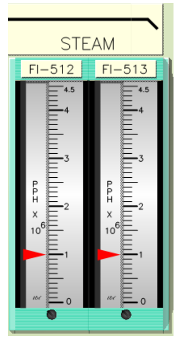
| **Examination Outline Cross-Reference** | | RO |
|---|---|---|
| **003 K3.02 - Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: S/G** | **Tier #** | 2 |
| | **Group #** | 1 |
| | **K/A #** | 003 K3.02 |
| | **Rating** | 3.5 |

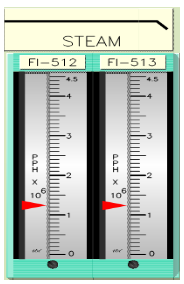
**Question 01**

Unit 1 is at 30% power, with the following 1-1 Steam Generator steam flow indication:

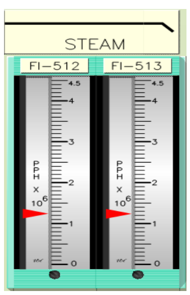



1-1 RCP trips. The plant remains at power.

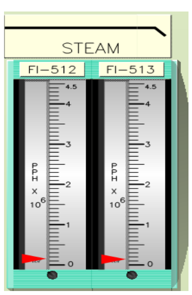
1) What will be the 1-1 Steam Generator steam flow indication shortly, (approximately 30 seconds), after 1-1 RCP trips?
2) Total steam flow will be ________________________ its initial value.

A. 1) 

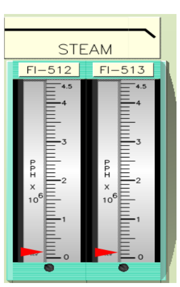
2) lower by approximately 25% from

B. 1) 

2) approximately the same as

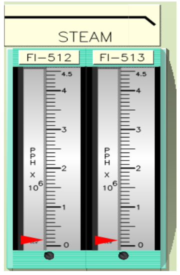
C. 1) 

2) lower by approximately 25% from

D. 1) 

2) approximately the same as

**Proposed Answer:**

D. 1) 


2) approximately the same as

**Explanation:**

A. Incorrect. Steam flow lowers. Plausible as steam flow rises in the other 3 loops. Second part is incorrect. Steam flow in the other 3 loops will rise and steam flow will return to its original value. Plausible to think that steam flow will be less overall.
B. Incorrect. Steam flow lowers. Second part correct.
C. Incorrect. First part correct, steam flow lowers. Second part is incorrect.
D. Correct. RCP trip will cause the loop temperature to lower and the steaming from the loop will stop (rises in the other 3 loops). The loss of steam flow from the loop will be picked up by the other loops.

**Technical References**: LTH-18

**References to be provided to applicants during exam:** None

**Learning Objective**: 10583 - DESCRIBE the reactor, RCS and Secondary System responses to each of the following transients: e. Stopping a Reactor Coolant Pump (RCP) with no resultant reactor trip.

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.14 | |

Difficulty: 3.1

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| **078 K4.03 - Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Securing of SAS upon loss of cooling water (note: apparent typo - written to address securing IAS as the KA is instrument air and SAS is its own KA- 079)** | **Tier #** | 2 |
| | **Group #** | 1 |
| | **K/A #** | 078 K4.03 |
| | **Rating** | 3.1 |

**Question 02**

A loss of Service Cooling Water (SCW) has occurred.

What Instrument Air compressor(s) cooling is/are affected by the loss of SCW?

A. 0-5, 0-6 and 0-7.

B. 0-5 and 0-6 only.

C. 0-5 only.

D. 0-7 only.

**Proposed Answer:** B. 0-5 and 0-6 only.

**Explanation:**

A. Incorrect. SCW cools rotary air compressors 0-5 and 0-6 (along with all 4 reciprocating air compressors). Plausible to believe all rotary air compressors would have the same cooling systems. 0-7 is air cooled.
B. Correct. SCW supplies cooling to rotary AC 0-5 and 0-6 only.
C. Incorrect. SCW cools rotary air compressors 0-5 and 0-6 (along with all 4 reciprocating air compressors). Plausible to know that there is one AC that is different than the other two and think that the difference is only one is cooled by SCW (as opposed to only one not cooled by SCW) and that one is 0-5.
D. Incorrect. SCW cools rotary air compressors 0-5 and 0-6 (along with all 4 reciprocating air compressors). Plausible to know that -07 is different than the other two (air cooled) and think that the difference is that it is cooled by SCW (as opposed to only one not cooled by SCW).

**Technical References**: OVID 106725 sheet 2, LK-1

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe Compressed Air System components. (7199)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.4 | |

Difficulty: 2.0

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| **026 K4.04 - Knowledge of CSS *design feature(s)* and/or interlock(s) which provide for the following: Reduction of temperature and pressure in containment after a LOCA by condensing steam, to reduce radiological hazard, and protect equipment from corrosion damage (spray)** | **Tier #** | 2 |
| | **Group #** | 1 |
| | **K/A #** | 026 K4.04 |
| | **Rating** | 3.7 |

**Question 03**

Concerning the design of the Containment Spray system:

1) Proper pH in the Recirc Containment Sump following a LOCA is assured by:
2) Design Containment pressure will not be exceeded if at least one Containment Spray train and a minimum of _____ CFCUs operate to remove heat and condense steam following a LOCA.

A. 1) an initial minimum Containment Spray Additive Tank level of 60%.
   2) 2

B. 1) an initial minimum Containment Spray Additive Tank level of 60%.
   2) 3

C. 1) the Containment Spray pumps remaining aligned to the RWST until level is 33%.
   2) 2

D. 1) the Containment Spray pumps remaining aligned to the RWST until level is 33%.
   2) 3

**Proposed Answer:** A. 1) an initial minimum Containment Spray Additive Tank level of 60%. 2) 2

**Explanation:**

A. Correct. The purpose of the SAT is to deliver with one Containment Spray pump running, enough sodium hydroxide (NaOH) into Containment to achieve a minimum pH of 8.0 in the recirculation sump prior to reaching the RWST low-low level. The basic pH helps the spray droplets entrain gaseous fission products, particularly iodine, aids in keeping fission products in solution in the recirculation sump and helps mitigate chloride stress corrosion of austenitic stainless-steel materials inside Containment.
   One train of Containment Spray and two of five CFCUs provide sufficient heat removal to maintain Containment pressure below its design value of 47 psig following a design basis LOCA or MSLB.
B. Incorrect. First part is correct. Second part is incorrect, 3 CFCUs is the minimum number of CFCUs in Technical Specifications without requiring LCO action.
C. Incorrect. Second part is correct. First part is incorrect. While the pumps remain aligned to the RWST until 4%. 33% is the level at which cold leg recirc is aligned (RHR pumps trip at 33%).
D. Incorrect. Both parts incorrect. First part is incorrect. The pumps remain aligned to the RWST until 4%. Second part incorrect, 3 CFCUs is the minimum number of CFCUs in Technical Specifications without requiring LCO action.

**Technical References**: LI-6, LCO 3.6.6

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain significant Containment Spray System design features and the importance to nuclear safety. (40802)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty: 2.6

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **059 A2.07 - Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Tripping of MFW pump turbine** | **Group #** | 1 |
| | **K/A #** | 059 A2.07 |
| | **Rating** | 3.0 |

**Question 04**

Unit 1 is at 100% power.

Main Feedwater pump 1-1 trips. An automatic ramp does not occur.

In accordance with OP AP-15, Loss of Feedwater Flow,

1) an automatic ramp of _______________ should be occurring.

2) the operator will ___________________________________________.

A. 1) 40 MW/Min
   2) manually initiate the ramp

B. 1) 40 MW/Min
   2) trip the reactor

C. 1) 225 MW/Min
   2) manually initiate the ramp

D. 1) 225 MW/Min
   2) trip the reactor

**Proposed Answer:** D. 1) 225 MW/Min 2) trip the reactor

**Explanation:**

A. Incorrect. 40 MW/Min is the ramp rate for the loss of the heater drip pump. The action is to trip the reactor is the ramp does not initiate automatically.

B. Incorrect. Ramp rate is incorrect. Action is correct.

C. Incorrect. Ramp rate is correct. Action is trip the reactor if the ramp does not occur.

D. Correct. Ramp rate for trip of a feed pump is 225 MW/Min. If the ramp does not occur, the operator trips the reactor per the immediate actions of OP AP-15.

**Technical References**: OP AP-15, section A, OP1.DC10

**References to be provided to applicants during exam:** None

**Learning Objective**: State the steps and transitions in procedures that are considered immediate actions. (9693)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.4

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **010 A3.02 - Ability to monitor automatic operation of the PZR PCS, including: PZR pressure** | | **Group #** | 1 |
| | | **K/A #** | 010 A3.02 |
| | | **Rating** | 3.6 |

**Question 05**

GIVEN:
- A rapid downpower from 100% to 75% has just occurred
- Pressurizer pressure channels indicate as follows:
  - PI – 455 – 2220 psig
  - PI – 456 – 2270 psig
  - PI – 457 – 2235 psig
  - PI – 474 – 2210 psig

What is the status of the Pressurizer Heaters controlled by HC-455K, Pzr Press Control?

A. All the heaters are off

B. Only the Backup heaters are on

C. Only the Proportional heaters are on

D. Both the Proportional and Backup heaters are on

**Proposed Answer:** C. Only the Proportional heaters are on

**Explanation:**

A. Incorrect. The pressure channel in control is the second highest. This is PI-457, at 2235 psig. This is high enough that proportional heaters would be on. Plausible because if its thought the highest channel is in control, this would be the answer.
B. Incorrect. Plausible if its thought the backup heaters that are on and not the proportional heaters.
C. Correct. At 2235 psig, the proportional heaters are on and backup heaters are off.
D. Incorrect. This would be correct if PI-474, the lowest channel, was in control.

**Technical References**: OIM page A-4-6

**References to be provided to applicants during exam:** None

**Learning Objective**: 4560 - Describe the operation of the Pzr, Pzr Pressure and Level Control System

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # 31 DCPP L111 11/2012 | X |
| | New | |
| | Past NRC Exam DCPP NRC 11/2012 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.9

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **061 K6.02 - Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps** | | **Group #** | 1 |
| | | **K/A #** | 061 K6.02 |
| | | **Rating** | 2.6 |

**Question 06**

Unit 2 tripped from 100% power.

2-3 Motor Driven AFW Pump starts and immediately trips.

Steam Generator AFW Supply Valves, LCV-115 and LCV-113 will:

A. Close due to the pump trip.

B. Close due to low pump discharge pressure.

C. Open due to the pump trip.

D. Open due to low pump discharge pressure.

**Proposed Answer:** C. Open due to the pump trip.

**Explanation:**

A. Incorrect. The valves will fail open. Plausible to think the valves would close if the pump is not running.
B. Incorrect. The valves will fail open. Plausible, this is the response of the valves on low pump discharge pressure if the pump is running (to prevent pump runout).
C. Correct. Opening the pump breaker removes power from the valves and they go full open. This is the normal state of the valves when the pumps are not running.
D. Incorrect. The valves fail open. Plausible that the valves would open in an attempt to raise system pressure.

**Technical References**: LD-1

**References to be provided to applicants during exam:** None

**Learning Objective**: 37635- Describe controls, indications, and alarms associated with the Auxiliary Feedwater System.

| | | |
|---|---|---|
| **Question Source:** | Bank #18 DCPP NRC 1/2010 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam: DCPP 1/2010 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.2

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **008 A3.02 - Ability to monitor automatic operation of the CCWS, including: Operation of the CCW pumps, including interlocks and ~~the CCW booster pump~~(N/A)** | **Group #** | 1 |
| | **K/A #** | 008 A3.02 |
| | **Rating** | 3.0 |

**Question 07**

The Standby Select switch for a non-running CCW pump is in MANUAL.

What automatic start(s) is/are still available?

1) Safety Injection
2) Transfer to Diesel
3) Low System Pressure

A. 1 only

B. 1 and 2

C. 3 only

D. 2 and 3

**Proposed Answer:** B. 1 and 2

**Explanation:**
All the listed possibilities are trips of the CCW pump and therefore plausible if its not known which require the MANUAL/AUTO switch to be in AUTO to be an active trip.

A. Incorrect. Auto is not required for the pump to start in response to a SI, however, a pump will also start on a transfer to diesel.
B. Correct because Auto is not required for the pump to start in response to a SI or Transfer to Diesel.
C. Incorrect. The Standby Select switch If in Auto, the pump will start in response to low system pressure, but will not if in Manual. Some equipment does not start if not in Auto, such as a diesel.
D. Incorrect because Auto is not required for the pump to start in response to a Transfer to Diesel but is for low system pressure.

**Technical References**: LF-2

**References to be provided to applicants during exam:** None

**Learning Objective**: Analyze automatic features and interlocks associated with the CCW System. (35487)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #7 DCPP NRC Exam 10/2016 | X |
| | New | |
| | Past NRC Exam | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.0

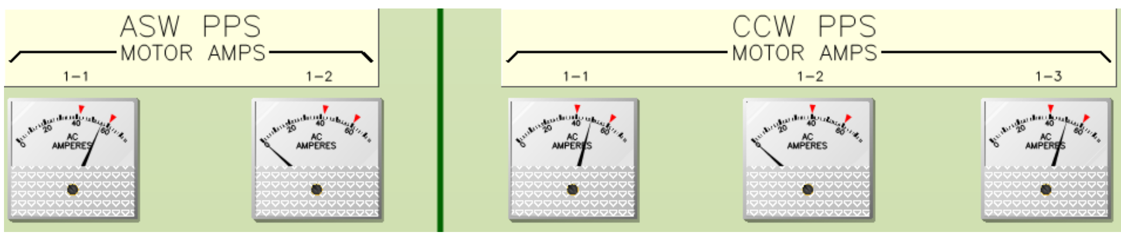
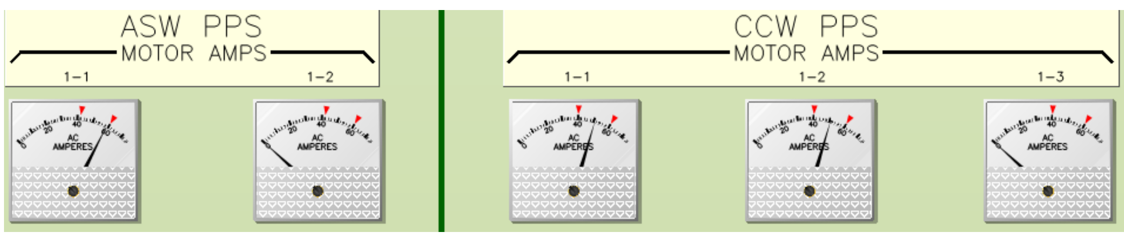
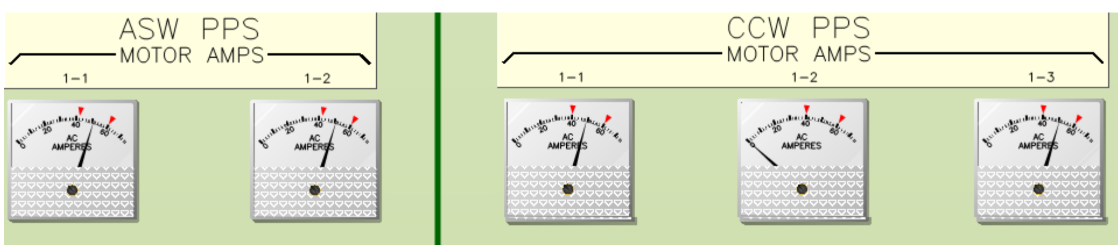
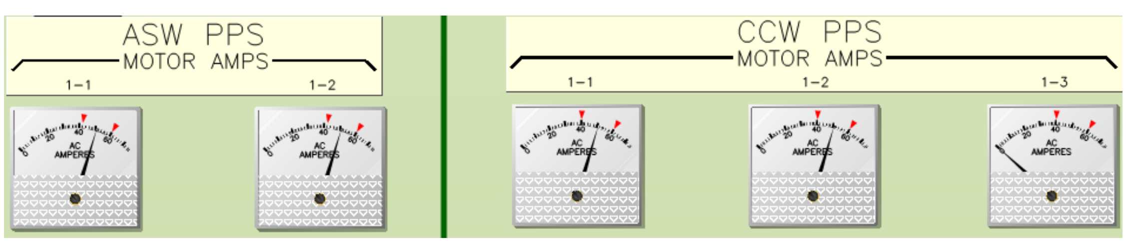
| | |
|---|---|
| **Examination Outline Cross-Reference** | **Level** RO |
| | **Tier #** 2 |
| **076 A4.04 Service Water (Aux Saltwater – DCPP equivalent)** | **Group #** 1 |
| **Ability to manually operate and/or monitor in the control room:** | **K/A #** 076 A4.04 |
| **Emergency heat loads** | **Rating** 3.5 |

**Question 08**

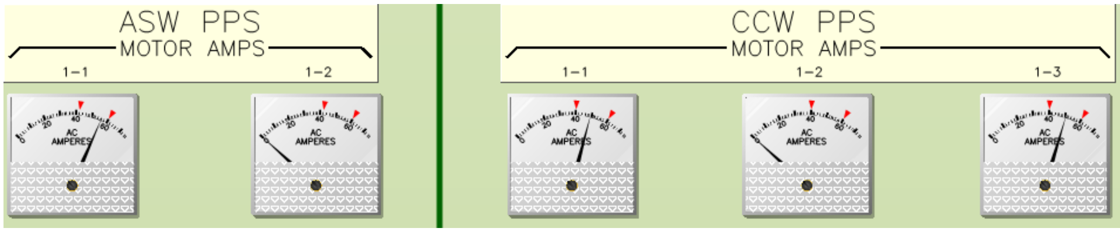
GIVEN:

- Safety Injection actuates on Unit 1 from 100% power
- Following the reactor trip, 4 kV Bus G de-energizes
- The crew is performing EOP E-0, Reactor Trip or Safety Injection

When the operator is performing Appendix E, ESF Auto Actions, Secondary and Auxiliaries Status, what will be the ASW and CCW pump status?

| | |
|---|---|
| A. |  |
| B. |  |
| C. |  |
| D. |  |

**Proposed Answer:**

| | |
|---|---|
| A. |  |

**Explanation:**
Note, addressing the “monitoring” of ASW and the emergency loads for ASW – the CCW system. Operator must know what pumps should be running and which are affected by the loss of the vital bus.

A. Correct. Normally, all ASW and CCW pumps start on SI. Bus G powers ASW pump 1-2 and CCW pump 1-2 and therefore, will not be running.
B. Incorrect. First part is correct. Second part is plausible – the power supplies do not align that pumps 1, 2 and 3 are from bus F, G and H. For instance, CCP 1-3 is powered from bus G and RHR pumps 1-1 and 1-2 are powered from G and H.
C. Incorrect. First part is plausible as there are instances of systems with 2 pumps that do not have a pump on bus G, such as SI. Second part is correct.
D. Incorrect. First part is plausible as there are instances of systems with 2 pumps that do not have a pump on bus G, such as RHR. Second part is plausible – the power supplies do not align that pumps 1, 2 and 3 are from bus F, G and H. For instance, CCP 1-3 is powered from bus G and RHR pumps 1-1 and 1-2 are powered from G and H

**Technical References**: OIM J-1-1 and J-6-1
**References to be provided to applicants during exam:** None
**Learning Objective**: State the power supplies to CCW System components. (8129)
State the power supplies to ASW System components. (5339)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.2

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **006 G2.2.39 ECCS: Knowledge of less than or equal to one hour** | **Group #** | 1 |
| **Technical Specification action statements for systems.** | **K/A #** | 006 G2.2.39 |
| | **Rating** | 3.9 |

**Question 09**

Unit 1 is at 100% power.

Which of the following would require the crew to take actions in less than one hour to satisfy Technical Specifications?

1. Nitrogen pressure in two Accumulators is less than the pressure required by LCO 3.5.1, Accumulators
2 RWST level is less than the level required by LCO 3.5.4, Refueling Water Storage Tank, (RWST)
3. Reactor coolant pump seal injection flow resistance is less than the 0.2117 ft/gpm$^2$ required by LCO 3.5.5, Seal Injection Flow

A. 1 only

B. 1 and 2

C. 3 only

D. 2 and 3

**Proposed Answer:** B. 1 and 2

**Explanation:**

A. Incorrect. Only partially correct. Two inoperable accumulators require action within one hour (immediately enter LCO 3.0.3) However,. Low RWST level requires action to restore the RWST to OPERABLE status within one hour.
B. Correct. Two accumulators inoperable, regardless of the reason, is an immediate (enter LCO 3.0.3) action. Additionally, low level in the RWST is a one hour action, (restore to OPERABLE) action
C. Incorrect. Seal flow resistance is 4 hours. Plausible because a reduction of available ECCS injection could be viewed as needing immediate action.
D. Incorrect. First part is correct.

**Technical References**: LCO 3.5.1, 3.5.4, 3.5.5
**References to be provided to applicants during exam:** None
**Learning Objective**: 9697E - Apply TS 3.5 Technical Specification LCOs

| | | |
|---|---|---|
| **Question Source:** | Bank # DCPP | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 3.1

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **063 K1.02 - Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: AC electrical system** | | **Group #** | 1 |
| | | **K/A #** | 063 K1.02 |
| | | **Rating** | 2.7 |

**Question 10**

Unit 1 is at 100% power.

What is the effect of opening the DC supply breaker to a vital 120 VAC Inverter?

1. PK19-18, VITAL UPS TROUBLE alarm
2. PK19-19, VITAL UPS FAILURE alarm
3. Lowering of Inverter output voltage

A. 1 only

B. 2 only

C. 1 and 3

D. 2 and 3

**Proposed Answer:** B. 2 only

**Explanation:**
Question tests the physical connection between the DC system and the (120 VAC) electrical distribution system. The battery (DC) is the backup to the inverter. The AC input is at a slightly higher voltage. If the DC is lost, the higher AC is still supplying the inverter, so no change involtage will occur. However the loss of DC does make the inverter inoperable and therefore, is a Failure, not Trouble alarm.

A. Incorrect. The Failure, not Trouble alarm is generated.
B. Correct. The higher AC voltage is unaffected. The loss of DC results in a Failure alarm only.
C. Incorrect. Both parts are incorrect.
D. Incorrect. First part is correct. Second part incorrect..

**Technical References** LJ-10
**References to be provided to applicants during exam:** None
**Learning Objective**: State the power supplies to Instrument AC System components. (3345)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 3.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **026 K2.01Knowledge of bus power supplies to the following: Containment spray pumps** | | **Group #** | 1 |
| | | **K/A #** | 026 K2.01 |
| | | **Rating** | 3.4 |

**Question 11**

GIVEN:

- A loss of offsite power and LOCA have occurred on Unit 2
- Containment Spray has actuated

Which Unit 2 Emergency Diesel Generators (EDG) will be powering the Containment Spray pumps?

1) Containment Spray pump 2-1 will be powered from EDG _____.

2) Containment Spray pump 2-2 will be powered from EDG _____.

A. 1) 2-1
   2) 2-2

B. 1) 2-1
   2) 2-3

C. 1) 2-2
   2) 2-1

D. 1) 2-2
   2) 2-3

**Proposed Answer:** A. 1) 2-1 2) 2-2

**Explanation:**
Unit 1 EDGs 1-1 powers bus H/ EDG 1-2 powers bus G/ EDG1-3 powers bus F
Unit 2 EDGs 2-1 powers bus G/ EDG 2-2 powers bus H/ EDG 2-3 power bus F
Containment spray pumps are powered from buses G and H (both units)

A. Correct. Unit 2 EDGs 2-1 (Bus G) and 2-2 (Bus H) power the spray pumps.
B. Incorrect. First part is correct. EDG 2-3 powers bus F not bus H.
C. Incorrect. This would be correct for Unit 1.
D. Incorrect. Bus F (EDG 2-3) does not power a spray pump.

