithium concentration to restore reactor coolant pH to within limits.

Which ONE of the following identifies the action that should be taken to reduce lithium concentration and how that action affects reactor coolant pH?

- A. Maximize letdown flow to the CVCS mixed beds; LOWER pH
- B. Maximize letdown flow to the CVCS mixed beds; RAISE pH
- C. Align letdown flow to the CVCS cation beds; LOWER pH.
- D. Align letdown flow to the CVCS cation beds; RAISE pH

The correct answer is C

- A. Incorrect- letdown flow may be maximized in certain instances, such as during failed fuel events, to remove fission products. Examinee may confuse the use of mixed **beds** with cation beds. Not effective in removing Lithium to adjust pH.
- B. Incorrect - letdown flow may be maximized in certain instances, such as during failed fuel events, to remove fission products. Examinee may confuse the use of mixed beds with cation beds. Not effective in removing Lithium to adjust pH.
- C. Correct- letdown can be aligned to the cation beds to remove Lithium which reduces the pH of reactor coolant.
- D. Incorrect - letdown can be aligned to the cation beds to remove Lithium and reduce pH of reactor coolant. Examinee may confuse whether Lithium removal reduces or raises reactor coolant pH.

REFERENCES:

3-OT-SYS062A

10CFR55 41.10 143.5 / 45.12

Ability to maintain primary and secondary plant chemistry within allowable limits.

RO - N/A SRO - 95

Reference: SYS062A  
K/A value: 2.9  
Level: 1  
Tier/Grp: 3

KIA Number: G 2.1.34  
Last Used:  
Source: NEW  
SRO Only: YES

Which ONE of the following situations requires tracking via a Configuration Status Sheet?

- A. A pump breaker is opened in accordance with Shift Manager direction due to inadvertent oil discharge.
- B. Repositioning a normally locked open valve in accordance with a system clearance.
- C. Opening a 125V DC control power breaker for a safety related pump in accordance with a system operating instruction.
- D. Opening a normally closed valve in accordance with a troubleshooting work document.

The correct answer is A.

- A. *Correct*- unanticipated problems that require configuration changes must be tracked. The configuration Status Sheet would be included with the work order used for repairs.
- B. Incorrect - repositioning a valve in accordance with the system clearance procedure is allowable and the clearance process would provide for tracking component configuration.
- C. Incorrect - opening a breaker in accordance with the system operating procedure is allowable and the procedure would provide for tracking component configuration.
- D. Incorrect - component configuration changes are allowable during trouble shooting activities using a work document that contains general configuration control instruction.

REFERENCES:

3-OT-SPP1001

10CFR55.43.3/45.13

Knowledge of the process for making configuration changes

RQ-NA SRO-96

Reference: 3-OT-SPP1001  
K/A value: 3.0  
Level: 2  
Tier/Grp: 2

K/A Number: G 2.2 14  
Last Used:  
Source: NEW  
SRO Only: YES

G2.3.3 001

Given the following plant conditions:

- Core off-load is in progress.
- A fuel assembly has just been removed from the core and is in the mast of the refueling machine.
- Failure of the reactor cavity seal occurs.
- AOI-29, "Dropped or Damaged Fuel or Refueling Cavity Seal Failure" was implemented.

In which ONE of the following locations should the fuel assembly be placed?

- A. In the RCCA change fixture.
- B. In any analyzed core location
- C. In the cavity side upender and lowered to horizontal position.
- D. Transport to the SFP side upender and leave in horizontal position,

The correct answer is B.

- A. Incorrect - RCCA change fixture may normally be used as an alternate storage location however not in the event
- B. *Correct* - AOI-29, "Dropped or Damaged Fuel or Refueling Cavity Seal Failure", directs **fuel** handlers to place any fuel assembly carried by the refueling machine in any analyzed core location.
- C. Incorrect - if placed in the upender and lowered the assembly would be underwater but inadequate level would be over the fuel for shielding.
- D. Incorrect - assemblies in the transfer cart may be transported to the SFP side upender and maintained in horizontal position. Examinee may think this is allowed for any assembly contained in the refueling machine.

REFERENCES:

3-OT-SYS079A; AOI-29, "Dropped or Damaged Fuel or Refueling Cavity Seal Failure"

10CFR55 43.4 /45.10

Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).

RO - N/A SRO - 97

Reference: AOI-29  
K/A value: 2.9  
Level: 2  
Tier/Grp: 3

K/A Number: G 2.3.3  
Last Used:  
Source: NEW  
SRO Only: YES

G 2.3.8 001

Given the following plant conditions:

- RE-90-118, Waste Gas Effluent Monitor and 1-RE-90-400, shield Building Exhaust Monitors are both out of service.
- Chemistry is requesting a Waste Gas Decay Tank release.