**Technical References**: OIM J-1-1

**References to be provided to applicants during exam:** None

**Learning Objective**: 6022 - State the power supplies to CSS components

| | | |
|---|---|---|
| **Question Source:** | Bank #40 DCPP NRC 07/2011 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 07/2011 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty:2.1

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **039 K3.03 - Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: AFW pumps** | **Group #** | 1 |
| | **K/A #** | 039 K3.03 |
| | **Rating** | 3.2 |

**Question 12**

Unit 1 is at 10% power.

A steam break, inside containment, occurs on Steam Generator 1-2. Safety Injection actuates. Narrow range level on Steam Generator 1-2 is off scale low. Other steam generator narrow range levels are 65%.

1) AFW pump 1-1__________________ automatically start.

2) After the steam supply to AFW pump 1-1 is isolated in accordance with EOP E-2, Faulted Steam Generator Isolation, AFW pump 1-1 is ______________ of providing 100% of its rated AFW flow.

A. 1) will
   2) capable

B. 1) will
   2) NOT capable

C. 1) will NOT
   2) capable

D. 1) will NOT
   2) NOT capable

**Proposed Answer:** C. 1) will NOT 2) capable

**Explanation:**

A. Incorrect. The TDAFW pump is not started by SI. It is started by 2 of 4 steam generators (only one is low), AMSAC or 12 kV UV. Second part is correct. While the two leads feed a common line to the suction of the TDAFW pump, the steam supplies are 100% redundant and available flow from the AFW pump is unaffected by the closing of one of the steam supplies.
B. Incorrect. The TDAFW pump is not started by SI. It is started by 2 of 4 steam generators (only one is low), AMSAC or 12 kV UV. Second part incorrect. While the leads from the steam generators feed a common header, the amount of flow from the TDAFW pump is unaffected by closing one, each one can supply 100% of the steam flow required to have the pump supply its rated flow.
C. Correct. SI starts the motor driven pumps start. The TDAFW pump will not automatically start. The steam supplies are redundant, only one is necessary for the pump to supply rated flow.
D. Incorrect. First part is correct. Second part is incorrect. The flow available is unaffected by the closing of one of the two steam supplies.

**Technical References**: OIM D-1-2, OVID 106704 sheet 4
**References to be provided to applicants during exam:** None

**Learning Objective**: State the purpose of Auxiliary Feed Water System components.
☐Turbine Steam Supply Control Valves FCV-37 and FCV-38

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.4 | |

Difficulty: 3.0

| Examination Outline Cross-Reference | Level | RO |
|---|---|---|
| | Tier # | 2 |
| 103 K4.06 Knowledge of containment system design feature(s) and/or interlock(s) which provide for the following: Containment isolation system | Group # | 1 |
| | K/A # | 103 K4.06 |
| | Rating | 3.1 |

**Question 13**

What will directly cause Containment Ventilation Isolation (CVI) to automatically actuate?

1. SI signal present
2. Containment Pressure exceeds 3 psig
3. Containment Pressure exceeds 22 psig

A. 1 only

B. 2 only

C. 3 only

D. 1 and 3

**Proposed Answer:** A. 1 only

**Explanation:**

A. Correct. SI automatically actuates CVI. Manual actuation (not Containment pressure) of Phase A or Phase B will also cause CVI.
B. Incorrect. 3 psig isolates containment penetrations by initiating Phase A, but CVI by Phase A is by MANUAL actuation (1 of 2 pushbuttons) of Phase A.
C. Incorrect. 22 psig actuates Phase B, however, to actuate CVI on Phase B, manual Phase B actuation (2 of 2) is required.
D. Incorrect. This is the coincidence for actuating Containment Spray and could be thought it also causes CVI.

**Technical References**: OIM B-6-9a

**References to be provided to applicants during exam:** None

**Learning Objective**: 37048 - Analyze automatic features and interlocks associated with the Reactor Protection System.

- Containment Ventilation Isolation Actuation Signal

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.9

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **064 A3.01 - Ability to monitor automatic operation of the ED/G system, including: Automatic start of compressor and ED/G** | | **Group #** | 1 |
| | | **K/A #** | 064 A3.01 |
| | | **Rating** | 4.1 |

**Question 14**

Unit 1 is at 100% power. All Emergency Diesel Generators (EDG) are OPERABLE.

1) If pressure is low in the "A" Starting Air Receiver for an EDG, _______ Air Compressor(s) start(s).
2) If the "A" Starting Air Receiver is completely depressurized when a complete loss of offsite power occurs, the speed indication for the associated EDG on VB4 will be _____ rpm shortly, (i.e. 1 minute) after the loss of power occurs.

A. 1) both "A" and "B"
   2) 0

B. 1) both "A" and "B"
   2) 900

C. 1) only the "A"
   2) 0

D. 1) only the "A"
   2) 900

**Proposed Answer:** D. 1) only the "A" 2) 900

**Explanation:**

A. Incorrect. The air system is normally split into A and B headers. Plausible as another air system, instrument air, is cross tied to both units and lowering pressure would affect both units. A lowering pressure in one air receiver causes only its affected compressor to start. Second part is incorrect, only one air receiver is required to start the EDG. The EDG will start (within 10 seconds) and be at rated speed, 900 rpm.
B. Incorrect. The air systems are not cross tied, only the affected train compressor starts. Either receiver can start the diesel in its required time. Second part is correct.
C. Incorrect. First part is correct, only the affected compressor starts. One train of air will start the EDG, speed will be 900 rpm (rated speed).
D. Correct. Both parts correct. Only the affected compressor starts and one train of air will start the EDG and it will reach rated speed of 900 rpm in its normal time of less than 10 seconds.

**Technical References**: LJ-6B, STP M-9S, Diesel Generator Operability Verification for "Starting on One Starting Train"

**References to be provided to applicants during exam:** None

**Learning Objective**: 6431 - State the purpose of Diesel Generator System components.

- Starting Air System

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.4

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **004 K6.29 Knowledge of the effect of a loss or malfunction on the following CVCS components: Reason for excess letdown and its relationship to CCWS** | **Group #** | 1 |
| | **K/A #** | 004 K6.29 |
| | **Rating** | 2.7 |

**Question 15**

Unit 1 is at 100% power.

1) In accordance with OP B-1A:IV, CVCS – Excess Letdown - Place In Service and Remove From Service, Excess Letdown provides up to _______ gpm at 2235 psig RCS pressure.

2) Excess letdown is cooled by a _____________ CCW header.

A. 1) 40
   2) Vital

B. 1) 40
   2) Non-Vital

C. 1) 75
   2) Vital

D. 1) 75
   2) Non-Vital

**Proposed Answer:** B. 1) 40 2) Non-Vital

**Explanation:**

A. Incorrect. Firsr part is correct, at NOP, excess letdown can provide up to 40 gpm. Second part incorrect, excess letdown is cooled by the non-vital header.
B. Correct. Both parts correct. OP B-1A:IV states excess letdown can provide for up to 40 gpm at NOP and it is cooled by the CCW non-vital header (header C).
C. Incorrect. Both parts are incorrect. Excess letdown cannot provide the “normal” letdown amount of the letdown orifices. Plausible to think placing excess letdown in service is how this is done.
D. Incorrect. Second part is correct. Cooling is from the non-vital CCW header.

**Technical References**: OP AP-11 (header C table 5), OP B-1A:IV

**References to be provided to applicants during exam:** None

**Learning Objective**: State the purpose of CVCS components. (35749)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 3.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **004 K6.29 Knowledge of the effect of a loss or malfunction on the following CVCS components: Reason for excess letdown and its relationship to CCWS** | | **Group #** | 1 |
| | | **K/A #** | 004 K6.29 |
| | | **Rating** | 2.7 |

**Question 15**

Unit 1 is at 100% power.

1) In accordance with OP B-1A:IV, CVCS – Excess Letdown - Place In Service and Remove From Service, Excess Letdown provides up to _______ gpm at 2235 psig RCS pressure.

2) A loss of the __________ CCW header would cause cooling to be lost to the excess letdown heat exchanger.

A. 1) 40
   2) “A” Vital

B. 1) 40
   2) Non-Vital

C. 1) 75
   2) “A” Vital

D. 1) 75
   2) Non-Vital

**Proposed Answer:** B. 1) 40  2) Non-Vital

**Explanation:**
KA is met by knowing the reason for excess letdown and also what would cause a loss of cooling to the excess letdown heat exchanger (effect of malfunction of loss of CCW).

A. Incorrect. Firsr part is correct, at NOP, excess letdown can provide up to 40 gpm. Second part incorrect, excess letdown is cooled by the non-vital header.
B. Correct. Both parts correct. OP B-1A:IV states excess letdown can provide for up to 40 gpm at NOP and it is cooled by the CCW non-vital header (header C).
C. Incorrect. Both parts are incorrect. Excess letdown cannot provide the “normal” letdown amount of the letdown orifices. Plausible to think placing excess letdown in service is how this is done.
D. Incorrect. Second part is correct. Cooling is from the non-vital CCW header.

**Technical References**: OP AP-11 (header C table 5), OP B-1A:IV
**References to be provided to applicants during exam:** None
**Learning Objective**: State the purpose of CVCS components. (35749)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| **005 A1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: Closed cooling water flow rate and temperature** | **Tier #** | 2 |
| | **Group #** | 1 |
| | **K/A #** | 005 A1.03 |
| | **Rating** | 2.5 |

**Question 16**

GIVEN:
- Unit 2 is in MODE 6
- RHR pump 2-1 and both RHR Heat Exchangers are in service for decay heat removal
- CCW pumps 2-1 and 2-2 are operating
- CCW pump 2-3 is out of service

If one of the running CCW pumps is lost, the operator would throttle ____1)_____ HCV-670, RHR Heat Exchanger Bypass valve, and throttle ____2)______ HCV-637/638, RHR HX Outlet valve in order to maintain RCS temperature stable.

A. 1) open
   2) shut

B. 1) open
   2) open

C. 1) shut
   2) shut

D. 1) shut
   2) open

**Proposed Answer:** D. 1) shut 2) open

**Explanation:**

A. Incorrect Throttling open HCV-670 will bypass the heat exchanger and shutting HCV-637/638 will reduce the flow through the heat exchanger resulting in a smaller cooldown rate..
B. Incorrect – Throttling open HCV-670 will bypass the heat exchanger and limit cooldown rate in addition opening HCV-670 will exceed the 5000 GPM maximum flowrate to the cold legs.
C. Incorrect. Throttling HCV-670 and HCV 637/638 shut will limit the flow through the RHR heat exchanger and reduce total flow to the RCS cold legs resulting in a reduced cooldown rate.
D. Correct. Throttling shut HCV-670 while opening HCV-637/638 will maintain the flowrate to the loops below the 5000 GPM limit in addition to increasing flow through the RHR HX to maintain the same RCS cooldown rate due to the reduced CCW flow to the RHR HX.

**Technical References**: OP B-2:V, RHR – Place in Service, Revision 38, LB2, Residual Heat Removal System

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss abnormal conditions associated with the RHR system (20950)

**Question Source:** Bank #23 DCPP L111 11/2012 X

| | | |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 11/2012 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.8

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 2 |
| **103 A2.03 - Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations Phase A and B isolation** | **Group #** | 1 |
| | **K/A #** | 103 A2.03 |
| | **Rating** | 3.5 |

**Question 17**

GIVEN:
- A large break LOCA occurred
- RCS pressure is 40 psig
- Containment pressure is 25 psig and rising
- No charging pumps are running
- No RHR pumps are running
- Both SI pumps are running

For the accident in progress, the operator will _____1)_______ the RCPs because _______________2)______________________.

A. 1) NOT trip
   2) there are no charging pumps running

B. 1) NOT trip
   2) there is still cooling to the RCPs

C. 1) trip
   2) of Phase B actuation

D. 1) trip
   2) of Phase A actuation

**Proposed Answer:** C. 1) trip 2) OF Phase B actuation.

**Explanation:**
Applicability: In the scenario of this question, Phase A isolation occurs on SI, and Phase B isolation occurs at 22 psig containment pressure (malfunction on containment system). Phase B isolation closes containment isolation valves associated with RCP cooling (also an "operation" of a containment system). These valves are listed in procedure STP V-11 "Containment Isolation Phase B Valves FCV-355, FCV-356, FCV-357, FCV-363, FCV-749, and FCV-750" as meeting Technical Specification 3.6.3 (Containment Isolation Valves) SR 3.6.3.8. As such, they are included in the "Containment" Technical Specification family and meet the K/A system designator for Containment (#103). Knowledge of RCP trip criteria is RO knowledge.

A. Incorrect because the RCPs are being secured due to losing cooling. Plausible because they would not be tripped during a LOCA if there are no "high head" pumps running. This includes the charging and/or the SI pumps. If its not known the SI pumps constitute "high head" flow, this answer is plausible
B. Incorrect. RCPs are tripped. Plausible because CCW pumps are still available, and it could be not known the effect of high containment pressure on the CCW supply to the RCPs.
C. Correct. Loss of RCP motor cooling occurs when Phase B occurs (22 psig). RCPs are stopped to prevent damage to the motors due to overheating.

D. Incorrect. First part is correct. Second part plausible because Containment isolation occurs at Phase A, but the CCW valves to the RCPs remain open and do not close until Phase B occurs.

**Technical References**: EOP E-0 “Reactor Trip or Safety Injection”, Foldout Page; STP V-11

“Containment Isolation Phase B Valves FCV-(various)

**References to be provided to applicants during exam:** None

**Learning Objective**: State RCP trip criteria during EOP implementation. (4895)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.3

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **008 A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW temperature** | **Group #** | 1 |
| | **K/A #** | 008 A1.02 |
| | **Rating** | 2.9 |

**Question 18**

GIVEN:

- Unit 1 is at 100% power.
- One CCW heat exchanger is in service.
- Containment temperature is 90°F
- Spent Fuel Pool temperature is 75°F

CCW heat exchanger outlet temperature is 95°F and rising. The crew is going to reduce CCW loads in accordance with OP AP-11, Malfunction of Component Cooling Water system, Appendix B, CCW Heat Load Isolation.

In accordance with OP AP-11, Appendix B, which of the following CCW heat loads could the operators isolate to lower CCW temperature while the unit is at power?

A. Spent Fuel Pool Heat Exchanger

B. Containment Fan Cooler Units

C. Seal Water Heat Exchanger

D. RCP Oil Coolers

**Proposed Answer:** C. Seal Water Heat Exchanger

**Explanation:**

A. Incorrect. While operation would not be affected by isolating, according to the note in Appendix B, the SFP heat exchanger may act as a heat sink and should not be isolated.
B. Incorrect. According to the note in Appendix B, the CFCUs may act as a heat sink and should not be isolated
C. Correct. CCW isolated while the unit is at power.
D. Incorrect. The RCP coolers are isolated when reactor shutdown, not at power.

**Technical References**: OP AP-11, Appendix B

**References to be provided to applicants during exam:** None

**Learning Objective**: 3466 - Discuss the effects and actions associated with a loss of CCW

| | | |
|---|---|---|
| **Question Source:** | Bank #33 DCPP NRC 07/2011 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 07/2011 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.7

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **073 G2.2.38 – Process Radiation Monitoring: Knowledge of conditions and limitations in the facility license.** | **Group #** | 1 |
| | **K/A #** | 073 G2.2.38 |
| | **Rating** | 3.6 |

**Question 19**

Which of the following radiation monitors is required by Technical Specifications LCO 3.4.15, RCS Leakage Detection Instrumentation?

A. RM-2, Containment Area Monitor

B. RM-11, Containment Air Particulate Monitor

C. RM-30, Containment High Range Area Monitor

D. RM-44A, Containment Exhaust Monitor

**Proposed Answer:** B. RM-11, Containment Air Particulate Monitor

**Explanation:**
Technical Specifications are part of the facility license. Above the line LCO is RO knowledge.

A. Incorrect. This is a radiation monitor in containment and plausible to think it would detect leakage into the containment atmosphere but RM-11 and 12 are the radiation monitors required by LCO 3.4.15.
B. Correct. RM-11 and RM-12 are the radiation monitors required for LCO 3.4.15
C. Incorrect. This is a radiation monitor in containment and referred to in EOPs and plausible to think it would detect leakage into the containment atmosphere but RM-11 and 12 are the radiation monitors required by LCO 3.4.15
D. Incorrect. This is a radiation monitor in containment and plausible to think it would detect leakage into the containment atmosphere and it does cause containment isolation on high radiation, but RM-11 and 12 are the radiation monitors required by LCO 3.4.15

**Technical References**: LG-4A, LCO 3.4.15, STP I-1A

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss significant Technical Specifications and Equipment Control Guidelines associated with the Radiation Monitoring System.

- Apply TS 3.3 and 3.4 Technical Specification LCOs. (9697C/D)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.11 | |

Difficulty: 2.3

**Examination Outline Cross-Reference**

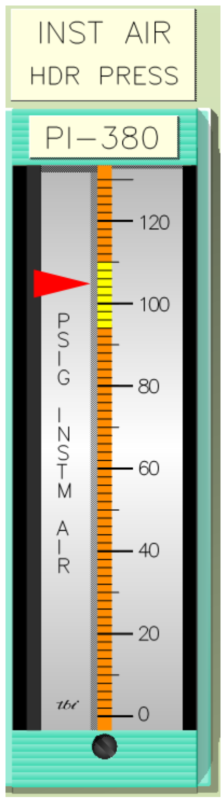
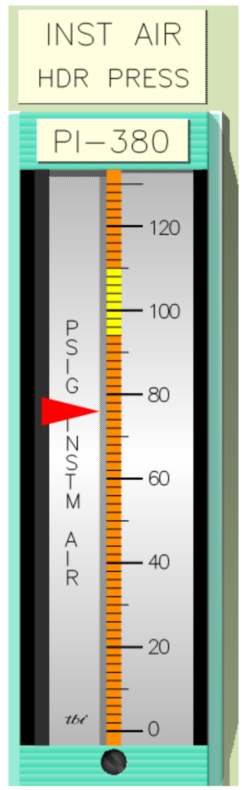
**078 A4.01 - Ability to manually operate and/or monitor in the control room: Pressure gauges**

| | |
|---|---|
| **Level** | RO |
| **Tier #** | 2 |
| **Group #** | 1 |
| **K/A #** | 078 A4.01 |
| **Rating** | 3.1 |

**Question 20**

Unit 1 is at 100% power.

The crew has entered OP AP-9, Loss of Instrument Air.

| | |
|---|---|
|  |  |
| Initial Pressure | Pressure 10 minutes later |

In accordance with OP AP-9, based on the PI-380 indication and rate of decrease, what will occur next?

A. Charging flow will begin to rise

B. the reciprocating air compressors will start

C. Instrument air to containment will be isolated

D. the Main Feedwater Reg valves may begin to close

**Proposed Answer:** D. the Main Feedwater Reg valves may begin to close

**Explanation:**

A. Incorrect. HCV-142 fails closed, charging will lower, not rise.
B. Incorrect. The Reciprocating air compressors start at approximately 92 psig.
C. Incorrect. FCV-584 closes at a higher pressure, approximately 85 psig.
D. Correct. According to the note in OP AP-9, the MFRV may begin to close at 75 psig.

**Technical References**: LB-1A, OP AP-9

**References to be provided to applicants during exam:** None

**Learning Objective**: 7209 - Discuss abnormal conditions associated with the Compressed Air System

| | | |
|---|---|---|
| **Question Source:** | Bank #54 DCPP L061C 02/2009 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 02/2009 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 2 |
| **022 K1.01 - Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: SWS/cooling system** | **Group #** | 1 |
| | **K/A #** | 022 K1.01 |
| | **Rating** | 3.5 |

**Question 21**

Which of the following lists ALL Unit 2 Containment Fan Coolers cooled by CCW Vital Header A?

A. 2-1 and 2-2 only

B. 2-3 and 2-4 only

C. 2-1, 2-2 and 2-5

D. 2-3, 2-4 and 2-5

**Proposed Answer:** B. 2-3 and 2-4

**Explanation:**

A. Incorrect. 2-1 and 2-2 are two of the three on header B.
B. Correct. Only two CFCUs are cooled by header A, 2-3 and 2-4
C. Incorrect. These three are cooled by header B
D. Incorrect. 2-3 and 2-4 are cooled by header A, but 2-5 is cooled by header B.

**Technical References**: LH-2, OIM F-2-1

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe CFCU components. • Component Cooling Water Supply (37580)

| | | |
|---|---|---|
| **Question Source:** | Bank #13 L141 04/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 04/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **006 K2.04 - Knowledge of bus power supplies to the following: ESFAS-operated valves** | | **Group #** | 1 |
| | | **K/A #** | 006 K2.04 |
| | | **Rating** | 3.6 |

**Question 22**

What is/are the 480 VAC power supply/supplies to the 1-1 Turbine Driven AFW Steam Generator AFW Control Valves, LCV-106, LCV-107, LCV-108 and LCV-109?

A. All four LCV's are powered from Bus G.

B. All four LCV's are powered from Bus H.

C. LCV-106 and LCV-107 are powered from Bus H. LCV-108 and LCV-109 are powered from Bus F.

D. LCV-106 and LCV-107 are powered from Bus F. LCV-108 and LCV-109 are powered from Bus G.

**Proposed Answer:** A. All four LCV's are powered from Bus G.

**Explanation:**

A. Correct. All LCV's are powered from Bus G
B. Incorrect. All are powered from the same MCC but it is G not H.
C. Incorrect. All are powered from Bus G. This is the power supply alignment for the 1-2 and 1-3 MDAFW pump LCVs.
D. Incorrect. Bus F the power supply for one the MDAFW pumps and Bus G supplies all (not half) the TDAFW valves.

**Technical References**: Sim VB3, LD-1

**References to be provided to applicants during exam:** None

**Learning Objective**: State the power supplies to Auxiliary Feed Water System components. (8405)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **013 K3.03 - Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment** | | **Group #** | 1 |
| | | **K/A #** | 013 K3.03 |
| | | **Rating** | 4.3 |

**Question 23**

GIVEN:

- Unit 2 trips when a small RCS break occurs
- One reactor trip breaker remains closed
- The following PKs are LIT:
  - o PK08-21, SAFETY INJECTION ACTUATION
  - o PK08-22, AUTO SI BLOCKED are both lit

Subsequently, containment pressure rises from 2 to 26 psig.

1) Phase B ______________________.

2) Containment Spray ___________________________.

A. 1) actuates
   2) actuates

B. 1) actuates
   2) does not actuate

C. 1) does not actuate
   2) actuates

D. 1) does not actuate
   2) does not actuate

**Proposed Answer:** A. 1) actuates 2) actuates

**Explanation:**

A. Correct. The failure of one train of SI to reset means *one* train of CS will still have an SI signal present (PK08-20). As such, one train of spray will actuate. SI signal present is not required for Phase B, therefore, Phase B will actuate.

B. Incorrect. First part is correct. Second part incorrect. Plausible that its thought with one signal reset, both trains and therefore no train of spray will actuate

C. Incorrect. First part incorrect. SI signal does not affect Phase B. If its thought that Phase B requires the SI signal, not containment spray and one SI signal removes the signal from the logic. This is similar to de-energizing Source Range nuclear instruments, only one IR channel is needed to energize P-6 and allow de-energizing both source ranges.

D. Incorrect. Both parts incorrect. Phase B does not require SI signal. If its thought that Phase B, like Containment Spray requires SI, and one reset removes the signal, this answer is plausible.

**Technical References**: OIM pages B-6-5 and B-6-8

**References to be provided to applicants during exam:** None

**Learning Objective**: 37123 - Discuss abnormal conditions associated with Eagle-21/SSPS

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #10 DCPP L121 08/2014 | X |

| | | |
|---|---|---|
| | New | |
| | Past NRC Exam DCPP 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 3.1

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **012 K5.02 Knowledge of the operational implications of the following concepts as the apply to the RPS: Power density** | **Group #** | 1 |
| | **K/A #** | 012 K5.02 |
| | **Rating** | 3.3 |

**Question 24**

What reactor trips are designed to prevent operation of the reactor with a power density of greater than 21.1 kW/foot?

A. Power Range Rate (Positive) and Power Range High Flux (High)

B. Power Range Rate (Positive) and Over Temperature Delta T (OTΔT)

C. Overpower Delta T (OPΔT) and Power Range High Flux (High)

D. Overpower Delta T (OPΔT) and Over Temperature Delta T (OTΔT)

**Proposed Answer:** C. Overpower Delta T (OPΔT) and Power Range High Flux (High)

**Explanation:**

A. Incorrect. Power Range High Flux is correct, however, PR rate (positive) is for ejected rod (flux peaking)
B. Incorrect. Power Range High Flux is correct, however, OTΔT is DNB protection.
C. Correct. OPΔT and Power Range High Flux are for excessive kw/foot (power density).
D. Incorrect. OPΔT is correct, OT is for DNB.

**Technical References**: OIM B-6-4-a

**References to be provided to applicants during exam:** None

**Learning Objective**: Analyze automatic features and interlocks associated with the Reactor Protection System. (37048)

| | | |
|---|---|---|
| **Question Source:** | Bank #10 DCPP L162 NRC 02/2018 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 02/2018 | Yes |
| **Question History:** | Last Two NRC Exams | Yes |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.2 | |

Difficulty: 2.5

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **010 K5.01 - Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables** | | **Group #** | 1 |
| | | **K/A #** | 010 K5.01 |
| | | **Rating** | 3.5 |

**Question 25**

GIVEN:

- Pressurizer liquid temperature is 604°F.
- Pressurizer vapor temperature is 618°F.
- RCS pressure is 1665 psig.

Given these conditions, the Pressurizer liquid is ____1)______ and the Pressurizer vapor is ____2)______.

A. 1) subcooled
   2) saturated

B. 1) subcooled
   2) superheated

C. 1) saturated
   2) saturated

D. 1) saturated
   2) superheated

**Proposed Answer:** B. 1) subcooled 2) superheated

**Explanation:**
Saturation temperature for 1680 psia is ~611°F (1700 psia = 613.13°F & 1650 psia = 609.05°F)
A. Incorrect. Plausible because the liquid is subcooled, however, if the steam tables are misread the vapor could be read as saturated.
B. Correct. Saturation temperature for 1665 psig is 611°F, therefore, the liquid is subcooled and the vapor is superheated.
C. Incorrect. Plausible if the steam tables are misread the liquid and vapor could be read as saturated.
D. Incorrect. Plausible because the vapor is superheated, however, if the steam tables are misread the liquid could be read as saturated.

**Technical References**: steam tables
**References to be provided to applicants during exam:** steam tables
**Learning Objective**: 40738 - Apply fundamentals topics associated with the Pzr, Pzr Pressure and Level Control System

| | | |
|---|---|---|
| **Question Source:** | Bank #07 L141 08/2014 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |

| | | |
|---|---|---|
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.14 | |

Difficulty: 2.0

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 2 |
| **076 K1.15 Knowledge of the physical connections and/or cause-effect relationships between the SWS and the following systems: FPS** | **Group #** | 1 |
| | **K/A #** | 076 K1.15 |
| | **Rating** | 2.5 |

**Question 26**

The crew is performing OP AP-11, Malfunction of Component Cooling Water System, Appendix D, Instructions for Loss of Ultimate Heat Sink, following a complete loss of ASW.

In accordance with OP AP-11, Appendix D, the crew will align ____1)______ to the ____2)_____ side of the CCW Heat Exchangers.

A. 1) Circulating Water
   2) tube

B. 1) Circulating Water
   2) shell

C. 1) Fire Water
   2) tube

D. 1) Fire Water
   2) shell

**Proposed Answer:** C. 1) Fire Water 2) tube

**Explanation:**

NOTE: ASW (synonymous to SWS at DCPP), is the normal cooling system to the heat exhangers. It flows thru the tubes and CCW flows thru the shell of the heat exchangers. Firewater can be aligned as the backup source in the event of a loss of UHS.

A. Incorrect. CW is a source of water that also uses saltwater. Second part is correct.
B. Incorrect. Both parts incorrect. CW is a plausible source as both ASW and CW are saltwater sources. Shell side is plausible if its thought CCW flows thru the tubes.
C. Correct. The appendix aligns firewater to a CCW heat exchanger by opening drains on either end of the heat exchanger and initiating flow thru the tubes of the heat exchanger.
D. Incorrect. Second part is not correct CCW flows thru the shell of the heat exchanger.

**Technical References**: LE-5, OVID 106717 sheet 8, OP AP-11 Appendix D

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe ASW System components. (37013)
Describe system interrelationships between the ASW System and other plant systems. (3785)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.4 | |

Difficulty: 2.3

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **062 A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including: Significance of D/G load limits** | | **Group #** | 1 |
| | | **K/A #** | 062 A1.01 |
| | | **Rating** | 3.4 |

**Question 27**

Unit 1 is at 100% power.

The crew is preparing to start and parallel Emergency Diesel Generator 1-1 to its Vital Bus in accordance with STP M-9A1, Diesel Engine Generator 1-1 Routine Surveillance Test.

In accordance with STP M-9A1, when the operator closes the output breaker, a minimum of ______1)____ MW should be picked up as soon as possible to prevent a trip due to ____________2)________________.

A. 1) 0.1
   2) directional (reverse) power

B. 1) 0.1
   2) overspeed

C. 1) 0.5
   2) directional (reverse) power

D. 1) 0.5
   2) overspeed

**Proposed Answer:** C. 1) 0.5 2) directional (reverse) power

**Explanation:**

A. Incorrect. Second part is correct. However, minimum load to pick up is 0.5 MW. 0.1 MW is the load at which the operator ensures the breaker is opened when securing from the run.
B. Incorrect. Both parts incorrect. Minimum load is 0.5 MW and trip is directional (reverse power). Overspeed is plausible if its believed that speed will rise with the breaker closed without load.
C. Correct. STP M-9A1 states that if load is not picked up as soon as possible after closing the DG output breaker, the breaker may trip open on directional (reverse) power relay actuation and instructs the operator to raise load to 0.5 MW when the breaker is closed.
D. Incorrect. First part is correct.

**Technical References**: STP M-9A1, OP J-6B:IV

**References to be provided to applicants during exam:** None

**Learning Objective**: 6408 - Describe significant precautions and limitations associated with the Diesel Generator System

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty: 2.5

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 2 |
| **007 A2.06 - Ability to (a) predict the impacts of the following malfunctions or operations on the PRTS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Bubble formation in PZR** | **Group #** | 1 |
| | **K/A #** | 007 A2.06 |
| | **Rating** | 2.6 |

**Question 28**

The crew is preparing to draw a bubble in the pressurizer using OP A-2:IX, Reactor Vessel-Vacuum Refill of the RCS.

In accordance with OP A-2:IX, the crew will ensure the PRT is ______1)_______ to ____________2)______________.

A. 1) filled to approximately 85%
   2) prevent air-in leakage past the PORVs and Safety Valves

B. 1) filled to approximately 85%
   2) ensure PRT gas space is purged

C. 1) drained to approximately 5%
   2) prevent air-in leakage past the PORVs and Safety Valves

D. 1) drained to approximately 5%
   2) ensure PRT gas space is purged

**Proposed Answer:** A. 1) filled to approximately 85%
2) prevent air-in leakage past the PORVs and Safety Valves

**Explanation:**

A. Correct. PRT level is raised to 85%. According to the note - PRT level is raised to approximately 85% to prevent air in-leakage past the PORVs and safety valves.
B. Incorrect. First part is correct. Second part incorrect. PRT level is raised. PRT purge is performed to reduce oxygen and hydrogen in OP A-4B:III but not for drawing a bubble, but for removing the PRT from service.
C. Incorrect. First part is incorrect. Plausible, as 3% is the level the PRT is drained to when removing from service. Second part corret. According to a note on page 13, PRT level is raised to approximately 85% to prevent air in-leakage past the PORVs and safety valves.
D. Incorrect. Both parts are incorrect.

**Technical References**: OP A-2:IX, OP A-4B:III, AR PK05-25

**References to be provided to applicants during exam:** None

**Learning Objective**: Draw a bubble in the Pressurizer (28370)

| | | |
|---|---|---|
| **Question Source:** | Bank #06 L161 NRC 10/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 3.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **029 K4.03 Knowledge of design feature(s) and/or interlock(s) which provide for the following: Automatic purge isolation** | | **Group #** | 1 |
| | | **K/A #** | 029 K4.03 |
| | | **Rating** | 3.2 |

**Question 29**

Containment Purge is in progress.

The following sequence of events occur:

- PK02-06, CONTMT VENT ISOLATION, alarms
- It is determined that the alarm was due to Containment Purge Radiation Monitor, RE-44A, failing high
- The operator attempts to reset the CVI signal with RE-44A still in alarm.

When the operator presses the RESET pushbuttons on VB1 the signal resets:

A. and is available to actuate again if RE-44B detects high radiation.

B. and immediately occurs again once the operator releases the reset pushbuttons.

C. however, a subsequent high radiation condition will not cause isolation to occur.

D. however, the containment purge cannot be re-established until the signal is cleared.

**Proposed Answer:** C. however, a subsequent high radiation condition will not cause isolation to occur.

**Explanation:**

A. Incorrect. Auto CVI is blocked.
B. Incorrect. Resetting the Containment Ventilation Isolation signal without first clearing the condition(s) that brought in the alarm will inhibit automatic containment ventilation isolation from another high radiation signal.
C. Correct. Auto CVI from RE-44B is blocked. Resetting the Containment Ventilation Isolation signal without first clearing the condition(s) that brought in the alarm will inhibit automatic containment ventilation isolation from another high radiation signal.
D. Incorrect. With the signal reset, purge can be re-established..

**Technical References**: OIM B-6-9a

**References to be provided to applicants during exam:** None

**Learning Objective**: 5119 - Analyze automatic features and interlocks associated with the Containment Purge System.

| | | |
|---|---|---|
| **Question Source:** | Bank #36 DCPP NRC 10/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.11 | |

Difficulty: 2.1

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **086 K6.04 - Knowledge of the effect of a loss or malfunction on the Fire Protection System following will have on the: Fire, smoke, and heat detectors** | | **Group #** | 2 |
| | | **K/A #** | 086 K6.04 |
| | | **Rating** | 2.6 |

**Question 30**

Per AR PK10-15, FIRE ALARM TROUBLE:

1) it can take as long as ____ seconds for the appropriate annunciator to scan all inputs.
2) if an event clears prior to being scanned, PK10-15 will ______________________________.

A. 1) 90
   2) not alarm

B. 1) 90
   2) still alarm

C. 1) 180
   2) not alarm

D. 1) 180
   2) still alarm

**Proposed Answer:** A. 1) 90 2) not alarm

**Explanation:**

A. Correct. According to AR PK10-15 The portion of the Fire Protection Network that originates annunciator signals **takes 90 seconds** to scan all inputs (60 seconds for IFDS). Depending on when it was last scanned, it can take up to 90 seconds (60 seconds for IFDS) for the Fire Protection Network to detect an alarming input and then alarm this annunciator. An event that clears before being scanned **will NOT** alarm.
B. Incorrect. First part is correct. Second part is incorrect. Plausible as the input could be thought to "latch" or have retentive memory such that it will still cause an alarm even its cleared. This could be thought to be a conservative fire prevention method to alert operators to a possible developing problem.
C. Incorrect. First part incorrect. 180 seconds is two times the time specified in the procedure. Second part correct.
D. Incorrect. Both parts incorrect.

**Technical References**: AR PK10-15

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe controls, indications, and alarms associated with the Fire Detection System. (37584)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |

**10CFR Part 55 Content:** 55.41.7
Difficulty: 2.9

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 2 |
| **033 A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Spent Fuel Pool Cooling System controls including: Radiation Monitoring Systems** | **Group #** | 2 |
| | **K/A #** | 033 A1.02 |
| | **Rating** | 2.8 |

**Question 31**

GIVEN:

- Radiation levels begin rising in the Fuel Handling Building
- At 1300 RM-58, Fuel Handling Building (FHB) Radiation Monitor, reaches the Alert setpoint (Amber light lit)
- At 1305, RM-58, Fuel Handling Building (FHB) Radiation Monitor, reaches the High setpoint (Red light lit)

1) What time did the FHB automatic ventilation changes associated with RM-58 occur?

2) An automatic action that occurs is the:

A. 1) 1300
   2) supply fan(s) stop

B. 1) 1300
   2) exhaust air is routed through a charcoal filter

C. 1) 1305
   2) supply fan(s) stop

D. 1) 1305
   2) exhaust air is routed through a charcoal filter

**Proposed Answer:** D. 1) 1305 2) exhaust air is routed through a charcoal filter

**Explanation:**

A. Incorrect. Both parts incorrect. Auto action occurs at the high (Trip 2) setpoint and ventilation realigns such that exhaust is routed through a charcoal filter by starting exhaust fan E-5 or E-6. A supply fan continues to run.
B. Incorrect. First part incorrect. Second part is correct.
C. Incorrect. First part is correct. Ventilation switches to Iodine Removal at the Trip 2 setpoint. Second part is incorrect. Plausible because it may be thought that supply fans should be stopped to force a negative pressure to prevent radioactivity from the room from exiting anywhere except out the ventilation system past effluent radiation monitors. However, fan capacities ensure a negative pressure with one supply and one exhaust fan running.
D. Correct. Exhaust fan E-5 or E-6 start and exhaust is routed through a charcoal filter to limit the radiation released.

**Technical References**: LH-7, LG-4A

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss abnormal conditions associated with the Fuel Handling Building Ventilation System. (40721)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |

| | | |
|---|---|---|
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.11 | |

Difficulty: 3.2

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **041 A2.02 -Ability to (a) predict the impacts of the following malfunctions or operations on the SDS; and (b) based on those predictions or mitigate the consequences of those malfunctions or operations Steam valve stuck open** | | **Group #** | 2 |
| | | **K/A #** | 041 A2.02 |
| | | **Rating** | 3.6 |

**Question 32**

GIVEN:
- The crew has entered EOP E-0.1, Reactor Trip Response, following a reactor trip
- AFW flow is 450 gpm
- Steam Generator Narrow Range levels are off scale low
- MSRs have been RESET
- Blowdown is isolated

The CO notes that RCS temperature is 540ºF and lowering and red and green lights are lit for two Group 2 steam dump valves. Only green lights are lit for all other steam dump valves.

In accordance with EOP E-0.1, the operator will:

A. close the MSIVs and MSIV Bypass valves.

B. place the STEAM DUMP CONTROL BYPASS SELECT switches, 43/SDA and 43/SDB in OFF RESET.

C. continue to monitor the steam dumps and check that they close when P-12 actuates.

D. place 40% STM DUMP VLVS PRESS CONT, HC-507 to MANUAL and press the DEC pushbutton.

**Proposed Answer:** A. close the MSIVs and MSIV Bypass valves.

**Explanation:**
A. Correct. Step 1.b. checks RCS temperature stable or trending to 547°F. If temperature is less than 547°F and lowering, actions are taken to stop/control the cooldown. With AFW flow already reduced and MSRs closed, the only action left is to close the MSIVs and bypass valves.
B. Incorrect. Placing the steam dumps in OFF will not cause the 2 valves that are open to close – because temperature is less than P-12 already, all steam dumps have a closed signal at this time.
C. Incorrect. Temperature is already below P-12. Plausible if the P-12 setpoint is not known.
D. Incorrect. Placing steam dumps in MANUAL would not close the Group 2 valves.

**Technical References**: EOP E-0.1
**References to be provided to applicants during exam:** None
**Learning Objective**:

| | | |
|---|---|---|
| **Question Source:** | Bank #62 DCPP NRC L031 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam #62 DCPP NRC 02/2005 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |

Comprehensive/Analysis

**10CFR Part 55 Content:** 55.41.5

Difficulty: 3.1

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **068 A3.02 - Ability to monitor automatic operation of the Liquid Radwaste System including Automatic isolation** | | **Group #** | 2 |
| | | **K/A #** | 068 A3.02 |
| | | **Rating** | 3.6 |

**Question 33**

RE-18, Liquid Radwaste radiation monitor, will automatically terminate a liquid radwaste discharge of a Floor Drain Receiver by:

NOTE:
- FCV-647, Filter 0-4 to ASW Overboard or EDRs
- RCV-18, Liquid Waste to Overboard
- FCV-477, Filters 04 and 05 outlet to EDRs

A. Closing RCV-18 only

B. Closing FCV-647 only

C. Closing RCV-18 and opening FCV-477

D. Closing FCV-647 and opening FCV-477

**Proposed Answer:** C. Closing RCV-18 and opening FCV-477

**Explanation:**
A. Incorrect. RCV-18 closes but additionally, FCV-477 opens.
B. Incorrect. FCV-647 does not close. Plausible as it is the next valve downstream of RE-18.
C. Correct. RE-18 in high alarm causes isolation by closing RCV-18 and opening a recirc path back by opening FCV-477
D. Incorrect. FCV-477 opens, however, RCV-18, not FCV-647 closes.

**Technical References**: OIM G-1-1 and G-3-1

**References to be provided to applicants during exam:** None

**Learning Objective**: 69251 - Explain the automatic actions associated with the Liquid Radwaste system.

| | | |
|---|---|---|
| **Question Source:** | Bank #61 DCPP L051 04/2007 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam #61 DCPP NRC 04/2007 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.11 | |

Difficulty: 2.2

| Examination Outline Cross-Reference | Level | RO |
|---|---|---|
| | Tier # | 2 |
| 027 A4.03 - Ability to manually operate and/or monitor in the control room: CIRS fans | Group # | 2 |
| | K/A # | 027 A4.03 |
| | Rating | 3.3 |

**Question 34**

1) During normal 100% power operations, ________ of the Containment Iodine Removal Fans are in service.

2) In EOP E-0, Reactor Trip of Safety Injection, Appendix E, ESF Auto Actions, Secondary and Auxiliaries Status, the operator ensures the Containment Iodine Removal Fans are _____________________.

A. 1) none
   2) ON

B. 1) none
   2) OFF

C. 1) one
   2) ON

D. 1) one
   2) OFF

**Proposed Answer:** B. 1) none 2) OFF

**Explanation:**

A. Incorrect. First part is correct. CIR fans are run to cleanup containment atmosphere when requested by chemistry. Normally, in OP L-1, "Plant Heat Up from Hot Shutdown to Hot Standby," OP L-5, "Plant Cooldown from Minimum Load to Cold Shutdown," or for any scheduled entry into Containment when iodine level is unacceptably high.

B. Correct. At power, the CIR fans are not run unless containment atmosphere cleanup is necessary before containment entry. During an accident, because the charcoal filters may catch fire, E-0 appendix E ensures the fans are off.

C. Incorrect. Both parts are incorrect. No units are normally in service and they are not run during accidents.

D. Incorrect. First part is incorrect. Second part is correct.

**Technical References**: E-0 Appendix E, LH-3

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss significant precautions and limitations associated with the Iodine Removal System. (5240)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **028 G2.1.27 – Hydrogen Recombiner and Purge Control – Knowledge of system purpose and/or function.** | | **Group #** | 2 |
| | | **K/A #** | 028 G2.1.27 |
| | | **Rating** | 3.9 |

**Question 35**

GIVEN:

- Large Break LOCA is in progress
- Core damage is occurring

Which of the following describes the minimum equipment that is needed in operation to maintain hydrogen at or below limits?

A. One Hydrogen Recombiner

B. Both Hydrogen Recombiners

C. One train of Containment Spray or both Hydrogen Recombiners

D. One train of Containment Spray and one Hydrogen Recombiner

**Proposed Answer:** A. One Hydrogen Recombiner

**Explanation:**

A. Correct. Only one recombiner is required. Each has 100% capacity.
B. Incorrect. More than the minimum, only one required.
C. Incorrect. Only train of Containment Spray is required to maintain containment pressure below design but is not credited for hydrogen removal. Plausible if iodine removal is confused with hydrogen removal.
D. Incorrect. Containment Spray is not credited for hydrogen removal.

**Technical References**: OP H-9, LI-2

**References to be provided to applicants during exam:** None

**Learning Objective**: 40834 - Explain significant CHPS design features and the importance to nuclear safety

| | | |
|---|---|---|
| **Question Source:** | Bank #33 L121 08/2014 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty: 2.8

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 2 |
| **045 K1.18 - Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the following systems: RPS** | | **Group #** | 2 |
| | | **K/A #** | 045 K1.18 |
| | | **Rating** | 3.6 |

**Question 36**

1) A Main Turbine Trip will cause a reactor trip if Reactor power is above __________.
2) In EOP E-0, Reactor Trip or Safety Injection, a turbine trip is verified by ensuring a minimum of _________ Stop Valves Closed.

A. 1) 35%
   2) 2

B. 1) 35%
   2) 4

C. 1) 50%
   2) 2

D. 1) 50%
   2) 4

**Proposed Answer:** D. 1) 50%   2) 4

**Explanation:**

A. Incorrect. Both parts incorrect. A turbine trip will cause a reactor trip above 50% (P-9). The trip signal is 4 of 4 stop valves closed, which is what is checked in E-0 as part of the immediate actions to verify the turbine is tripped. Both plausible, 35% is the setpoint for P-8, (RCS loop flow trip shift from 2 of 4 to 1 of 4). 2 of 4 is the coincidence for many reactor trips.
B. Incorrect. First part incorrect, second part correct. 4 stop valves closed is checked as part of the immediate actions in E-0.
C. Incorrect. First part correct. Second part incorrect, all 4 stop valves are checked, not 2.
D. Correct. First part correct, above P-9, 50%, a turbine trip will cause a reactor trip. Second part correct, all stop valves (4) are checked in E-0.

**Technical References**: OIM B-6-2, EOP E-0

**References to be provided to applicants during exam:** None

**Learning Objective**: Analyze automatic features and interlocks associated with the Reactor Protection System. • Turbine Trip(37048)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 3.3

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 2 |
| **014 K5.01 - Knowledge of the operational implications of the following concepts as they apply to the RPIS: Reasons for differences between RPIS and step counter** | **Group #** | 2 |
| | **K/A #** | 014 K5.01 |
| | **Rating** | 2.7 |

**Question 37**

Of the two Rod Position Indication Systems:

1) The most accurate is ______________________________.

2) The most reliable is _______________________________.

NOTE:
- DRPI – Digital Rod Position Indication
- BDPI – Bank Demand Position Indication

A. 1) DRPI
   2) BDPI

B. 1) DRPI
   2) DRPI

C. 1) BDPI
   2) DRPI

D. 1) BDPI
   2) BDPI

**Proposed Answer:** C. 1) BDPI 2) DRPI

**Explanation:**
To answer the question, it must be known how each system operates that makes each one the most reliable or accurate. Accuracy: The BDPI system is more accurate, capable of an accuracy of being within 1 step (5/8 inch) of the actual rod position. This is much more accurate than the Digital Rod Position Indication (DRPI) which has an accuracy of +4 steps. BDPI is considered to not be very reliable since it infers rod position indication without actually measuring it. In comparison, DRPI actually measures rod position and is thus more reliable.
A. Incorrect. Answers are backwards. DRPI more reliable, BDPI more accurate
B. Incorrect. While DRPI is the most reliable, (second part correct), the most accurate is BDPI.
C. Correct. BDPI is more accurate while DRPI is more reliable.
D. Incorrect. DRPI is more reliable.