Which ONE of the following statements describes the condition(s) which will allow the WGDT (Waste Gas Decay Tank) release? (use references provided)

- A. Both monitors must be returned to service prior to WGDT release
- B. WGDT release can not be performed until RE-90-118 is returned to service.
- C. WGDT release can not be performed until 1-RE-90-400 is returned to service.
- D. WGDT release is permitted even though both monitors remain out of service.

The correct answer is D.

- A. Incorrect - Student may select because ODCM lists both monitors as required for a gaseous release.
- B. Incorrect - Student may select because ODCM lists this monitor as required at all times when release in progress.
- C. Incorrect - Student may select because ODCM lists this monitor as required at all times.
- D. *Correct*- ODCM will allow release with both monitors OOS if all Comp measures taken.

REFERENCES:

Lesson Plan 3-OT-ODCM

10CFR55 43.4/45.10

Knowledge of the process for performing a planned gaseous radioactive release.

RO - N/A SRO - 98

Reference: ODCM  
K/A value: 3.2  
Level: 2  
Tier/Grp: 3

K/A Number: G 2.3.8  
Last Used: NEW  
Source: NEW  
SRO Only: YES

G 2.4.41 001

Given the following plant conditions:

- While handing fuel in the spent fuel pool, a fuel element is dropped.
- Gas bubbles are rising from the element.
- All SFP radiation monitor alarms are LIT in the control room.
- 1-RE-90-1, SFP area radiation monitor is reading 2758 mR/hr
- 0-RE 90-101B, Auxiliary Building Rad Monitor has been indicating 2.3E+06 cpm for the last 20 minutes.
- Field surveys indicate 110 mrem/hr at the EAB (Exclusion Area Boundary).

Which ONE of the following is the proper Emergency Plan declaration for this event? (use references provided)

- A. Site Area in accordance with category 7.1.
- B. Alert in accordance with category 7.1
- C. Alert in accordance with category 7.3.
- D. Alert in accordance with category 7.4

The correct answer is B.

- A. *Correct* - Field Survey results > 100 mrem/hr at the SP (Site Perimeter) satisfy #2 of the Site Area classification of section 7.1.
- B. Incorrect - Alert section of 7.1 is satisfied but is not the highest classification
- C. Incorrect - Alert section of 7.3 is satisfied but is not the highest classification
- D. Incorrect - Alert section of 7.4 is satisfied but is not the highest classification.

REFERENCES:

Lesson Plan 3-OT-PDC-048C

10 CFR 55.43.5/45.11

Knowledge of the emergency action level thresholds and classifications.

SRO-99

Reference: 3-OYT-PCD-048C  
K/A value: 4.1  
Level: 2  
Tier/Grp: 3

K/A Number: G 2.4.41  
Last Used: NEW  
Source: NEW  
SRO Only:

Given the following plant conditions:

- Unit was *at* 100% power.
- An inadvertent Safety Injection occurred.
- Operators have just transitioned to ES-1.1, "SI Termination".
- PZR level is 25% and slowly RISING.
- PZR pressure is 2050 psig and RISING
- The following annunciators are LIP:
  - 88-B, PRT LEVEL HI/LO
  - 88-C, PRT PRESS HI
  - 88-D, PRT TEMP HI

Which ONE of the following is the cause of the alarms and the correct procedure implementation?

- A. Pressurizer PORVs, 1-PCV-68-340 and 334, have failed open; transition to E-1, "Loss of Reactor or Secondary Coolant".
- B. Pressurizer PORVs, 1-PCV-68-340 and 334, have lifted; continue in ES-1.1, "SI Termination"
- C. RCP #1 Seal Leakoff Relief Valve, 1-RLF-62-636, has failed open; transition to E-1, "Loss of Reactor or Secondary Coolant".
- B.J** RCP #1 Seal Leakoff Relief Valve, 1-RLF-62-636, has lifted; continue in ES-1.1, "SI Termination".

*The correct answer is D.*

- A. Incorrect - diagnosis of given conditions should indicate that PZR PORVs should be closed since PZR pressure is rising.
- B. Incorrect - diagnosis of given conditions should indicate that PZR PORVs should be closed since PZR pressure is rising. There is no condition that indicates PORVs have opened.
- C. Incorrect - RCP #1 Seal Leakoff Relief Valve, 1-RLF-62-636 normally opens following a Safety Injection to provide RCP leakoff flow path.
- D. *Correct* - this relief will open when the seal return line containment isolation valves close due to a Phase A and continue RCP seal leak-off to the PRT.

REFERENCES:

ES-1.1; E-1; 3-OT-SYS068B;

—

10CFR 55 43.5 145.3 145.12

Ability to interpret the significance of each annunciator or alarm

RO - N/A SRO - 100

Reference: SYS068B

K/A value: 3.6

Level: 2

Tier/Grp: 3

K/A Number: G 2.4.45

Last Used:

Source: NEW

SRO Only: YES