**Technical References**: LA-3A

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe Rod Control System components. (36987)

| | | |
|---|---|---|
| **Question Source:** | Bank #35 DCPP NRC L121 08/2014 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41. | |

Difficulty: 2.0

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 2 |
| **017 K3.01 - Knowledge of the effect that a loss or malfunction of the ITM system will have on the following: Natural circulation indications** | **Group #** | 2 |
| | **K/A #** | 017 K3.01 |
| | **Rating** | 3.5 |

**Question 38**

The crew is verifying natural circulation is established in accordance with E-0.1, Reactor Trip Response. Subcooling, as displayed on VB2, is 40°F. All core exit thermocouples are reading 570°F.

A single core exit thermocouple failing ___1)____ will cause subcooling indication to indicate ___2)____ subcooling.

A. 1) LOW 2) MORE

B. 1) LOW 2) LESS

C. 1) HIGH 2) MORE

D. 1) HIGH 2) LESS

**Proposed Answer:** D. 1) HIGH 2) LESS

**Explanation:**

A. Incorrect. Low failure would not affect indication. Only the highest is used, not an average.
B. Incorrect. Low failure would not affect indication. Only the highest is used, not an average
C. Incorrect. The highest temperature is used to determine subcooling. If temperature rises, the calculation of Tsat to "actual" Temperature will less and indicated subcooling will be LESS. Plausible if the thought is higher temperature equals more subcooling (as it would be if pressure was raised and raised Tsat).
D. Correct. If "actual" temperature rises, the difference between Tsat and actual is less and subcooling will be less.

**Technical References**: LA-2D, E-0.1

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe RVLIS components • Subcooled Margin Monitor

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #33 DCPP L141 04/2016 | X |
| | New | |
| | Past NRC Exam DCPP NRC 04/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.2 | |

Difficulty: 2.3

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **EPE 055 EK3.02 - Knowledge of the reasons for the following responses as the apply to the Station Blackout: Actions contained in EOP for loss of offsite and onsite power** | | **Group #** | 1 |
| | | **K/A #** | EPE 055 EK3.02 |
| | | **Rating** | 4.3 |

**Question 39**

The crew is performing EOP ECA-0.0, Loss of Vital AC Power, step 18, DEPRESSURIZE Intact Steam Generators To Reduce RCS Pressure To Inject Accumulators.

According to the background document for EOP ECA-0.0, the reason for stopping the depressurization when steam generator pressure is less than 300 psig is to prevent:

A. injection of accumulator nitrogen.

B. drawing a bubble in the reactor vessel head.

C. tube failure due to high RCS/steam generator DP.

D. challenging RCS Integrity Critical Safety Function.

**Proposed Answer:** A. injection of accumulator nitrogen.

**Explanation:**

A. Correct. Per ECA-0.0 background, the target SG pressure for Step 18 should ensure that RCS pressure is above the minimum pressure to preclude injection of accumulator nitrogen into the RCS. The target SG pressure should be based on the nominal SG pressure to preclude nitrogen addition, plus margin for controllability (e.g., 100 psi).
B. Incorrect. During the depressurization a head bubble may occur (caution states the depressurization is not stopped if it occurs). Plausible as most procedures try to avoid bubble formation.
C. Incorrect. DP across steam generator U-tubes has a normal 1700 psid limit. This is not the concern during the depressurization.
D. Incorrect. This is the reason for stopping at 310°F.

**Technical References**: ECA-0.0 and background

**References to be provided to applicants during exam:** None

**Learning Objective**:

| | | |
|---|---|---|
| **Question Source:** | Bank #DCPP Bank B-1021 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.0

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 1 |
| **EPE 007 EA1.03 - Ability to operate and monitor the following as they apply to a reactor trip: RCS pressure and temperature** | **Group #** | 1 |
| | **K/A #** | EPE 007 EA1.03 |
| | **Rating** | 4.2 |

**Question 40**

The crew is performing EOP E-0, Reactor Trip or Safety Injection. RCS temperature is 542°F and rising slowly.

In EOP E-0,

1) per the Foldout page, the operator will trip the RCPs if RCS _______________________.
2) at Step 6, CHECK RCS Temperature, the operator will stabilize temperature at ______________________________.

A. 1) subcooling is less than 20°F
   2) 542°F

B. 1) subcooling is less than 20°F
   2) 547°F

C. 1) pressure is less than 1300 psig
   2) 542°F

D. 1) pressure is less than 1300 psig
   2) 547°F

**Proposed Answer:** C. 1) pressure is less than 1300 psig 2) 542°F

**Explanation:**

A. Incorrect. Subcooling is used for many EOP transitions, SI termination, and RCP trip criteria, however, RCS pressure is the criteria used for RCP trip. Second part correct.
B. Incorrect. First part incorrect.. Second part is incorrect. If temperature is higher, action is taken to lower temperature to 547°F. Also, no load RCS temperature is 547°F and steps in the EOPs check is temperature is trending to 547°F.
C. Correct. Both parts correct. RCS pressure less than 1300 psig is the criteria for RCP trip. If temperature is low, action is taken to stabilize temperature at its current value to limit the inventory in the pressurizer in the event of an inadvertent SI.
D. Incorrect. First is correct. Second part is incorrect.

**Technical References**: EOP E-0

**References to be provided to applicants during exam:** None

**Learning Objective**: 4895 - State RCP trip criteria during EOP implementation
77210 - From memory, explain the guidance to respond to a reactor trip, per EOP E-0 and EOP E-0.1.

| **Qquestion uestion Source:** | Bank # | |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.3

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 040 AA2.01 - Ability to determine and interpret the following as they apply to the Steam Line Rupture: Occurrence and location of a steam line rupture from pressure and flow indications** | | **Group #** | 1 |
| | | **K/A #** | APE 040 AA2.01 |
| | | **Rating** | 4.2 |

**Question 41**

Unit 1 is at 15% power.

A steam break occurs causing:
- Reactor trip
- SI
- MSI
- FWI
- All equipment operated as designed

Current Steam Generator Pressures:
- 1-1 – 900 psig, stable
- 1-2 – 200 psig, decreasing
- 1-3 – 200 psig, decreasing
- 1-4 – 870 psig, stable

The steam break:

A. cannot be isolated.

B. was isolated when the MSIVs closed.

C. will be isolated by the operator closing TDAFW pump 1-1 Steam Inlet valve, FCV-95.

D. will be isolated by the operator closing both TDAFW pump 1-1 Steam Supply valves, FCV-37 and FCV-38.

**Proposed Answer:** D. will be isolated by the operator closing both TDAFW pump 1-1 Steam Supply valves, FCV-37 and FCV-38

**Explanation:**

A. Incorrect. The break is downstream of the steam valves to the TDAFW and can be isolated. Plausible if its thought the break is upstream of the steam headers to the TDAFW pump. If so, the break would be unisolable.

B. Incorrect. The break is not isolated. Plausible if its thought the pressure is lowering in the 1-2 and 1-3 steam generators due to the TDAFW pump running.

C. Incorrect. FCV-95 is closed at power. If there was a leak downstream of the valve, the plant would not have tripped.

D. Correct. The break is downstream of the normally open FCV-37 and 38. Closing both valves will isolate the leak.

**Technical References**: OVID 106704 sheet 4

**References to be provided to applicants during exam:** None

**Learning Objective**: 40561 - Describe the basic flow path of the main steam system

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #48 DCPP L051 04/2007 | X |
| | New | |
| | Past NRC Exam DCPP NRC 04/2007 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 3.2

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 008 G2.4.4 – Pressurizer Vapor Space Accident: Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.** | | **Group #** | 1 |
| | | **K/A #** | APE 008 G2.4.4 |
| | | **Rating** | 4.5 |

**Question 42**

GIVEN:
- Unit 1 is at 100% power
- RCS pressure is 2235 psig and lowering slowly
- PRT pressure is 5 psig and rising slowly

For the current plant conditions, what indication(s) would cause the crew to confirm there is seat leakage through a PORV for entry into OP AP-1, Excessive Reactor Coolant System Leakage?

1. PORV tailpipe temperature indication, TI-463, reads top of scale, 400°F
2. PORV tailpipe temperature indication, TI-463, reads 230°F and rising
3. Sonic Flow is indicated

A. 1 only

B. 2 only

C. 1 and 3

D. 2 and 3

**Proposed Answer:** B. 2 only

**Explanation:**

A. Incorrect. A reading at top of scale is most likely an instrument failure. Also, saturation temperature for 400°F is approximately 225 psig, well above the PRT pressure. Plausible if its thought temperature is driven by pressurizer temperature, 650°F.
B. Correct. The isenthalpic process would have tailpipe temperature going to saturation temperature for the PRT. At 5 psig, (20 psia), this temperature is approximately 230°F. Also, the sonic indicators, unlike the tailpipe temperatures, are on separate headers for each pressurizer safety and do not respond to steam leaking past a PORV, only safety steam flow.
C. Incorrect. Both parts are incorrect.
D. Incorrect. First part is correct. However, sonic flow will not respond to PORV leakby, only Pressurizer Safety leakby.

**Technical References**: AR PK05-23, steam tables, LPA-13

**References to be provided to applicants during exam:** Steam Tables

**Learning Objective**: Discuss why having a solid understanding of plant design, engineering principles, and sciences is a necessary operator fundamental. (56220)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.2

**Examination Outline Cross-Reference**

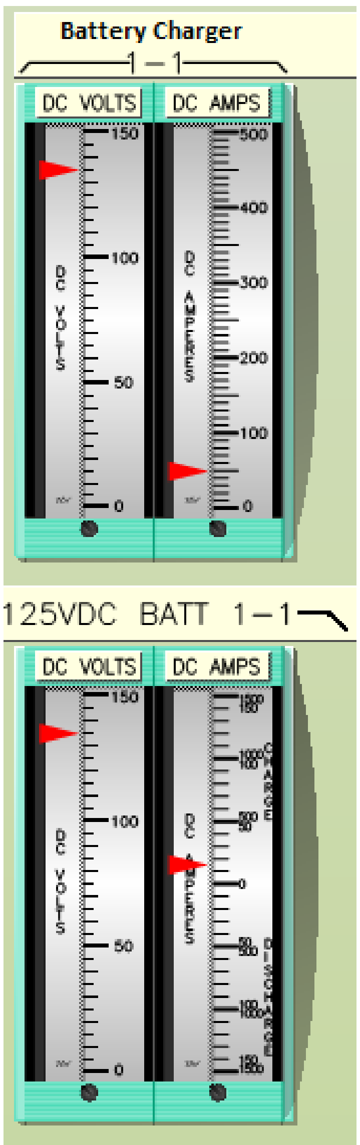
**APE 058 AK1.01 - Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation**

| | |
|---|---|
| **Level** | RO |
| **Tier #** | 1 |
| **Group #** | 1 |
| **K/A #** | APE 058 AK1.01 |
| **Rating** | 2.8 |

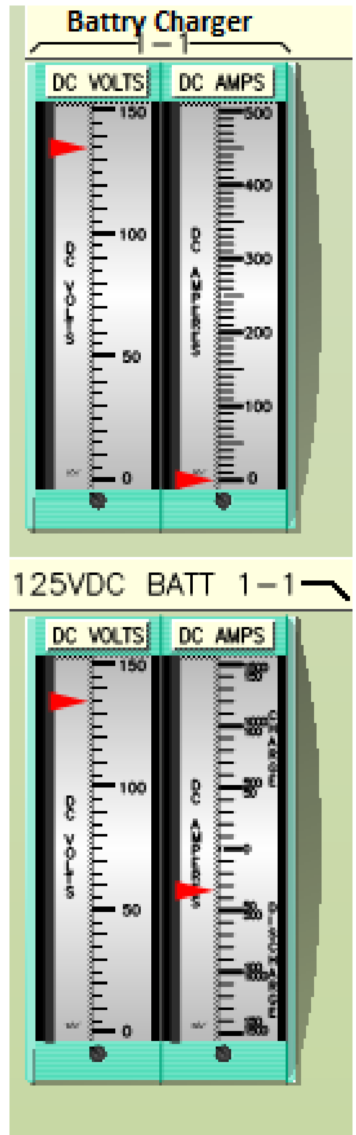
**Question 43**

Unit 1 is at 100% power.

Initial Indications




Current Indications




The current indications are consistent with:

A. the loss of DC Bus 1-1.

B. a loss of 480 VAC bus H.

C. placing of the battery on equalizing charge.

D. opening the battery charger output breaker.

**Proposed Answer:** D. opening the battery charger output breaker.

**Explanation:**

A. Incorrect. While DC amps of the charger are at 0, negative amps on the battery indicate the battery is carrying the bus, not a loss of the bus.
B. Incorrect. The normal supply to Battery Charger 1-1 is bus F. loss of Bus H would not impact DC bus 1-1. Plausible as EDG 1-1 supplies bus H.
C. Incorrect. Equalizing charge would have higher battery voltage and there would still be amps indicated on the charger.
D. Correct. Opening the charger output breaker would result in the battery supplying the bus. Indications would be 0 amps from the charger and negative amps from the battery, as it is now carrying load. .

**Technical References**: OIM J-1-1 and J-1-2

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss abnormal conditions associated with the DC Power System. (5193)

| | | |
|---|---|---|
| **Question Source:** | Bank #49 DCPP L091 07/2011 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam #49 DCPP NRC 07/2011 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.5

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 1 |
| **APE 025 AK2.01 - Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: RHR heat exchangers** | **Group #** | 1 |
| | **K/A #** | APE 025 AK2.01 |
| | **Rating** | 2.9 |

**Question 44**

GIVEN:

- Unit 1 is in MODE 5
- Both trains of RHR are in service
- Total RHR flow is 3000 gpm (both RHR pumps running)

Instrument air pressure to HCV-637, 1-2 RHR Heat Exchanger outlet valve, has just been lost.

RHR flow to loop 3 and 4 cold legs will:

A. lower to zero.

B. lower to a minimum flow limited by a mechanical stop.

C. rise to runout conditions.

D. rise to a maximum flow limited by a mechanical stop.

**Proposed Answer:** D. rise to a maximum flow limited by a mechanical stop

**Explanation:**

A. Incorrect HCV-637 will fail open raising flow. Plausible because it may be thought that the valve will fail closed on loss of air as there is not a mechanical stop on closing.
B. Incorrect. HCV-637 will fail open raising flow. Plausible because there is a mechanical stop to ensure some minimum flow (like there is for opening), then this is a logical answer.
C. Incorrect. HCV-637 will fail open raising flow. However, it is limited by a stop to prevent runout. If this is not known, runout is a logical answer.
D. Correct. RHR heat exchanger outlet valves (HCV-637 and 638) are fail open valves. With HCV-637 open (to its stop) flow can rise to between 3976 gpm and < 4319 gpm, limited by a mechanical stop. Flow to the loops will rise.

**Technical References**: LB-2; OIM B-3-1

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss abnormal conditions associated with the RHR system (20950)

| | | |
|---|---|---|
| **Question Source:** | Bank #04 DCPP L141 04/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 04/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.3

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 1 |
| **APE 022 AK3.06 - Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: RCP thermal barrier cooling** | **Group #** | 1 |
| | **K/A #** | APE 022 AK3.06 |
| | **Rating** | 3.2 |

**Question 45**

Unit 1 is at 100% power.

A loss of seal injection to all RCPs occurs.

For the current plant conditions, stopping of all RCPs ___1)___ required ______________2)______________.

A. 1) is
   2) immediately, before tripping the reactor

B. 1) is
   2) after the reactor is tripped

C. 1) is NOT
   2) because RCP seal flow is now from CCW

D. 1) is NOT
   2) because RCP seal flow is now from RCS cooled by the thermal barrier heat exchanger

Proposed Answer: D. 1) is NOT 2) because RCP seal flow is now from RCS cooled by the thermal barrier heat exchanger

**Explanation:**

A. Incorrect. A trip is not required as long as CCW supplies the RCP thermal barrier. Plausible as SDS (passive Shutdown Seal) actuation is a concern if all cooling is lost and the seal heats up to greater than 260°F
B. Incorrect. A trip is not required as long as CCW supplies the RCP thermal barrier. Plausible as SDS (passive Shutdown Seal) actuation is a concern if all cooling is lost and the seal heats up to greater than 260°F
C. Incorrect. First part is correct. CCW cools the thermal barrier heat exchanger, it does not replace the charging injection. Plausible if the flow paths are not understood.
D. Correct. The loss of seal injection allows RCS to begin to flow up the shaft of the RCP. This RCS is cooled to approximately 140°F as it travels up the shaft of the pump and enters the number 1 seal. This is acceptable as long as CCW is supplying the thermal barrier.

**Technical References**: LA-6, OP L-1, AR PK04-22
**References to be provided to applicants during exam:** None
**Learning Objective**: Discuss abnormal conditions associated with the RCP. (35744)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.3 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 027 AA1.01 - Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, and PORVs** | | **Group #** | 1 |
| | | **K/A #** | APE 027 AA1.01 |
| | | **Rating** | 4.0 |

**Question 46**

Unit 1 is at 100% power.

Following a transient, HC-455K, PZR Press Control, output is 90.0% and rising.

1) Pressurizer Spray valves will be _____________.

2) Pressurizer PORV(s) will be _____________.

A. 1) partially open
   2) closed

B. 1) partially open
   2) open

C. 1) fully open
   2) closed

D. 1) fully open
   2) open

**Proposed Answer:** D. 1) fully open 2) open

**Explanation:**

A. Incorrect. Based on the current output, the sprays and PORVs will be open. The spray valves begin to open at a setpoint of 40.6% which corresponds to a pressure 25 psig above 2235 (2260). The spray valves are fully open at 71.9% or +75 psig (2310 psig). The PORVs open at 87.5% or 100 psig above setpoint (2335 psig) If the fully open spray valve setpoint is not known, its plausible to think only pressurizer spray valves are open.
B. Incorrect. Plausible if its thought the setpoints for less than fully open sprays and PORVs open overlap.
C. Incorrect. There is a pressure band when the sprays are open and PORVs closed, but this is from 71.9% to 87.5% (2310 to 2335 psig)
D. Correct. Sprays are fully open at 71.9% and PORVs open at 87.8%. If output is 90%, sprays are fully open and the PORVs are also open.

**Technical References**: OIM page A-4-5

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe the operation of the Pressurizer, Pressure & Level Control System. (4585)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # 2016 South Texas Project, #58 | X |
| | New | |
| | Past NRC Exam | Yes |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.6

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 1 |
| **E05 EA2.2 - Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink) Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments** | **Group #** | 1 |
| | **K/A #** | E05 EA2.2 |
| | **Rating** | 3.7 |

**Question 47**

GIVEN:

- A total loss of Main Feedwater and Auxiliary Feedwater occurs
- The crew is performing the actions of EOP FR-H.1, Response to Loss of Secondary Heat Sink
- Bleed and Feed has been initiated
- All steam generators are "dry"
- Core Exit Thermocouples are 555°F, rising slowly

The capability to feed all steam generators using the TDAFW pump has been restored.

Per EOP FR-H.1, what action should be taken by the crew?

A. Fully open <u>one</u> TDAFW LCV to establish maximum AFW flow to one steam generator.

B. Fully open <u>all</u> TDAFW LCVs to establish maximum AFW flow to all steam generators.

C. Throttle open <u>one</u> TDAFW LCV to establish AFW flow of 25 to 100 gpm to one steam generator.

D. Throttle open <u>all</u> TDAFW LCVs to establish AFW flow of 25 to 100 gpm to each steam generator.

**Proposed Answer:** A. Fully open one TDAFW LCV to establish maximum AFW flow to one steam generator.

**Explanation:**

A. Correct. With core exit temperatures increasing, maximum flow to restore a heat sink as quickly as possible is necessary.
B. Incorrect because only one steam generator is used in order to limit potential faults to only that steam generator. Plausible because the need to re-establish a heat sink is urgent and the TDAFW pump would normally be used to feed all steam generators.
C. Incorrect because maximum flow to one steam generator is to be used if core exit thermocouples are rising. Plausible because 100 gpm is the top end of the allowable flow band (25-100 gpm) to one dry steam generator if core exit temperatures are lowering.
D. Incorrect because only one steam generator is used in order to limit potential faults to only that steam generator. Plausible because the TDAFW pump would normally be used to feed all steam generators, and the restricted flow band of 25-100 gpm would be used if core exit temperatures were stable or lowering.

**Technical References**: EOP FR-H.1 Foldout page

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain feeding a dry S/G including: (6375)

• Definition of dry S/G

• Effects of feeding a dry S/G

| | | |
|---|---|---|
| **Question Source:** | Bank #50 L161 10/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.7

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 1 |
| **E11 G2.2.22 – Loss of Emergency Coolant Recirc - Knowledge of limiting conditions for operations and safety limits.** | **Group #** | 1 |
| | **K/A #** | E11 G2.2.22 |
| | **Rating** | 4.0 |

**Question 48**

The crew has entered EOP ECA-1.1, Loss of Emergency Recirculation.

They are performing step 13, "ESTABLISH One Train Of SI Flow".

In accordance with EOP ECA-1.1, which of the following alignments for Charging Pumps (CCP) and Safety Injection Pumps (SIP) would be acceptable?

A. CCP 1-1 and SIP 1-1

B. CCP 1-2 and SIP 1-2

C. CCP 1-3 and SIP 1-1

D. CCP 1-3 and SIP 1-2

Proposed Answer: B. CCP 1-2 and SIP 1-2

**Explanation:**
NOTE: bank question KA is EA2.2 which has wording that mirrors selected generic KA.

The limiting condition for operation is the application of the note which states: The ECCS CCPs and SI Pps should be stopped in alternate trains when possible. According to the DCPP background document the basis is so if one train is disabled, some flow will still be available.

A. Incorrect. The note before step 13 provides guidance to leave pumps in alternate trains. running. This refers to power supplies such that if a single power supply was lost, that all running equipment would not be simultaneously lost. CCP 1-1 and SIP 1-1 are both from bus F and does not meet the alternate train guidance.
B. Correct. CCP 1-2 and SIP 1-2 meet the alternate train requirement because they are powered from Vital 4 kV buses G and H respectively.
C. Incorrect. Either CCP 1-1 or 1-2 should be running. CCP 1-3 is the non-ECCS CCP. Plausible because CCP 1-3 is powered from bus G (train B) and SIP 1-1 is from bus F (train A).
D. Incorrect. Either CCP 1-1 or 1-2 should be running during accident conditions, although CCP 1-3 is functional, it is the non-ECCS CCP. Plausible because CCP 1-3 and SIP 1-2 are powered from different buses, which meets the guidance in the note prior to step 13.

**Technical References**: EOP ECA-1.1 and background

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain basis of emergency procedure steps for ECA-1.1. (42460)

| | | |
|---|---|---|
| **Question Source:** | Bank #55 DCPP L141 04/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 04/2016 | Yes |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 3.1

| Examination Outline Cross-Reference | Level | RO |
|---|---|---|
| | Tier # | 1 |
| **APE 062 AK3.03 - Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: Guidance actions contained in EOP for Loss of nuclear service water** | Group # | 1 |
| | K/A # | APE 062 AK3.03 |
| | Rating | 4.0 |

**Question 49**

The crew is aligning Unit 1 for Cold Leg Recirculation in accordance with EOP E-1.3, Transfer to Cold Leg Recirculation.

Only one train of ASW is available.

When the crew completes the alignment, the reason only one RHR heat exchanger and three CFCUs will be in operation is to prevent:

A. runout of the ASW pump.

B. runout of the CCW pump.

C. flashing and water hammer in the ASW system.

D. exceeding CCW system temperature design limit.

**Proposed Answer:** D. exceeding CCW system temperature design limit.

**Explanation:**
Design of the ASW (Diablo equivalent to Nuclear Service Water) system is to adequately remove CCW heat. EOP E-1.3 includes operator actions to limit the heat loads during post-LOCA cold-leg recirculation if less than two ASW pumps and two CCW heat exchangers are in Service (a loss of one train).

A. Incorrect. With a single train of CCW in service, its plausible the student could focus on the single CCW train and believe runout is a possibility. The problem is due to the lack of cooling (from ASW), CCW heat removal is reduced to the point that if loads are not restricted, design temperature could be exceeded.
B. Incorrect. The system is designed for one pump to supply both CCW trains during normal operation without runout. Plausible because, if one train is supplying both trains of CCW, then its possible to think the loads could cause the only running ASW pump to approach runout.
C. Incorrect. Temperature remains less than saturation. Plausible because if two trains of CCW were put into service with only one train of ASW, temperature will rise.
D. Correct. The heat load of all the loads on the CCW with only one ASW train could cause the system to not be able to meet its purpose to remove heat from the CCW system and the CCW system could exceed its design temperature

**Technical References**: EOP E-1.3, LF-2, FSAR

**References to be provided to applicants during exam:** None

**Learning Objective**: 8105 - Explain significant CCW system design features and the importance to nuclear safety

**Question Source:** Bank #53 DCPP L162 02/2018 X

| | | |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 02/2018 | Yes |
| **Question History:** | Last Two NRC Exams | Yes |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty: 2.2

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **E04 EK2.2 - Knowledge of the interrelations between the (LOCA Outside Containment) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.** | | **Group #** | 1 |
| | | **K/A #** | E04 EK2.2 |
| | | **Rating** | 3.8 |

**Question 50**

The crew is performing the actions in EOP ECA-1.2, LOCA Outside Containment.

In accordance with EOP ECA-1.2:

1) what system is isolated when attempting to locate the leak?

2) what indication is used to determine if the leak has been isolated?

A. 1) RHR
   2) Pressurizer level

B. 1) RHR
   2) RCS pressure

C. 1) Charging Injection
   2) Pressurizer level

D. 1) Charging Injection
   2) RCS pressure

Proposed Answer: B. 1) RHR 2) RCS pressure

**Explanation:**

A. Incorrect. Incorrect. Pressurizer level will increase, but after pressure begins to rise and the system is refilled. RCS pressure is checked in ECA-1.2
B. Correct. RHR is isolated, one train at a time. If the leak is isolated, pressure will respond and quickly repressurize the system as SI flows into the now intact system.
C. Incorrect. Both parts incorrect. RHR is isolated, as it is the low pressure system and deemed to be the most likely location for a LOCA outside containment. The procedure checks RCS pressure not pressurizer level.
D. Incorrect. Second part is correct, however, RHR not Charging injection is isolated.

**Technical References**: ECA-1.2

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain basis of emergency procedure steps for ECA-1.2. (42461, 7920H)

| | | |
|---|---|---|
| **Question Source:** | Bank #53 L091C 03/2012 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 03/3012 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.6

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 1 |
| **APE 057 AK3.01 - Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus** | **Group #** | 1 |
| | **K/A #** | APE 057 AK3.01 |
| | **Rating** | 4.1 |

**Question 51**

Unit 1 is at 100% power.

All instrument AC power from PY-13 and PY-14 is lost.

1) __________ reactor trip breaker(s) will be open.
2) PK08-21, SAFETY INJECTION ACTUATION will be ___________.

A. 1) Only one
   2) lit

B. 1) Only one
   2) NOT lit

C. 1) Both
   2) lit

D. 1) Both
   2) NOT lit

Proposed Answer: C. 1) Both 2) lit

**Explanation:**

Candidate must understand the reason the reactor trip breakers would/would not be open and why SI would or would not actuate for a loss of 2 instrument buses in order to answer the question successfully.

A. Incorrect. Second part is correct. Loss of PY-14 causes a loss of one train of SI, however, SI actuates and both RTBs open.
B. Incorrect. Both RTBs open. One train of SI actuates and the PK will be lit due to the coincidence met for actuation due to the loss of two trains of bistables.
C. Correct. Both RTBs UV coils will de-energize and cause a reactor trip due to 2 trains of trip bistables tripping on the loss of power to the PY's. While one train of slave relays for SI is de-energized, SI actuates for the second train and PK08-21 will be lit.
D. Incorrect. First part correct. Second part is plausible due to loss of one train of slave relays and it could be thought that the second train is powered from PY-13.

**Technical References**: OIM B-6-1b, OP AP-4

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain the consequences of loss of vital instrument bus. (4274)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 3.2

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 015 AA1.03 - Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Reactor trip alarms, switches, and indicators** | | **Group #** | 1 |
| | | **K/A #** | APE 015 AA1.03 |
| | | **Rating** | 3.7 |

**Question 52**

Unit 1 is at 40% power. Main Turbine load is 410 MWe.

RCP 1-1 trips.

1) As a result of the RCP 1-1 trip, PK04-14 REACTOR TRIP ACTUATED will __________ lit.

2) Indicated RCS flow in RCS Loop 1-1 will stabilize at approximately ____%.

A. 1) NOT be 2) 0

B. 1) NOT be 2) 30

C. 1) be 2) 0

D. 1) be 2) 30

**Proposed Answer:** D. 1) be 2) 30

**Explanation**

A. Incorrect. P-8, Loss of flow, will cause a reactor trip when REACTOR power is above 35%. If its thought its turbine power for P-8 (as it is with P-13 or C-5), then power would be below P-8 and would not cause a trip. Loop flow will lower but stabilize at approximately 30% due to reverse flow from the other loops.
B. Incorrect. First part incorrect, power is above P-8 and the RCP trip will cause a reactor trip. Second part is correct, flow lowers but because of reverse flow through the affected loop, flow will indicate approximately 30%.
C. Incorrect. First part is correct. Second part is incorrect. Flow will stabilize at approximately 30%.
D. Correct. Both parts correct. The reactor will trip and RCS flow, due to reverse flow, will indicate approximately 30%.

**Technical References**: LB-6A, OIM B 6-2, 6-3, 6-4a

**References to be provided to applicants during exam:** None

**Learning Objective**: Analyze automatic features and interlocks associated with the Reactor Protection System. (37048)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.4

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **EPE 038 EA2.12 - Ability to determine or interpret the following as they apply to a SGTR: Status of MSIV activating system** | | **Group #** | 1 |
| | | **K/A #** | EPE 038 EA2.12 |
| | | **Rating** | 3.9 |

**Question 53**

GIVEN:

| S/G | Narrow Range Level | Trend | Steam Generator Pressure | Trend |
|---|---|---|---|---|
| 1-1 | 92% | Rising slowly | 1040 psig | Stable |
| 1-2 | 22% | Rising slowly | 800 psig | Lowering slowly |
| 1-3 | 22% | Rising slowly | 800 psig | Lowering slowly |
| 1-4 | 0% | Offscale | 550 psig | Lowering rapidly |

- The crew has performed EOP E-2, Faulted Steam Generator Isolation and has entered EOP E-3, Steam Generator Tube Rupture
- The operator has completed EOP E-3 Appendix FF, Isolate Flow from Ruptured Steam Generator, up through step 3, "CLOSE Ruptured S/Gs MSIV and MSIV Bypass Valves"

What is the current status of the Steam Generator MSIVs?

A. All MSIVs are closed.

B. Only Steam Generator 1-1 MSIV is closed.

C. Only Steam Generator 1-4 MSIV is closed.

D. Both Steam Generator 1-1 and 1-4 MSIVs are closed.

**Proposed Answer:** A. All MSIVs are closed.

**Explanation:**

A. Correct. MSI occurred due to Steam Generator 1-4 pressure. All MSIVs closed.
B. Incorrect. All MSIVs are closed. Plausible due to P-14, at 90%, causes auto actions to occur, however, closing MSIVs is not one of the auto actions.
C. Incorrect. Plausible if its thought that the low pressure in Steam Generator 1-4 closed only that MSIV.
D. Incorrect. All MSIVs are closed. Plausible if its thought P-14 closed the 1-1 Steam Generator MSIV and low pressure closed 1-4 Steam Generator MSIV and the pressures in 1-2 and 1-3 are the same (due to supplying TDAFW pump).

**Technical References**: OIM B-6-10, B-6-2, C-2-1, E-3 appendix FF

**References to be provided to applicants during exam:** None

**Learning Objective**: Analyze automatic features and interlocks associated with the Main Steam System. (7340)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 3.1

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 056 G2.4.46 – Loss of Offsite Power: Ability to verify that the alarms are consistent with the plant conditions.** | | **Group #** | 1 |
| | | **K/A #** | APE 056 G2.4.46 |
| | | **Rating** | 4.2 |

**Question 54**

A loss of all offsite power occurs.

Emergency Diesel Generator 1-1 automatically starts and then trips on overspeed.

What alarm(s) will be received in the Control Room due to the overspeed trip?

1. PK16-02, DIESEL 11 CRANKING
2. PK16-13, DIESEL 11 ENGINE TRIP
3. PK16-15, DSL GEN 11 SHUTDOWN RELAY TRIP

A. 1 only

B. 2 only

C. 1 and 3

D. 2 and 3

Proposed Answer: D. 2 and 3

**Explanation:**

A. Incorrect. PK16-02 only alarms while starting. Plausible because the PK will initially be lit but goes out. PK16-13 alarms but so will PK16-15.
B. Incorrect. Incomplete, PK16-13 AND PK 16-15 alarm.
C. Incorrect Overcrank relay does cause the SDR to actuate (PK16-15), however, overcrank will not actuate for overspeed.
D. Correct. Both alarm. Overspeed causes the engine to trip, PK16-13 and the SDR to actuate, PK16-15.

**Technical References**: AR PK16-13, 16-02, 16-15

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe controls, indications, and alarms associated with the Diesel Generator System. (37724)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.7

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **EPE 011 EK1.01 - Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: Natural circulation and cooling, including reflux boiling** | | **Group #** | 1 |
| | | **K/A #** | EPE 011 EK1.01 |
| | | **Rating** | 4.1 |

**Question 55**

GIVEN:
- A large break LOCA has occurred
- RCS pressure is 25 psig
- Reactor Trip and Safety Injection have actuated
- All Centrifugal Charging Pumps have failed
- Safety Injection Pumps and Residual Heat Removal Pumps are running

How significant is reflux cooling in removing heat from the core for the current plant conditions?

A. Reflux cooling is minimal. Core heat is removed by Safety Injection water flowing out the break to the containment sump and eventually recirculated.

B. Reflux cooling is minimal. Safety injection pumps will provide enough volume to maintain the core covered, and heat will be removed using natural circulation and steam dumps.

C. Reflux cooling is significant. Without high pressure injection via the charging pumps, steam generator U-tubes will eventually void, stopping Natural Circulation.

D. Reflux cooling is significant. Coolant is boiled in the core, with the steam condensing in the Steam Generator tubes, flowing back to the core through the Hot Legs.

**Proposed Answer:** A. Reflux cooling is minimal. Core heat is removed by Safety Injection water flowing out the break to the containment sump and eventually recirculated

**Explanation:**

A. Correct. On a LBLOCA, the RCS rapidly depressurizes to containment pressure. The large injection and leak flow rates remove core decay heat. SG pressures are higher than RCS pressure. Reflux cooling is insignificant.
B. Incorrect. On a LBLOCA the RCS blows down and the SG tubes are voided. Natural circulation is not available. Plausible because reflux cooling is minimal, and ECCS pumps and accumulators will eventually refill and reflood the core.
C. Incorrect. Reflux cooling is insignificant on a LBLOCA. Plausible because on a Small Break LOCA without high pressure injection, natural circulation will be interrupted when SG tubes void, making reflux more important.
D. Incorrect. Reflux cooling is insignificant on a LBLOCA. Plausible because the description of reflux cooling is correct.

**Technical References**: LMCD-FRC

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain how core cooling is provided during a loss of reactor coolant including the role of the following: …(d) Reflux Cooling…" (41698)
2. "Differentiate between large and small break LOCAs based on their characteristic stages."

(41699)

| | | |
|---|---|---|
| **Question Source:** | Bank #41 L121 08/2014 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.2

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 1 |
| **APE 065 AA1.03 - Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Restoration of systems served by instrument air when pressure is regained** | **Group #** | 1 |
| | **K/A #** | APE 065 AA1.03 |
| | **Rating** | 2.9 |

**Question 56**

Unit 1 is tripped due to a loss of instrument air.

Nitrogen is not available to a 10% steam dump valve.

1) Without instrument air or nitrogen, the 10% steam dump valve fails:

2) The operator can regain control of the valve by:

A. 1) closed
   2) placing the AUTO/MANUAL controller in MANUAL and using the increase/decrease pushbuttons on VB3

B. 1) closed
   2) using the Cut-in toggle switch and the OPEN/CLOSE switch on VB3

C. 1) open
   2) placing the AUTO/MANUAL controller in MANUAL and using the increase/decrease pushbuttons on VB3

D. 1) open
   2) using the Cut-in toggle switch and the OPEN/CLOSE switch on VB3

Proposed Answer: B. 1) closed
2) using the Cut-in toggle switch and the OPEN/CLOSE switch on VB3

**Explanation:**

A. Incorrect. The valve fails closed, but air to operate the valve is not thru the controller which is only available with instrument air or nitrogen.
B. Correct. The loss of instrument air and nitrogen causes the valve to fail closed. Restoration of the 10% steam dumps is by cutting in backup air using the Cut In toggle switch. Backup air is supplied thru the cut-in switch and then controlled using the open/close switch on VB3. The controller is no longer part of the circuit.
C. Incorrect. The valves fail closed, not open. Operation is using the toggle switch, not the controller.
D. Incorrect. First part incorrect. The valves fail closed. Second part correct.

**Technical References**: LC-2B

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe controls, indications, and alarms associated with the Steam DumpSystem. (37810)

| | | |
|---|---|---|
| **Question Source:** | Bank #54 L162 02/2018 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |

| | | |
|---|---|---|
| | Past NRC Exam DCPP NRC 02/2018 | Yes |
| **Question History:** | Last Two NRC Exams | Yes |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.3

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 1 |
| **APE 059 G2.4.45 - Accidental Liquid Radwaste Release: Ability to prioritize and interpret the significance of each annunciator or alarm.** | **Group #** | 2 |
| | **K/A #** | APE 059 G2.4.45 |
| | **Rating** | 4.1 |

**Question 57**

Unit 1 is at 100% power.

PK11-17, SG BLOW DOWN HI RAD, input 508, Steam Gen Blowdown Sample Hdr Hi Rad, alarms.

Which of the following should have occurred?

NOTE:
- FCV-498, Disch Tunnel valve
- FCV-499, Equip Drn Rcvr valve

A. FCV-498 opened and FCV-499 closed

B. Both FCV-498 and FCV-499 opened

C. FCV-498 closed and FCV-499 opened

D. Both FCV-498 and FCV-499 closed

**Proposed Answer:** C. FCV-498 closed and FCV-499 opened

**Explanation:**

A. Incorrect. This is backwards of actual actions.
B. Incorrect. FCV-499 opens.
C. Correct. Either RE-19 or 23 will isolate the system by closing the outside containment, sample valves and terminate blowdown effluent flow to the discharge tunnel by aligning to the Equipment Drain Receiver.
D. Incorrect. Plausible that both valves close to isolate the discharge.

**Technical References**: LD-2, AR PK11-17

**References to be provided to applicants during exam:** None

**Learning Objective**: 8724 Analyze automatic features and interlocks associated with the SGBD system

| | | |
|---|---|---|
| **Question Source:** | Bank #59 DCPP L161 10/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.7 | |

Difficulty: 2.0

| | |
|---|---|
| **Examination Outline Cross-Reference** | **Level** RO |
| | **Tier #** 1 |
| **E16 EK1.3 - Knowledge of the operational implications of the following concepts as they apply to the (High Containment Radiation) Annunciators and conditions indicating signals, and remedial actions associated with the (High Containment Radiation)** | **Group #** 2<br>**K/A #** E16 EK1.3<br>**Rating** 3.0 |

**Question 58**

The crew is checking Pressurizer level in E-1, Loss of Reactor or Secondary Coolant, at step 7, "CHECK If ECCS Flow Should Be Reduced." PK11-19, CONTMT RADIATION, is LIT.

1. According to EOP F-0, Critical Safety Function Status Trees, the crew will use adverse containment values for Pressurizer level if the radiation rate setpoint of ____________ is reached.
2. If in adverse containment, the Pressurizer level required to reduce ECCS flow will be ___________ than the non-adverse setpoint value.

A. 1) $10^5$ R/HR
   2) lower

B. 1) $10^5$ R/HR
   2) higher

C. 1) $10^6$ R/HR
   2) lower

D. 1) $10^6$ R/HR
   2) higher

Proposed Answer: B. 1) $10^5$ R/HR 2) higher

**Explanation:**

A. Incorrect. If containment radiation rate is greater than $10^5$ R/HR, the operator is instructed to use adverse containment setpoints. However, the required Pressurizer level for reducing ECCS flow is higher (40%) than the normal value (12%).
B. Correct. Adverse containment setpoint is $10^5$ R/hr and the level required is 40% vs 12%
C. Incorrect. Setpoint is $10^5$ r/hr. $10^6$ R is the integrated dose. Level required is higher, not lower.
D. Incorrect. Setpoint is incorrect. Required level is correct.

**Technical References**: EOP E-1, EOP F-0

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain the use of adverse containment parameters during EOP usage

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |

Comprehensive/Analysis

**10CFR Part 55 Content:** 55.41.10

Difficulty: 2.2

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 033 AK3.01 - Knowledge of the reasons for the following responses as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Termination of startup following loss of intermediate range instrumentation-** | | **Group #** | 2 |
| | | **K/A #** | APE 033 AK3.01 |
| | | **Rating** | 3.2 |

**Question 59**

GIVEN:
- Reactor startup in progress
- Reactor is critical in the intermediate range at $1x10^{-5}$ amps.

Intermediate Range channel N36 loses control power and fails low.

What is the effect on the reactor startup?

A. Terminated because the reactor has tripped due to the Intermediate Range High Flux trip bistable de-energized.

B. Terminated because the reactor has tripped due to the P-6 Permissive clearing and energizing the Source Range channels above the Source Range High Flux trip setpoint.

C. Unaffected, the reactor remains critical, however, one Intermediate Range High Flux bistable has tripped.

D. Unaffected, the reactor remains critical, however, both Source Ranges are energized.

Proposed Answer: A. Terminated because the reactor has tripped due to the Intermediate Range High Flux trip bistable de-energized.

**Explanation:**

A. Correct. when the IR loses control power, the High Flux trip (1 of 2) will cause the reactor to trip.
B. Incorrect. P-6 automatically energizes the Source Ranges on a downpower, but it is a 2/2 coincidence.
C. Incorrect. The reactor will be tripped. One high flux bistable will be tripped, but the coincidence is 1/2. Trip coincidence could be confused with P-6 energizing the Source Ranges coincidence 2/2.
D. Incorrect. The reactor has tripped. P-6 will not have acutated.

**Technical References**: OIM B-4-2

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain the effect of Excore NIS channel failures, including:
• Individual Channel Failures
• Loss of power supplies/fuses

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #59 DCPP NRC 04/2007 | X |
| | New | |
| | Past NRC Exam DCPP NRC 04/2007 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |

| | | |
|---|---|---|
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41. | |

Difficulty: 2.5

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 024 AK3.02 - Knowledge of the reasons for the following responses as they apply to Emergency Boration: Actions contained in EOP for emergency boration** | | **Group #** | 2 |
| | | **K/A #** | APE 024 AK3.02 |
| | | **Rating** | 4.2 |

**Question 60**

According the background document for EOP FR-S.1, Response to Nuclear Power Generation/ATWS, what is the basis for opening a PORV if RCS pressure is greater than 2335 psig?

A. To prevent passing two phase flow through the safety valves.

B. To ensure PTS limits will not be exceeded when the reactor is tripped and cools down.

C. To minimize primary-to-secondary leakage in case of a SGTR, until other recovery actions can be taken.

D. To allow sufficient borated injection flow into the RCS to ensure the addition of negative reactivity to the core.

Proposed Answer: D. To allow sufficient borated injection flow into the RCS to ensure the addition of negative reactivity to the core.

**Explanation:**

A. Incorrect. 2 phase flow through safeties is a concern for accidents such as steam generator safeties and overfill, but not the bases for this check of pressure in FR-S.1
B. Incorrect. PTS is a concern for overcooling events, such as a steam break.
C. Incorrect. SGTR is not a concern in FR-S.1 at this time. The concern is inserting negative reactivity to shutdown power generation.
D. Correct. From FR-S.1 Background: The check on RCS pressure is intended to alert the operator to a condition which would reduce charging or SI pump injection into the RCS and, therefore, boration. The PRZR PORV pressure setpoint is chosen as that pressure at which flow into the RCS is insufficient. The contingent action is a rapid depressurization to a pressure which would allow increased injection flow. When primary pressure drops 200 psi below the PORV pressure setpoint, the PORVs should be closed. The operator must verify successful closure of the PORVs, closing the isolation valves, if necessary.

**Technical References**: FR-S.1 background for step 4

**References to be provided to applicants during exam:** None

**Learning Objective**: 7920 - Explain basis of emergency procedure step

| | | |
|---|---|---|
| **Question Source:** | Bank #5 NRC L091 07/2011 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCCP NRC 07/2011 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.1

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 1 |
| **E13 EA1.2 - Ability to operate and / or monitor the following as they apply to the (Steam Generator Overpressure) Operating behavior characteristics of the facility** | **Group #** | 2 |
| | **K/A #** | E13 EA1.2 |
| | **Rating** | 3.0 |

**Question 61**

1) If steam generator pressure rises to 1120 psig, the Critical Safety Function Status tree terminus for Heat Sink will have turned from Green to ______________.

2) At steam generator pressure of 1120 psig, how many of the steam generator safeties should be open?

A. 1) Magenta
   2) one

B. 1) Magenta
   2) five

C. 1) Yellow
   2) one

D. 1) Yellow
   2) five

Proposed Answer: D. 1) Yellow 2) five

**Explanation:**

A. Incorrect. There are no Magenta heat sink procedures. Its Red or Yellow. All the safeties should be open. Plausible if setpoints are not known. One safety is a plausible cause of a challenge to the safety function.
B. Incorrect. First part is incorrect. At 1120 psig, all safeties should be open.
C. Incorrect. First part correct. The terminus will be yellow. Second part incorrect. All safeties should be open.
D. Correct. The Heat Sink terminus is Red, Yellow, or Green. If pressure rises to 1115 psig, the terminus will be yellow. Safety setpoints are 1065 psig, 1078 psig, 1090 psig, 1103 psig and 1115. All should be open.

**Technical References**: F-0,

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe Main Steam System components.

- Steam Line Safety Valves

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #64 DCPP L161 10/2016 | X |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.8 | |

Difficulty: 3.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 001 AA2.05 - Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Uncontrolled rod withdrawal, from available indications** | | **Group #** | 2 |
| | | **K/A #** | APE 001 AA2.05 |
| | | **Rating** | 4.4 |

**Question 62**

Unit 1 is at 65% power. Control systems are in AUTO.

Rods begin to step out at 8 steps per minute.

The following alarms are received:
- PK04-03, TAVG DEVIATION FROM REF
- PK05-16, PZR PRESSURE HI/LO, due to input 363, "Pzr Press Hi From REF"

The operator reports Tref is unchanged.

Which of the following actions should be taken by the operator?

A. Trip the reactor due to a vapor space leak.

B. Trip the reactor due to a dropped rod or rods.

C. Place rods in Manual due to a malfunction of rod control.

D. Place rods in Manual due to a power range instrument failure.

Proposed Answer: C. Place rods in Manual due to a malfunction of rod control.

**Explanation:**

A. Incorrect. No indication of trip required, a vapor space break causes pressurizer level to rise, but does not impact temperature.
B. Incorrect.a dropped rod would not cause high pressure. The reactor is tripped if 2 or more rods drop.
C. Correct. Indication of outward rod motion. Action is to place rods in Manual.
D. Incorrect. No power range instrument failure would cause high pressure, high level and increasing temperature and outward rod motion.

**Technical References**: OP AP-12A, Continuous Withdrawal or Insertion of a Control Rod Bank.

**References to be provided to applicants during exam:** None

**Learning Objective**: Given an abnormal condition, summarize the major actions of OP AP-12 to mitigate an event in progress. (3477M)

| | | |
|---|---|---|
| **Question Source:** | Bank #57 L051 04/2007 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 04/2007 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |

| | | |
|---|---|---|
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.10 | |
| Difficulty: 2.4 | | |

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **APE 037 G2.4.8 Steam Generator Tube Leak- Knowledge of how abnormal operating procedures are used in conjunction with EOPs.** | | **Group #** | 2 |
| | | **K/A #** | APE 037 G2.4.8 |
| | | **Rating** | 3.8 |

**Question 63**

The crew has started a plant shutdown in accordance with OP AP-3, Steam Generator Tube Failure.

According to OP AP-3, the procedure must be completed unless:

A. the reactor trips

B. safety injection actuates

C. superseded by EOP E-3, Steam Generator Tube Rupture

D. superseded by OP AP-1, Excessive Reactor Coolant System Leakage

Proposed Answer: C. superseded by EOP E-3, Steam Generator Tube Rupture

**Explanation:**

A. Incorrect. The note states if the reactor trips, the actions of OP AP-3 must be completed upon exiting the EOPs or may be done in parallel. Plausible many AOPs, such as OP AP-1, direct going to E-0 if the reactor trips.
B. Incorrect. The procedure is completed unless superseded by EOP E-3. Plausible because actuation of SI will require more than a transition to E-0.1 after the reactor trip.
C. Correct. The note states: "Once it has been determined that a leaking S/G exists that would require shutdown per this procedure, this procedure must be completed unless superseded by EOP E-3. If the EOPs are entered for any reason during performance of this procedure, the actions required by this procedure must be completed upon exiting the Emergency Procedures. Procedures may be performed in parallel if resources allow.
D. Incorrect. Plausible as RCS leakage and a tube rupture in the EOP network would require leaving E-3 and going to ECA-3.1 Could be thought that the complication of RCS leakage would terminate the necessity to complete OP AP-3 actions.

**Technical References**: OP AP-1, OP AP-3

**References to be provided to applicants during exam:** None

**Learning Objective**: Given an abnormal condition, summarize the major actions of OP AP-3 to mitigate an event in progress. (3477C)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 1 |
| **EPE 074 EK1.03 - Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Processes for removing decay heat from the core** | | **Group #** | 2 |
| | | **K/A #** | EPE 074 EK1.03 |
| | | **Rating** | 4.5 |

**Question 64**

According to the background document for EOP FR-C.1, Response to Inadequate Core Cooling, what is the most effective method to recover the core and restore core cooling?

A. Rapidly depressurizing steam generators.

B. Establishing high head ECCS injection.

C. Starting RCPs in available RCS loops.

D. Initiation of RCS feed and bleed.

**Proposed Answer**: B. Establishing high head ECCS injection

**Explanation:**

A. Incorrect. Depressurization of the RCS to establish low head injection flow (and inject accumulators is the preferred method of heat removal if high head injection cannot be established).

B. Correct. IAW the background document: *Reinitiation of high pressure safety injection is the most effective method to recover the core and restore adequate core cooling. If some form of high pressure injection cannot be established or is ineffective in restoring adequate core cooling, then the operator must take actions to reduce the RCS pressure in order for the SI accumulators and low-head SI pumps to inject.* Analyses have shown that a rapid secondary depressurization is the most effective means for achieving this. If secondary depressurization is not possible, or primary-to-secondary heat transfer is significantly degraded, and at least one idle SG is available, then the operator must start the RCP(s) associated with the available idle SG(s). The RCPs will provide forced two phase flow through the core and temporarily improve core cooling until some form of make-up flow to the RCS can be established.

C. Incorrect. Starting RCPs is a temporary method to core until some form of flow can be established.

D. Incorrect. This is the method used in EOP FR-H.1 – as a last resort.

**Technical References**: EOP FR-C.1 background

**References to be provided to applicants during exam:** None

**Learning Objective**: Prioritize the operator-initiated recovery techniques that would mitigate the consequences of a loss of core cooling. (11311)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.5 | |

Difficulty: 2.3

| Examination Outline Cross-Reference | Level | RO |
|---|---|---|
| | Tier # | 1 |
| APE 060 AK2.02 - Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following: Auxiliary building ventilation system | Group # | 2 |
| | K/A # | APE 060 AK2.02 |
| | Rating | 2.7 |

**Question 65**

PK11-25, PLANT VENT RADIATION and PK11-21, HIGH RADIATION alarm. The source of the radiation is unknown.

The SFM directs operators to enter OP AP-14, Tank Ruptures. In accordance with OP AP-14, the operator places the Auxiliary Building Ventilation system in "Safeguards Only" with "S" signal.

What combination of supply and exhaust fans will be running while in "Safeguards Only"?

A. ONE Supply fan and ONE Exhaust fan

B. ONE Supply fan and TWO Exhaust fans

C. TWO Supply fans and ONE Exhaust fan

D. TWO Supply fans and TWO Exhaust fans

Proposed Answer: A. ONE Supply fan and ONE Exhaust fan

**Explanation:**

A. Correct. Only one supply and exhaust fan will be running.
B. Inorrect. Only one exhaust fan is running. Two is plausible if its thought that two would establish a negative pressure in the aux building.
C. Incorrect. Only one supply fan runs. Plausible that the desired outcome is to maximize flow.
D. Incorrect. This is the Buildings and Safeguards alignment.

**Technical References**: LH-1, OIM H-2-4, H-2-5

**References to be provided to applicants during exam:** None

**Learning Objective**: Describe the operation of the Auxiliary Building Ventilation System. (5512)

| | | | |
|---|---|---|---|
| **Question Source:** | | Bank # | |
| X | (note changes; attach parent) | Modified Bank # | |
| | | New | X |
| | | Past NRC Exam | No |
| **Question History:** | | Last Two NRC Exams | No |
| **Question Cognitive Level:** | | Memory/Fundamental | X |
| | | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | | 55.41.11 | |

Difficulty: 2.0

| Examination Outline Cross-Reference | Level | RO |
|---|---|---|
| | Tier # | 3 |
| **G2.1.44 Knowledge of RO duties in the control room during fuel handling, such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation.** | Group # | 1 |
| | K/A # | G2.1.44 |
| | Rating | 3.9 |

**Question 66**

While taking logs during core loading the operator notes the following trends.

| Time | RCS Temp | Boron | N31 | N32 |
|---|---|---|---|---|
| 1200 | 62°F | 2570 PPM | 13 CPS | 15 CPS |
| 1300 | 76°F | 2510 PPM | 32 CPS | 28 CPS |

The recommendation to the Shift Foreman is that core loading should be suspended due to changes in ___________________________.

A. RCS temperature

B. boron concentration

C. counts on one Source Range channel

D. counts on both Source Range channels

**Proposed Answer:** B. boron concentration

**Explanation:**
step 5.3.2 - The loading procedure will be suspended, pending evaluation by the Refueling SRO and reactor engineer under the following circumstances:
a. If there occurs on any one responding nuclear channel an unexpected increase in count rate by a factor of three (3).
b. An unexpected increase in count rate by a factor of two on all responding channels.
c. An unexpected change in Reactor Coolant System temperature of greater than 20°F.
d. If the measured boron concentration indicates a change of greater than ± 50 ppm from the nominal value at the start of core loading.
A. Incorrect. Temperature change is less than 20°F (14°F)
B. Correct. Boron change is greater than 50 ppm (60 ppm)
C. Incorrect. Source range counts on one channel is less than 3 (approximately 2.5 – 13 to 32)
D. Incorrect. Counts did not double on both SR channels (not doubled on N32)

**Technical References**: OP B-8DS2

**References to be provided to applicants during exam:** None

**Learning Objective**: 36965 - Discuss significant precautions and limitations associated with the Fuel Handling system

| **Question Source:** | Bank #60 L061C 02/2009 | X |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 02/2009 | Yes |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.6 | |

Difficulty: 2.6

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 3 |
| **G2.2.40 Ability to apply Technical Specifications for a system.** | **Group #** | 2 |
| | **K/A #** | G2.2.40 |
| | **Rating** | 3.4 |

**Question 67**

1) LCO 3.2.4, QUADRANT POWER TILT RATIO (QPTR), states QPTR shall be ≤ ______ when power THERMAL POWER is > 50% RTP.

2) According to Technical Specifications section 1.1, Definitions, the definition of QPTR is which of the following?

   a. the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater.

   b. the difference in normalized flux signals between the top and bottom halves of an excore neutron detector.

A. 1) 1.00
   2) a

B. 1) 1.00
   2) b

C. 1) 1.02
   2) a

D. 1) 1.02
   2) b

**Proposed Answer**: C. 1) 1.02 2) a.

**Explanation:**

A. Incorrect. LCO 3.2.4 states QPTR shall be less than or equal to 1.02. Plausible the limit is less than 1 as the action is to reduce power 3% for every 1% greater than *1.00* Second part correct.
B. Incorrect. First part incorrect. Second part incorrect, this is the definition for AFD.
C. Correct. LCO limit is 1.02. Second part is the definition for QPTR.
D. Incorrect. First part correct. Second part incorrect – this is the definition for AFD

**Technical References**: LCO 3.2.4, Section 1.1, definitions

**References to be provided to applicants during exam:** None

**Learning Objective**: 9697 - Apply Technical Specification LCOs

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.7

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 3 |
| **G2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.** | | **Group #** | 2 |
| | | **K/A #** | G2.2.2 |
| | | **Rating** | 4.6 |

**Question 68**

Which of the following describes a normally performed operator action as a plant startup from MODE 5 to MODE 2 is performed?

A. When PK08-01, INTMED RNG PERMISSIVE P-6, goes ON, the operator takes the Source Range Trip Reset/Block switches to “BLOCK”.

B. When RCS pressure exceeds P-11 and PK08-06, PZR SI PERMISSIVE, P-11, goes OFF, the operator takes the Pressurizer SI RESET/BLOCK switches to “RESET”.

C. When PK08-05, PWR RNG AT POWER PER P-10, goes ON, the operator takes the Intermediate Range Rod Stop and Trip Block switches to “BLOCK”.

D. When RCS temperature exceeds 283°F and RHR has been removed from service, the operator takes the Low Setpoint Protection Cutout switches to CUTIN for the Pressurizer PORVs.

**Proposed Answer**: A. When PK08-01, INTMED RNG PERMISSIVE P-6, goes ON, the operator takes the Source Range Trip Reset/Block switches to “BLOCK”.

**Explanation:**

A. Correct. At P-6, the operator goes to BLOCK to de-energize the Source Range instruments - OP L-2, attachment 3, 1.c
B. Incorrect. This is normally not done. SI should auto unblock as pressure is raised. When performing a cooldown, the SI signals are blocked (action required), however, no action should be required if there is not a failure of the circuit. Setup notes it’s a normal action that is taken – OP L-1 step 6.2.3.h.3
C. Incorrect. This action is not taken at this time. This would block the IR High Flux trip. This is done at P-10, which is at 10% power (in MODE 1).
D. Incorrect. To remove LTOP from service, the switches are placed in CUTOUT (placed in CUTIN to place in service when performing cooldown) – OP L-1, step 6.1.3.m.

**Technical References**: OP L-1, OP L-2, L-3, Callaway OE 2019 Trip during startup

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss operator behaviors and practices related to the operator fundamental of closely monitoring plant indications and conditions. (56218)

| | | |
|---|---|---|
| **Question Source:** | Bank #70 DCPP NRC L121 08/2014 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.6 | |

Difficulty: 2.5

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 3 |
| **G2.4.17 Knowledge of EOP terms and definitions.** | | **Group #** | 4 |
| | | **K/A #** | G2.4.17 |
| | | **Rating** | 3.9 |

**Question 69**

In accordance with AD1.DC12, Writer's Manual - Emergency and Off-Normal Operating Procedures:

1) an immediate action step is identified by a block around the ________________.

2) steps in the EOP that make certain a certain characteristic or condition exists by either confirming the condition, or taking the necessary actions to establish the condition start with the action verb ______________.

A. 1) step number
   2) CHECK

B. 1) step number
   2) ENSURE

C. 1) entire step
   2) CHECK

D. 1) entire step
   2) ENSURE

**Proposed Answer**: B.1) step number 2) ENSURE

**Explanation:**

A. Incorrect. First part is correct. An immediate action is identified with a block around the step number. Second part incorrect. CHECK means: To note a condition and compare with some procedure requirement.
B. Correct. An immediate action is identified with a block around the step number. Ensure means to make certain a certain characteristic or condition exists by either confirming the condition, or taking the necessary actions to establish the condition.
C. Incorrect. Both parts are incorrect. A block around the entire step is used to identify a "continuous action".
D. Incorrect. First part is incorrect, a block around an entire step is used for "continuous actions".Second part is correct.

**Technical References**: AD1.DC12 and attachment 1

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain definition of terms used in the EOPs. (5428)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.0

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | RO |
| | **Tier #** | 3 |
| **G2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions** | **Group #** | 2 |
| | **K/A #** | G2.2.44 |
| | **Rating** | 4.2 |

**Question 70**

The crew is reviewing the foldout page as part of a procedure transition brief.

In accordance with OP1.DC10, Conduct of Operations, as a minimum, what amount of communication is required by an operator who is assigned a foldout page item to monitor?

A. Repeat back of the high level action

B. Simple acknowledgement of the assignment

C. A brief summary of the action and the parameters to monitor

D. Repeat back of the high level action and the specific parameters and parameters to monitor

**Proposed Answer**: A. Repeat back of the high level action

**Explanation:**

A. Correct. Per OP1.DC10,

a) Specific assignments should be made to Control Room operators by assigning the foldout page number and the *operator repeating back the high-level action*.
b) Specific parameters and values are not required to be repeated back.
c) A copy of the foldout page should be given to any operator with an assignment.
B. Incorrect. The high level action is repeated back.
C. Incorrect. Only the high level action needs to be repeated back.
D. Incorrrect. Only the high level action needs to be repeated back.

**Technical References**: OP1.DC10

**References to be provided to applicants during exam:** None

**Learning Objective**: 41675 - Describe the expectations for performing briefs and updates, including the following: Procedure transition briefs, Pre-job briefs, Diagnostic briefs

| | | |
|---|---|---|
| **Question Source:** | Bank #67 DCPP L091 07/2011 | Yes |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 07/2011 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 3 |
| **G2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.** | | **Group #** | 3 |
| | | **K/A #** | G2.3.12 |
| | | **Rating** | 3.2 |

**Question 71**

Unit 1 is at 100% power.

An operator is preparing to enter Unit 1 containment for a non-emergency entry.

In accordance with RCP D-230, Radiological Control for Containment Entry, as part of exposure control for the operator, the ___________________________ shall maintain possession of the MIDS keys during the containment entry?

A. Radiation Protection Foreman (or designee)

B. Work Control Shift Foreman (or designee)

C. Unit 1 Shift Foreman (or designee)

D. Operator making the entry

**Proposed Answer**: A. Radiation Protection Foreman (or designee)

**Explanation:**

A. Correct. The RP foreman shall be in possession of the keys (or designee).
B. Incorrect. The WCSFM is responsible for authorizing work packages, but does not control the MIDS keys
C. Incorrect. The SFM authorizes entry and controls keys, but not the MIDS keys.
D. Incorrect. While it may seem that having the operator control the key would be a positive control, the keys shall be in the possession of the RP Foreman (or designee)

**Technical References**: RCP D-230

**References to be provided to applicants during exam:** None

**Learning Objective**:

| | | |
|---|---|---|
| **Question Source:** | Bank #73 DCPP L141 04/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 04/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.12 | |

Difficulty: 2.0

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 3 |
| **G2.4.35 Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.** | | **Group #** | 4 |
| | | **K/A #** | G2.4.35 |
| | | **Rating** | 3.8 |

**Question 72**

The crew is performing EOP ECA-0.0, Loss of Vital AC Power.

An operator has been dispatched to perform Appendix DC, Shed Non-Essential DC Loads.

In accordance with Appendix DC,

1) the operator will stop the Main Turbine DC Bearing Oil Pump when _________________________.

2) the operator will stop the Air Side Seal Oil Backup Pump when _________________________.

A. 1) Main Turbine speed is zero
   2) the emergency Purge of the Main Generator is complete

B. 1) Main Turbine speed is zero
   2) Main Turbine speed is zero

C. 1) the emergency Purge of the Main Generator is complete
   2) the emergency Purge of the Main Generator is complete

D. 1) the emergency Purge of the Main Generator is complete
   2) Main Turbine speed is zero

**Proposed Answer**: A. 1) Main Turbine speed is zero
2) the emergency Purge of the Main Generator is complete

**Explanation:**

A. Correct. Both are in service while the turbine coasts down. At zero speed, the operator is instructed to shutdown the DC Bearing Oil Pump (open breaker 72-1008). When the purge is compete, the Air Side Seal Oil pump is shutdown (open breaker 72-1006).
B. Incorrect. First part is correct. Second part is incorrect. Plausible if its known both pumps are in service but its not known the purge must be done.
C. Incorrect. Second part is correct. First part incorrect.
D. Incorrect. Both parts are incorrect. This is the reverse of the correct answer.

**Technical References**: EOP ECA-0.0, appendix DC

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain the basis for securing DC loads on loss of vital AC bus. (7118)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |

| | | |
|---|---|---|
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.0

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 3 |
| **G2.1.26 Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen).** | **Group #** | 1 |
| | **K/A #** | G2.1.26 |
| | **Rating** | 3.4 |

**Question 73**

An operator calls and reports the spill of hydrazine in the vicinity of the Auxiliary Feedwater pump chemical addition skid.

In accordance with CP M-9A, Hazardous Materials Incident Initial Emergency Response/Mitigation Procedure, assistance should be immediately requested from:

A. DCPP Safety

B. Radiation Protection

C. DCPP Fire Department

D. Chemistry and Environmental Operations

**Proposed Answer**: C. DCPP Fire Department

**Explanation:**

A. Incorrect. Plausible that Safety would be the department to deal with chemical spills.
B. Incorrect Plausible because the spill in the Auxiliary Building (inside the RCA).
C. Correct. The procedure states to call the DCPP Hazardous Materials Emergency Response Team – which if the DCPP Fire Department.
D. Incorrect. Because it's a chemical spill, plausible Chemistry is contacted..

**Technical References**: CP M-9A

**References to be provided to applicants during exam:** None

**Learning Objective**: 39579 Discuss the appropriate response to various chemical spills

| | | |
|---|---|---|
| **Question Source:** | Bank #66 DCPP L091C 02/2009 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 02/2009 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.10 | |

Difficulty: 2.0

| **Examination Outline Cross-Reference** | **Level** | RO |
|---|---|---|
| | **Tier #** | 3 |
| **G2.1.37 - Knowledge of procedures, *guidelines*, or limitations associated with reactivity management.** | **Group #** | 1 |
| | **K/A #** | G2.1.37 |
| | **Rating** | 4.3 |

**Question 74**

The operator at the controls notes reactor power is beginning to lower.

In accordance with OP1.DC10, Conduct of Operations, Attachment 11, Operations Diagnostic Model, the operator will check ______________________next.

A. Pressurizer level

B. RCS subcooling

C. RCS Tave

D. Pressurizer pressure

**Proposed Answer**: C.RCS Tave

**Explanation:**

Questions tests the guidelines in OP1.DC10 for monitoring the reactivity control.

Monitoring Key Parameters:

• POWER - *Reactivity control is of paramount importance. Reactor power could be changed by actions taken in the RCS* - such as boration or dilution - or by a very limited number of primary side problems (rod misalignment, for example). Reactor power could also be changed by changes in secondary power or efficiency. In support of cause and effect, power can be thought of as reactor power, or secondary power - but in essence it is the comparison between power produced in the reactor, and power removed by the secondary. *Changes in either the primary or secondary always result in changes to Tave*. Unintentional power changes must be immediately addressed.

• TEMPERATURE - *Changes to Tave only occur because of changes to the thermodynamic balance of the plant (i.e., the power produced by the reactor is different than the power removed by the secondary plant).* Tave changes always result in changes to the density of the RCS fluid inventory. Significant changes in density (Larger Tave changes) always result in changes to PZR level. Unintentional Tave changes require an understanding of POWER before proper action can be taken to stabilize the plant.

By quickly reviewing reactor and secondary power indications, then RCS Tave, then PZR level, then PZR pressure, then primary and secondary flow rates, a mental model (or image) of the true plant condition can be determined. If a key parameter alarms, simply reviewing the key parameters can help determine if the cause of the alarm can be attributed to the alarming parameter, or if the parameter transient is merely an effect of a higher priority parameter transient.

• When a plant transient occurs, the key parameters are quickly and frequently checked to ensure that proper system response is occurring. Provided that all systems are responding appropriately, no operator action would be required to essentially stabilize the plant.

Stabilizing the highest priority parameter that is not stable aids in stabilizing all the lesser priority parameters (i.e., until power is stabilized, Tave cannot be stabilized. Until Tave is stabilized, PZR level cannot be stabilized, etc.).

A. Incorrect level is checked after RCS Tave.
B. Incorrect.. Plausible because Subcooling is a key parameter checked in EOPs for verification of sufficient core cooling. However, it is not part of the PTLPF model
C. Correct the next parameter is RCS Tave.
D. Incorrect. Pressurizer pressure is checked after Pressurizer level.

**Technical References**: OP1.DC10

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss the STAR-T diagnostic model. (56221)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #68 L161 10/2016 | X |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.2 | |

Difficulty: 2.3

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | RO |
| | | **Tier #** | 3 |
| **G2.3.11 Ability to control radiation releases.** | | **Group #** | 3 |
| | | **K/A #** | G2.3.11 |
| | | **Rating** | 3.8 |

**Question 75**

In accordance with OP G-1:II, Liquid Radwaste System - Discharge of Liquid Radwaste, what is REQUIRED prior to initiating a liquid radwaste discharge?

1. Sufficient dilution flowrate
2. Shift Foreman review and approval of the discharge permit
3. Shift Manager review and approval of the discharge permit

A. 2 only

B. 1 and 2

C. 3 only

D. 1 and 3

**Proposed Answer**: B.1 and 2

**Explanation:**

A. Incorrect because both a gas and liquid discharge require adequate dilution flow prior to initiating the discharge. Plausible because it may be thought that since review and approval is needed prior to initiating the release, and there must be an operable rad monitor (or comp actions in place), the review covers the need for dilution flow.
B. Correct. Approval by the SFM is required, additionally, there must be adequate flow rate (ASW or Circ water flow) for the discharge to occur.
C. Incorrect because review and approval is required, but not from the SM. Plausible because the SM is responsible for both units and radwaste release is a common function.
D. Incorrect because SM approval not required. Plausible because the SM is responsible for both units and a radwaste release is a common function.

**Technical References**: OP G-1:II

**References to be provided to applicants during exam:** None

**Learning Objective**: Discuss significant precautions and limitations associated with the Liquid Radwaste System. (8454)

| | | |
|---|---|---|
| **Question Source:** | Bank #71 DCPP L161 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.41.12 | |

Difficulty:2.0

| **Examination Outline Cross-Reference** | **Level** | SRO |
|---|---|---|
| | **Tier #** | 2 |
| **004 A2.27 - Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations Improper RWST boron concentration** | **Group #** | 1 |
| | **K/A #** | 004 A2.27 |
| | **Rating** | 4.2 |

**Question 76**

Unit 1 is at 100% power.

Results of a sample of the RWST boron concentration reveals the boron concentration is higher than the limit of LCO 3.5.4, Refueling Water Storage Tank (RWST).

1) According to the bases for LCO 3.5.4, what is the potential impact of a boron concentration higher than the limit of LCO 3.5.4?
2) What action should be taken by the SFM?

NOTE:
- LCO 3.5.2, ECCS-Operating
- LCO 3.5.4, Refueling Water Storage Tank (RWST)

A. 1) excessive boric acid precipitation in the core following a large break LOCA
   2) Enter only LCO 3.5.4

B. 1) excessive boric acid precipitation in the core following a large break LOCA
   2) Enter both LCO 3.5.2 and LCO 3.5.4

C. 1) excessive caustic stress corrosion of the RWST
   2) Enter only LCO 3.5.4

D. 1) excessive caustic stress corrosion of the RWST
   2) Enter both LCO 3.5.2 and LCO 3.5.4

Proposed Answer: A. 1) excessive boric acid precipitation in the core following a large break LOCA
2) Enter only LCO 3.5.4

**Explanation:**

SRO knowledge of bases of LCO and applicability of LCO 3.0.2 to time of discovery.

A. Correct. The bases for LCO 3.5.4 states During accident conditions, the RWST provides a source of borated water to the ECCS and CS System pumps. Improper boron concentrations could result in a reduction of SDM or *excessive boric acid precipitation* in the core following a LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment. The upper limit on boron concentration of 2500 ppm is used to determine the maximum allowable time to initiate hot leg recirculation following a LOCA. The purpose of initiating hot leg recirculation is to avoid boron precipitation in the core following the accident when the break is in the cold leg.
LCO 3.5.2 does not need to be entered. Due to LCO 3.0.6.
B. Incorrect. First part is correct. Second part incorrect. LCO 3.5.2 is not entered. Plausible because both trains of ECCS are supplied by the RWST and two inoperable trains of ECCS

would require action.

C. Incorrect. First part is incorrect. Plausible as high boron can cause excessive caustic stress corrosion but of components in containment during a LOCA. Second part correct.
D. Incorrect. Both parts are incorrect.

**Technical References**: B3.5.4, LCO 3.5.4, LCO 3.0.6

**References to be provided to applicants during exam:** none

**Learning Objective**: 9694E - Apply TS 3.5 Technical Specification bases

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.2 | |

Difficulty: 3.2

## Question 76

### Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing ≤ 1 hour TS/TRM Action?

Yes → RO question

No ↓

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes → RO question

No ↓

Can question be answered *solely* by knowing the TS Safety Limits?

Yes → RO question

No ↓

Does the question involve one or more of the following for TS, TRM, or ODCM?

- Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)
- Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)
- Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(2) for SRO-only

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 2 |
| **039 G2.1.7 – Main and Reheat Steam: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.** | **Group #** | 1 |
| | **K/A #** | 039 G2.1.7 |
| | **Rating** | 4.7 |

**Question 77**

GIVEN:
- The crew is performing the diagnostic steps of EOP E-0, Reactor Trip or Safety Injection
- RCS temperature is currently 315°F and rising after an initial decrease to 230°F
- RCS pressure 1750 psig and rising
- Pressurizer level 15% and rising
- Steam Generator Narrow Range levels:
  - 1-1 is 22%, rising slowly
  - 1-2 is 0%, stable
  - 1-3 is 18%, stable
  - 1-4 is 23%, rising slowly
- Steam Generator pressures:
  - 1-1 is 820 psig, rising
  - 1-2 is 0 psig, stable
  - 1-3 is 900 psig, stable
  - 1-4 is 890 psig, rising

What procedure should the crew transition to next?

A. EOP E-1.1, Safety Injection Termination

B. EOP E-2, Faulted Steam Generator Isolation

C. EOP FR-P.1, Response to Imminent Pressurized Thermal Shock Condition

D. EOP FR-H.5, Response to Steam Generator Low Level

Proposed Answer: B. EOP E-2, Faulted Steam Generator Isolation

**Explanation:**

SRO must evaluate the current conditions and determine which procedure entry is appropriate. Based on conditions, a RED challenge to RCS Integrity had existed, but according to rules of EOP usage, does not need to be addressed. Also, SI termination criteria is met, however, a faulted S/G must be addressed prior to terminating SI>

A. Incorrect. Although conditions support SI termination, a transition to E-2 will be made based on Steam Generator 1-2 completely depressurized.
B. Correct. A transition from E-0 is required to perform the faulted steam generator isolation.
C. Incorrect. The initial decrease was to a temperature that made the status tree for RCS integrity Red, however, the status is currently Green. The condition has cleared and does need to be addressed.
D. Incorrect. Conditions met for entry but H.5 is a YELLOW path and not addressed at this time.

**Technical References**: F-0, E-0

**References to be provided to applicants during exam:** None

**Learning Objective**: 3552 - Given initial conditions, assumptions, and symptoms, determine the correct Emergency Operating Procedure to be used to mitigate an operational event

| | | |
|---|---|---|
| **Question Source:** | Bank #85 DCPP L081 01/2010 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 01/2010 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.0

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| **Examination Outline Cross-Reference** | **Level** | SRO |
|---|---|---|
| | **Tier #** | 2 |
| **061 A2.07 - 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: Air or MOV failure** | **Group #** | 1 |
| | **K/A #** | 061 A2.07 |
| | **Rating** | 3.5 |

**Question 78**

GIVEN:

- Unit 1 trips from 100% power
- The crew is performing EOP E-0, Reactor Trip or Safety Injection
- 480VAC power is lost to AFW pump 1-1 LCVs
- None of the MDAFW pumps can be started
- Narrow range steam generator levels are 12% and lowering slowly in all Steam Generators
- Containment pressure is 0.8 psig and stable
- RCS temperature is 540°F and lowering slowly
- RCS pressure is 1900 psig and lowering slowly

Which of the following actions should be taken by the Shift Foreman as a transition is made from EOP E-0?

A. Go to EOP E-0.1, Reactor Trip Response, the turbine driven AFW pump is supplying all four steam generators.

B. Go to EOP E-0.1, Reactor Trip Response, and direct the operator to locally open the TDAFW level control valves, LCV-106, 107, 108 and 109 to establish AFW flow from the TDAFW pump.

C. Go to EOP FR-H.1, Response to Loss of Secondary Heat Sink, there is a RED path on Secondary Heat Sink because the TDAFW Steam Supply valve, FCV-95 did not open.

D. Go to EOP FR-H.1, Response to Loss of Secondary Heat Sink, there is a RED path on Secondary Heat Sink because the TDAFW level control valves, LCV-106, 107, 108 and 109 are closed.

Proposed Answer: A. Go to EOP E-0.1, Reactor Trip Response, the turbine driven AFW pump is supplying all four steam generators.

**Explanation:**

A. Correct. The TDAFW pump is running, it starts on 2/4 steam generators less than 15%.The TDAFW pump LCVs are powered from 480 VAC (Bus G), however, are left full open and will remain open. Although there is no valve indication (lights will be out), full flow from the pump will be supplying all four steam generators.
B. Incorrect. The valves will be fully open due to the loss of 480 VAC power and will have to locally throttled when heat sink is greater than 16%.
C. Incorrect. FCV-95 is DC powered. Loss of DC bus 1-2 would cause FCV-95 to lose power and Bus G would be de-energized, which causes the LCVs to lose power. However, the DC bus is energized, only the bus is de-energized.
D. Incorrect. The LCVs are powered from bus G but remain open despite the loss of power to

them, therefore, there is no challenge to Heat Sink CSF.

**Technical References**: OP AP-23

**References to be provided to applicants during exam:** None

**Learning Objective**: 3552 - Given initial conditions, assumptions, and symptoms, determine the correct Emergency Operating Procedure to be used to mitigate an operational event

| | | |
|---|---|---|
| **Question Source:** | Bank #89 DCPP L091C 03/2012 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 03/2012 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.0

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | |
|---|---|
| **Examination Outline Cross-Reference** | **Level** SRO |
| | **Tier #** 2 |
| **063 G2.2.25 – DC Electrical Distribution: Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.** | **Group #** 1 |
| | **K/A #** 063 G2.2.25 |
| | **Rating** 4.2 |

**Question 79**

Unit 1 is at 100% power. One battery charger is declared inoperable.

LCO 3.8.4, DC Sources – Operating, Condition A is shown below:

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One battery charger inoperable. | A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage. | 2 hours |
| | <u>AND</u> | |
| | A.2 Verify battery float current ≤ 2 amps. | 12 hours |
| | <u>AND</u> | |
| | A.3 Restore battery charger to OPERABLE status. | 14 days |

According to the bases for REQUIRED ACTION A.2, what is the reason for verifying battery float current ≤ 2 amps?

A. Indicates the battery is fully recharged.

B. Indicates the battery is supplying the DC bus.

C. Indicates the battery is partially discharged but still OPERABLE.

D. Indicates the battery is on the exponential charging current portion (the second part) of its recharge cycle

Proposed Answer: A. Indicates the battery is fully recharged.

**Explanation:**

A. Correct. According to the bases, "Required Action A.2 requires that the battery float current be verified as less than or equal to 2 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, *it has now been fully recharged.* If at the expiration of the 12 hour period the battery float current is not less than or equal to 2 amps this indicates there may be additional battery problems and the battery must be declared inoperable in accordance with LCO 3.8.6 Required Action B.2."
B. Incorrect. If amps are greater than 2 amps, its an indication the battery is discharging.
C. Incorrect. Greater than 2 amps is an indications of discharging and the battery would be inoperable.

D. Incorrect. This is the bases for the minimum float voltage.

**Technical References**: B3.8.4 and B3.8.6

**References to be provided to applicants during exam:** None

**Learning Objective**: 9694H - Apply TS 3.8 Technical Specification bases

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.2 | |

Difficulty: 3.4

**Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)**

Can question be answered *solely* by knowing ≤ 1 hour TS/TRM Action?

Yes → RO question

No ↓

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes → RO question

No ↓

Can question be answered *solely* by knowing the TS Safety Limits?

Yes → RO question

No ↓

Does the question involve one or more of the following for TS, TRM, or ODCM?

- Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)
- Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)
- Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(2) for SRO-only

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 2 |
| **013 A2.01 - 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** | **Group #** | 1 |
| | **K/A #** | 013 A2.01 |
| | **Rating** | 4.8 |

**Question 80**

GIVEN:
- EOP E-3, Steam Generator Tube Rupture, is being performed
- SI and Phase A have been reset
- Charging is in service
- The crew has just completed step 26, ISOLATE Charging Injection

The Control Operator reports:
- RCS subcooling is 15°F and lowering
- Pressurizer level is 30% and lowering
- RCS pressure is 800 psig and lowering.

The Shift Foreman should direct the operator to _________1)__________ and go to ________________2)______________________.

A. 1) reinitiate SI
   2) EOP E-1, Loss of Reactor or Secondary Coolant

B. 1) reinitiate SI
   2) EOP ECA-3.1, SGTR With Loss of Reactor Coolant, Subcooled Recovery Desired

C. 1) manually restart ECCS pumps as necessary
   2) EOP E-1, Loss of Reactor or Secondary Coolant

D. 1) manually restart ECCS pumps as necessary
   2) EOP ECA-3.1, SGTR With Loss of Reactor Coolant, Subcooled Recovery Desired

Proposed Answer: D. 1) manually restart ECCS pumps as necessary
2) EOP ECA-3.1, SGTR With Loss of Reactor Coolant, Subcooled Recovery Desired

**Explanation:**

A. Incorrect. Both are incorrect. E-1 is plausible as this is the procedure to deal with LOCA's. Actuate SI is the normal response to initiation of a LOCA/leak.
B. Incorrect. First part is incorrect. Second part is correct. ECA-3.1 deals with tube ruptures and another event, such as a LOCA.
C. Incorrect. First part is correct. Second part is incorrect.
D. Correct. Action per the Foldout page is to manually start ECCS pumps and go to ECA-3.1

**Technical References**: EOP E-3 step 26 and Foldout page.

**References to be provided to applicants during exam:** None

**Learning Objective**: 7336 - State contents of foldout page

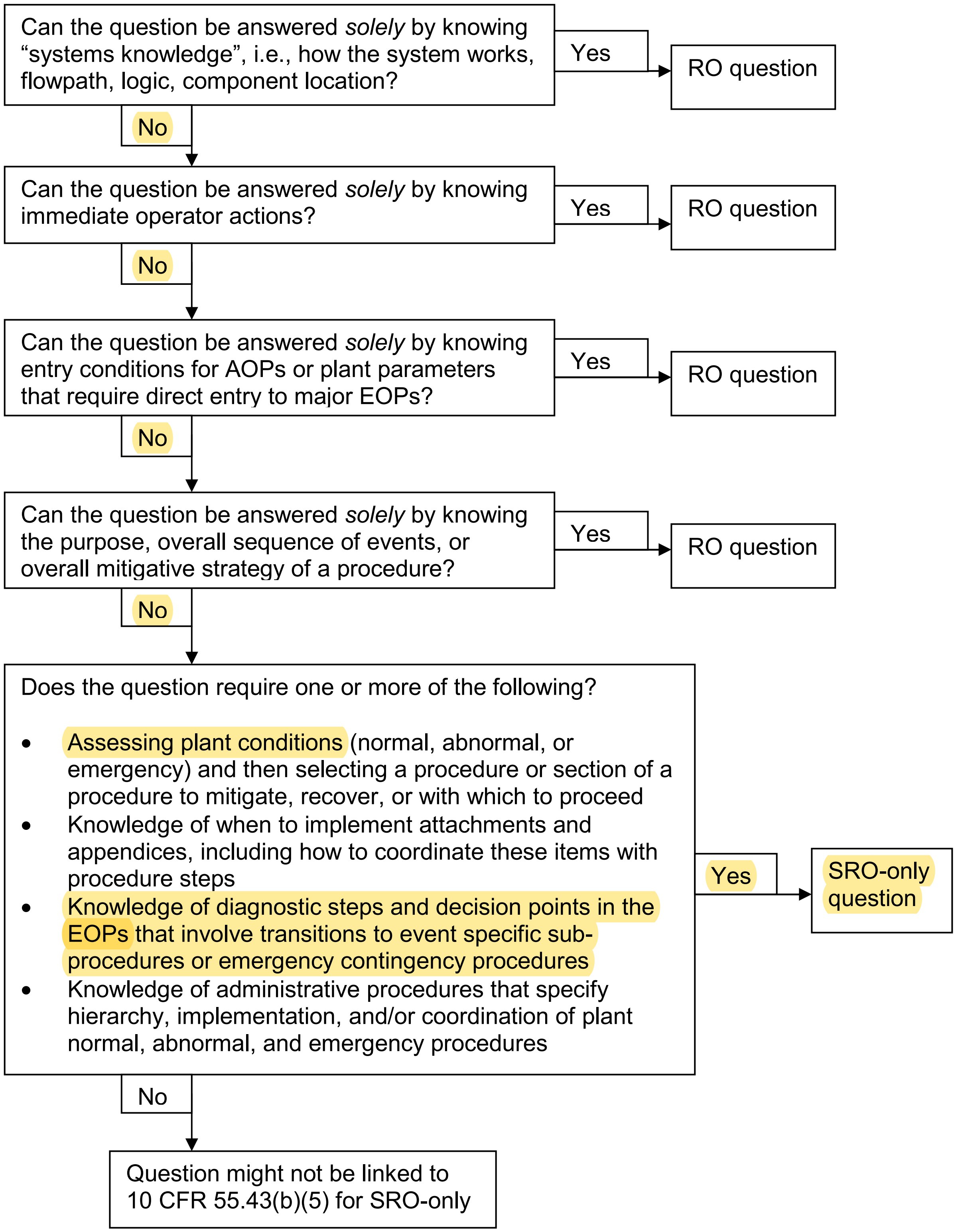
**Question Source:** Bank #89 DCPP L121 08/2014 X

| | | |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 08/2014 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 2.7

## Question 80

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**



| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 2 |
| **029 G2.1.32 - Containment Purge System: Ability to explain and apply system limits and precautions** | | **Group #** | 2 |
| | | **K/A #** | 029 G2.1.32 |
| | | **Rating** | 4.0 |

**Question 81**

What is the reason for limiting the open time of the containment purge valves to no more than 200 hours for the year?

A. To prevent exceeding the NPDES permit.

B. To prevent valve erosion and subsequent excessive leakage past the valves when they are closed.

C. To minimize the probability of a LOCA occurring while the valves are open, limiting the offsite boundary doses.

D. To minimize the probability the valves will not fully close when the purge is secured, resulting in a breach of Containment integrity.

Proposed Answer: C. To minimize the probability of a LOCA occurring while the valves are open, limiting the offsite boundary doses.

**Explanation:**

A. Incorrect. The NPDES covers releases to the environment, but releases to the ocean, not from Containment.
B. Incorrect. These butterfly valves are not fully open (limited to 50 degrees of travel), so its plausible that there is concern of wear.
C. Correct .Containment purges rely on RM-44A and 44B to be OPERABLE. These are process rad monitors. Their operation is assumed to close the purge valves that are opened. Per ECG 23.3, The purging time restriction is meant to minimize the probability of a LOCA while conducting purging operations and thereby limit offsite boundary doses.
D. Incorrect. The valves are limited in travel because these valves have not been qualified to close under accident conditions. Knowing that there is a concern with closing makes this distractor plausible.

**Technical References**: CAP A-6A, ECG 23.3

**References to be provided to applicants during exam:** None

**Learning Objective**: 7428 – State gaseous radwaste system administrative controls

| | | |
|---|---|---|
| **Question Source:** | Bank #89 L162 01/2018 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 01/2018 | Yes |
| **Question History:** | Last Two NRC Exams | Yes |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.2 | |

Difficulty: 2.3

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 2 |
| **035 A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the S/GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure/level transmitter failure** | **Group #** | 2 |
| | **K/A #** | 035 A2.03 |
| | **Rating** | 3.6 |

**Question 82**

Unit 1 is at 100% power.

73 hours ago, Steam Generator 1-1 pressure channel PT-514 in Protection Set 1 - Rack 3, was inoperable and the actions to satisfy LCO 3.3.2 Condition D have been completed.

The Shift Foreman has just declared Steam Generator 1-4 pressure channel PT-544 in Protection Set 1 - Rack 3 inoperable due to a failed surveillance.

What action should be taken by the Shift Foreman?

A. Be in MODE 3 in 5 hours

B. Be in MODE 3 in 78 hours

C. Trip the applicable bistables within 72 hours

D. Enter LCO 3.0.3

Proposed Answer: C. Trip the applicable bistables within 72 hours

**Explanation:**

A. Incorrect. If its assumed they are in the D.2 time (78 hours) with the second channel failure, then there's 5 hours between when PT-544 failed and 78 hours.
B. Incorrect. If its assumed the bistables can't be tripped and so the shutdown action of D.2 applies.
C. Correct. Per the note, separate entry is allowed for each function. The Bases for LCO 3.3.2 states "In the event a channel's Trip Setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. *When the Required Channels in Table 3.3.2-1 are specified (e.g., on a per steam line, per loop, per SG), then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate.*
D. Incorrect. If there is a lack of familiarity with the bases statement about the note, then it could be thought that separate function(s) is for different functions, ie failed NI and failed level transmitter, both of which use ACTION D.

**Technical References**: LCO 3.3.2 and B3.3.2

**References to be provided to applicants during exam:** first 3 pages of LCO 3.3.2

**Learning Objective**: 9697C - Apply TS 3.3 Technical Specification LCOs.

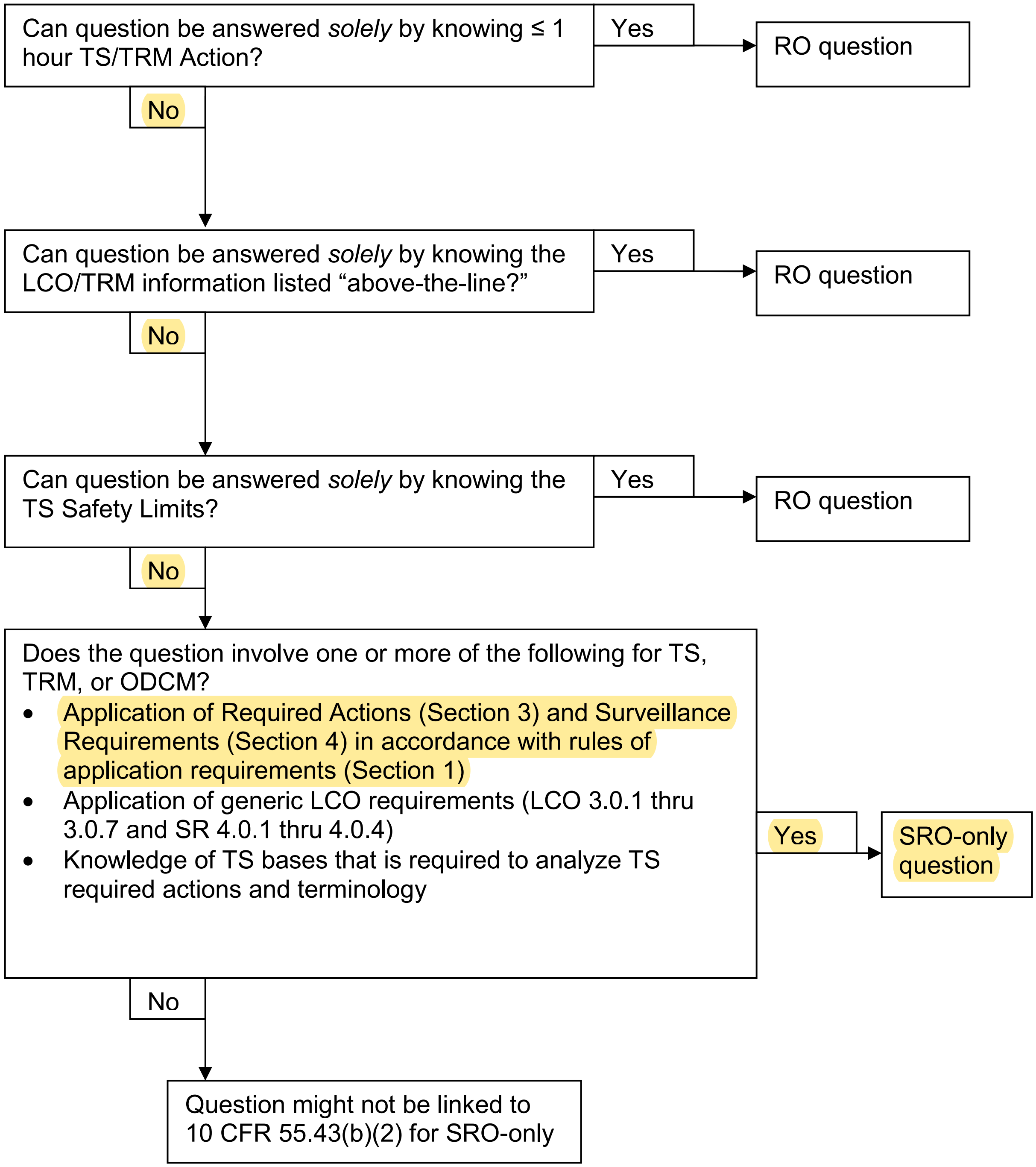
**Question Source:** Bank #

| | | |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.2 | |

Difficulty: 2.7

## Question 82

**Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)**



| **Examination Outline Cross-Reference** | **Level** | SRO |
|---|---|---|
| | **Tier #** | 2 |
| **002 G2.4.4 - RCS: Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.** | **Group #** | 2 |
| | **K/A #** | 002 G2.4.4 |
| | **Rating** | 4.7 |

**Question 83**

GIVEN:

- Unit 1 is in MODE 4
- Pressurizer level is 20% and lowering
- RCS subcooling is 15°F
- The PZR PORVs and Safeties are all closed
- Train 'A' RHR is aligned for shutdown cooling

Which of the following procedures should be entered by the Shift Foreman?

A. EOP E-1, Loss of Reactor or Secondary Coolant

B. OP AP-24, Shutdown LOCA

C. OP AP SD-0, Loss of, or Inadequate Decay Heat Removal

D. OP AP SD-2, Loss of RCS Inventory

**Proposed Answer:** B. OP AP-24, Shutdown LOCA

**Explanation:**
Shutdown AP's are not "major" procedures and therefore not RO knowledge

A. Incorrect. EOP E-1 is applicable for events at power
B. Correct. Applicable in MODE 4 for loss of RCS inventory
C. Incorrect. Applicable only in MODEs 5 or 6.
D. Incorrect. Applicable only in MODEs 5 or 6.

**Technical References**: LCO 3.3.3, B3.3.3, EOP E-1
**References to be provided to applicants during exam:** None
**Learning Objective**: 9694C - Apply TS 3.3 Technical Specification bases.

| | | |
|---|---|---|
| **Question Source:** | Bank #76 L111 11/12 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 11/12 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.0

## Question 83

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 1 |
| **E04 EA2.2 - Ability to determine and interpret the following as they apply to the (LOCA Outside Containment): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.** | **Group #** | 1 |
| | **K/A #** | E04 EA2.2 |
| | **Rating** | 4.2 |

**Question 84**

The crew is performing the actions of EOP ECA-1.2, LOCA Outside Containment.

A few minutes after performing leak isolation steps, the following conditions exist:

- ECCS flow is stable
- Pressurizer level is 22% and rising slowly
- RCS pressure is 400 psig and lowering slowly

What procedure should be entered next by the Shift Foreman?

A. Go to EOP E-1.1, SI Termination.

B. Go to EOP ECA-1.1, Loss of Emergency Coolant Recirculation.

C. Go to EOP E-1, Loss of Reactor or Secondary Coolant, then go to E-1.1, SI Termination.

D. Go to EOP E-1, Loss of Reactor or Secondary Coolant, then go to E-1.2, Post-LOCA Cooldown Depressurization.

**Proposed Answer:** B. Go to EOP ECA-1.1, Loss of Emergency Coolant Recirculation

**Explanation:**

To answer this question, the SRO must know and understand the bases which explains what the expected response is if the LOCA is isolated and the appropriate procedure to be entered from ECA-1.2.

A. Incorrect. The bases for ECA-1.2 states: This step instructs the operator to check RCS pressure to determine if the break has been isolated by previous actions. If the break is isolated in Step 2, a significant RCS pressure increase will occur due to the SI flow filling up the RCS with break flow stopped. The operator transfers to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, if the break has been isolated, for further recovery actions. If the break has not been isolated, the operator is sent to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, for further recovery actions since there will be no inventory in the sump. However, going to E-1.1 is plausible because if the break is/was isolated, as they would do for a leak while in E-1.

B. Correct. Because pressure has not responded, the break is not isolated, ECA-1.1 is the appropriate procedure. The objective of the loss of ECR guideline is threefold: 1) to continue attempts to restore emergency coolant recirculation capability, 2) to delay depletion of the RWST by adding makeup fluid and reducing outflow, and 3) to depressurize the RCS to minimize break flow and cause SI accumulator injection.

C. Incorrect. The break is not isolated. The operator transfers to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, if the break has been isolated, for further recovery actions and then to E-1.1 if there are no other complications. If the break has not been isolated, the operator is sent to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, for further recovery actions since there will be no inventory in the sump.

D. Incorrect. The break is not isolated, therefore a transition to E-1 is not correct. However, if its thought the break is not isolated and the course of action is the same as a small RCS break, then the transition to E-1.2 would plausible.

**Technical References**: ECA-1.1 and 1.2 & background

**References to be provided to applicants during exam:** None

**Learning Objective**: 3552 - Given initial conditions, assumptions, and symptoms, determine the correct Emergency Operating Procedure to be used to mitigate an operational event

| | | |
|---|---|---|
| **Question Source:** | Bank #80 L141 04/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 04/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.5

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5) (Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location? — Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions? — Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? — Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? — Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 1 |
| **APE 077 G2.4.30 Generator Voltage and Electric Grid Disturbances: 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.** | | **Group #** | 1 |
| | | **K/A #** | APE 077 G2.4.30 |
| | | **Rating** | 4.1 |

**Question 85**

Unit 1 and Unit 2 are at 100% power.

Due to grid instability, the Shift Manager is in contact with the Grid Control Center (GCC) about an emergency backdown order.

Per Operations Policy B-1, Communications With Generation and Transmission Organizations, which of the following questions should be asked by the Shift Manager?

1. How quickly?
2. How many total megawatts need to be shed?
3. How many megawatts per unit need to be shed?

A. 2 only

B. 3 only

C. 1 and 2

D. 1 and 3

**Proposed Answer:** C. 1 and 2

**Explanation:**

Ops Policy B-1 is implemented by the Shift Manager. The knowledge of the information that should be obtained by the SM when notified of the need to perform an emergency backdown.

A. Incorrect. 2 only The information that must be known is: 1. Is it an emergency, 2. How many total MW and 3. How quickly (time). The SM decides how much per unit and ramp rate (max is 100 MW/unit). 2 is one of the anwers, but how quickly (1) must also be asked.
B. Incorrect. 3 only. Plausible to think the amount of load shed is broken down on a per unit basis – how quickly must also be asked.
C. Correct. Of the questions listed, how quickly and the total amount needs to be asked. (Both 1 and 2)
D. Incorrect. 1 correct, 3 is not. Plausible – that it would given to the site as to how much each unit will shed but the SM decides how much per unit.

**Technical References**: Ops Policy B-1

**References to be provided to applicants during exam:** None

**Learning Objective**: 3654 - Identify and discuss Operations Department policy statements

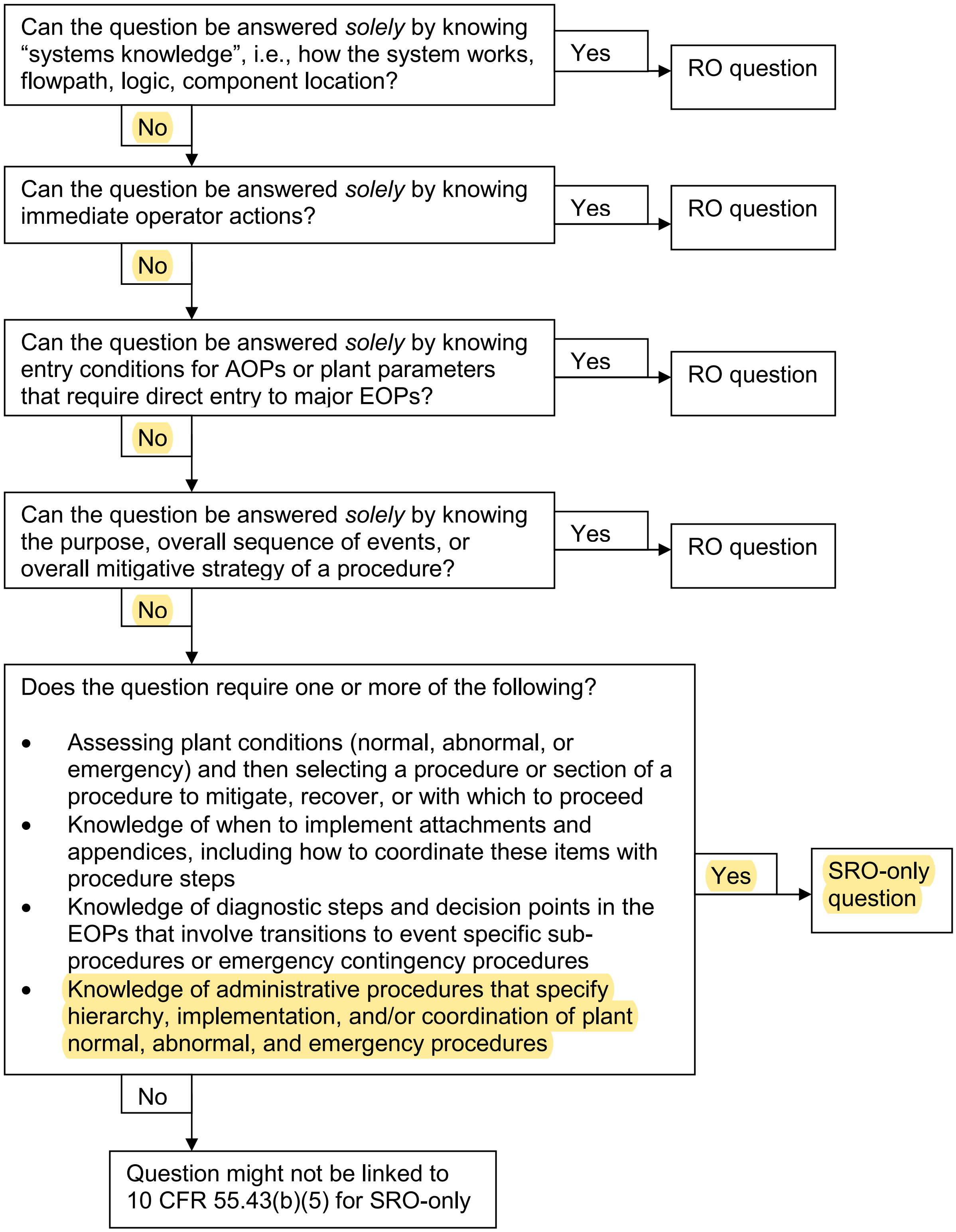
**Question Source:**

| | | |
|---|---|---|
| | Bank #81 L161 10/2016 | X |
| (note changes; attach parent) | Modified Bank # | |

| | | |
|---|---|---|
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 2.2

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**



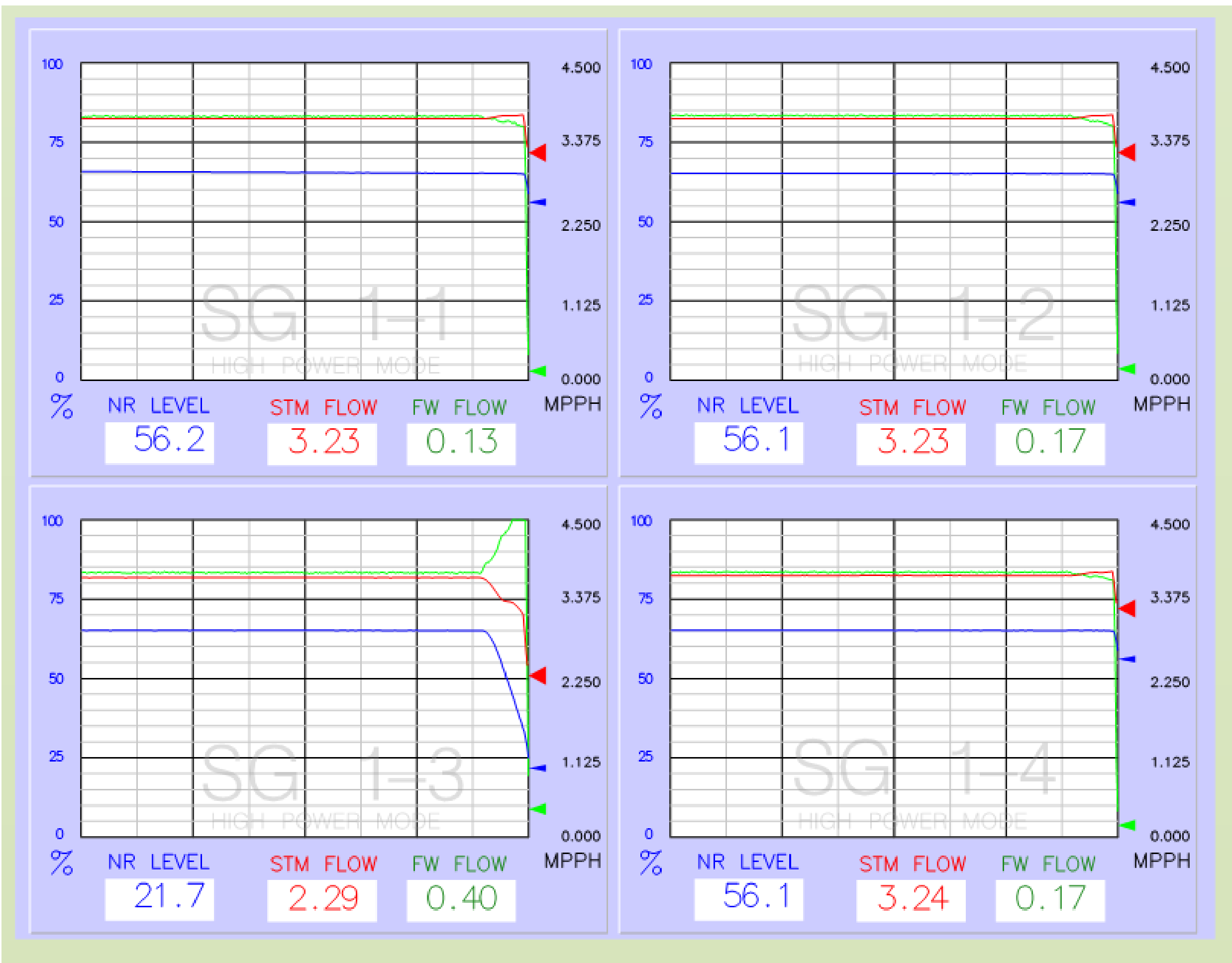
| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 1 |
| **APE 054 AA2.08 - Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Steam flow-feed trend recorder** | **Group #** | 1 |
| | **K/A #** | APE 054 AA2.08 |
| | **Rating** | 3.3 |

**Question 86**

GIVEN:

Unit 1 is at 100% power.

The following indications are seen on VB3:




1) What event is in progress?

2) In accordance with OP1.ID2, Time Critical/Sensitive Operator Actions, what is the maximum amount of time the operator has to isolate the faulted steam generator?

A. 1) Main Feedwater line break
   2) 8.6 minutes

B. 1) Main Feedwater line break
   2) 10 minutes

C. 1) Main Steamline break
   2) 8.6 minutes

D. 1) Main Steamline break
   2) 10 minutes

**Proposed Answer:** B. 1) Main Feedwater line break 2) 10 minutes

**Explanation:**

A. Incorrect. Event in progress is a feed break. Time is plausible – 8.6 minutes is the time to make a PORV available for a feed break.
B. Correct. For a feed break, steam flow will lower as feed flow rises. For a steam break both will rise. Therefore, a feed break is in progress. In accordance with OP1.ID2, the time to isolate the faulted steam generator is 10 minutes.
C. Incorrect. Both parts incorrect. Steam flow would rise for a steam break. Time is to make a PORV available.
D. Incorrect. First part is incorrect. A feed break is in progress. Second part is correct.

**Technical References**: simulator. OP1.ID2
**References to be provided to applicants during exam:** None
**Learning Objective**: Explain the plant's response to a faulted S/G. (5461)

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.7

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

**Examination Outline Cross-Reference**

**EPE 029 ATWS - G2.4.9 Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.**

| | |
|---|---|
| **Level** | SRO |
| **Tier #** | 1 |
| **Group #** | 1 |
| **K/A #** | EPE 029 G2.4.9 |
| **Rating** | 4.2 |

**Question 87**

Unit 1 is at 13% power.

The following sequence of events occur:

- A loss of 12 kV bus D occurs
- Operator attempts at a manual trip from the Control Room are unsuccessful
- The rods fully insert when the reactor trip breakers are tripped locally

1) An automatic reactor trip __________________ have occurred when 12 kV bus D was de-energized.

2) What is the highest Emergency Action Level for this event?

| Inability to shut down the reactor causing a challenge to core cooling or RCS heat removal. 1 | Automatic or manual trip fails to shut down the reactor and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor. 1 | Automatic or manual trip fails to shut down the reactor. 1 |
|---|---|---|
| ☐ **SS6.1** (p.196)<br>An automatic or manual trip fails to shut down the reactor.<br>**AND**<br>**All** actions to shut down the reactor are **not** successful.<br>**AND EITHER**:<br>• CSFST Core Cooling Red path conditions met.<br>• CSFST Heat Sink Red path conditions met .<br>**AND**<br>Heat sink is required (Note 11). | ☐ **SA6.1** (p.194)<br>An automatic or manual trip fails to shut down the reactor.<br>**AND**<br>Manual trip actions taken at the control room panels (CC1, VB2 or VB5) are **not** successful in shutting down the reactor. (Note 8) | ☐ **SU6.1** (p.188)<br>An automatic trip did **not** shut down the reactor after any RTS setpoint is exceeded.<br>**AND**<br>A subsequent automatic trip or manual trip action taken at the control room panels (CC1, VB2 or VB5) is successful in shutting down the reactor. (Note 8)<br><br>☐ **SU6.2** (p.191)<br>A manual trip did **not** shut down the reactor after any manual trip action was initiated.<br>**AND**<br>A subsequent automatic trip or manual trip action taken at the control room panels (CC1, VB2 or VB5) is successful in shutting down the reactor. (Note 8) |

**Note 8**: A manual trip action is **any** operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does **not** include manually driving in control rods or implementation of boron injection strategies

A. 1) should 2) Unusual Event

B. 1) should 2) Alert

C. 1) should NOT 2) Unusual Event

D. 1) should NOT 2) Alert

**Proposed Answer:** B. 1) should 2) Alert

**Explanation:**

A. Incorrect. Above 10% power, a loss of 2 RCPs should cause an automatic trip. Second part is incorrect classification of an Alert is warranted.
B. Correct. Reactor trip is generated above 10%. Second part is correct. With actions in the control room to shutdown the reactor unsuccessful, an Alert is the proper classification.
C. Incorrect. First part is incorrect. Below 10%, loss of RCPs cause a reactor trip. Plausible because there are inhibits, such as C-5, which are active until 15% Second part incorrect,

reactor was not shutdown by Control Room action.

D. Incorrect. First part incorrect, above 10%, a loss of 2 RCPs causes a reactor trip. Second part correct. Efforts to shutdown the reactor in the control room were unsuccessful.

**Technical References**: EAL "HOT", OIM B-6-3 and B-6-4a

**References to be provided to applicants during exam:** None

**Learning Objective**: 42285 - Given indications of an event, use EP G-1 to classify the event with 100% accuracy within 15 minutes

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.1 | |

Difficulty: 2.8

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?
Yes → RO question
No ↓

Can the question be answered *solely* by knowing immediate operator actions?
Yes → RO question
No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?
Yes → RO question
No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?
Yes → RO question
No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question
No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 1 |
| **EPE 009 EA2.34 - Ability to determine or interpret the following as they apply to a small break LOCA: Conditions for throttling or stopping HPI** | | **Group #** | 1 |
| | | **K/A #** | EPE 009 EA2.34 |
| | | **Rating** | 4.2 |

**Question 88**

The crew is performing the actions of EOP E-1.2, Post-LOCA Cooldown and Depressurization.

Current plant conditions:

| | |
|---|---|
| ECCS CCP Status | 1-2 running |
| SI pump Status | 1-1 running |
| RHR pump Status | Both secured |
| Pressurizer level | 24% and stable |
| RCS Subcooling | 115°F and stable |
| RCS Hot Leg temperature | 342°F |
| RCP Status | 1-2 running |
| Containment Pressure | 1.5 psig and stable |

What action should be taken by the Shift Foreman?

A. Maintain current ECCS pump status and go to step 24, ENSURE ECCS Flow Not Required.

B. Leave RHR pumps off, direct the operator to stop the remaining SI pump.

C. Direct the operator to start an RHR pump in SI mode, then stop the remaining SI pump.

D. Direct the operator to start an RHR pump in SI mode, then go to Step 13, DEPRESSURIZE the RCS to Refill the Pressurizer

**Proposed Answer:** C. Direct the operator to start an RHR pump in SI mode, then stop the remaining SI pump.

**Explanation:**

A. Incorrect. Plausible if step 16.a is misinterpreted that instead of one SI pump being stopped, that both SI pumps are stopped. The RNO bypasses the rest of step 16, no RHR or SI pump status changes are made.
B. Incorrect. Plausible if in step 16.c subcooling is misinterpreted to meet requirements, PZR level is checked and then in 16.d the SI pump is stopped.
C. Correct. E-1.2, Step 16.b and c: Required subcooling is 153°F, so subcooling (115°F) is inadequate. Step 16.c RNO with T-hot less than 350°F directs operators to start an RHR pump. Then, at Step 16.d PZR level is greater than SI termination setpoint of 17%, so step 16.e directs stopping the running SI pump

D. Incorrect. Plausible if at step 16.d PZR level is misinterpreted to be less than required (Level is 24%, adverse containment criterion is 25% but does not apply). 16.d RNO directs going to step 13 to refill the PZR.

**Technical References**: EOP E-1.2

**References to be provided to applicants during exam:** EOP E-1.2 step 16

**Learning Objective**: 3552 - Given initial conditions, assumptions, and symptoms, determine the correct Emergency Operating Procedure to be used to mitigate an operational event

| | | |
|---|---|---|
| **Question Source:** | Bank #DCPP bank B-0186 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.0

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 1 |
| **APE 026 G2.4.18 - Loss of Component Cooling Water: Knowledge of the specific bases for EOPs.** | **Group #** | 1 |
| | **K/A #** | APE 026 G2.4.18 |
| | **Rating** | 4.0 |

**Question 89**

A design basis 200 gpm leak has occurred in the CCW system.

In accordance with OP1.ID2, Time Critical Operator Actions, the leak must be detected and isolated within _____1)____ to prevent the loss of ____________2)___________.

A. 1) 20 minutes 2) CCW due to surge tank depletion

B. 1) 20 minutes 2) cooling to the charging pumps

C. 1) 1 hour 2) CCW due to surge tank depletion

D. 1) 1 hour 2) cooling to the charging pumps

Proposed Answer: A. 1) 20 minutes 2) CCW due to surge tank depletion

**Explanation:**

A. Correct. According to OP1.ID2, the time is 20 minutes to prevent surge tank depletion.
B. Incorrect. First part correct. Second part plausible as loss of CCW could result in a loss of cooling to CCW loads and the charging pumps have a TCOA associated with a loss of cooling (60 minutes to establish cooling from fire water).
C. Incorrect. First part incorrect. 60 minutes is the TCOA for establishing backup cooling to a charging pump. Second part is correct.
D. Incorrect. Both parts are incorrect.

**Technical References**: OP1.ID2 attachment 1

**References to be provided to applicants during exam:** None

**Learning Objective**: 3477L Given an abnormal condition, summarize the major actions of OP AP-11 to mitigate an event in progress including: Bases for TCOAs with operator actions of 1 hour or less.

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 2.8

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| **Examination Outline Cross-Reference** | **Level** | SRO |
|---|---|---|
| | **Tier #** | 1 |
| **E10 EA2.1 Ability to determine and interpret the following as they apply to the (Natural Circulation with Steam Void in Vessel with/without RVLIS) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.** | **Group #** | 2 |
| | **K/A #** | E10 EA2.1 |
| | **Rating** | 3.9 |

**Question 90**

GIVEN:

- Unit 2 has tripped following a loss of condenser vacuum
- At 1300,
  - the crew entered EOP E-0.2, Natural Circulation Cooldown
  - CST level is 48%
- At 1700,
  - CST level is 20%
  - required boron concentration is established and the crew is ready to initiate an RCS cooldown from 547°F to MODE 4

Assuming the cooldown could be performed at the maximum rate allowed by EOP E-0.2, what action should be taken by the Shift Foreman?

A. Establish approximately a 25°F/hour cooldown and remain in EOP E-0.2.

B. Establish approximately a 50°F/hour cooldown and remain in EOP E-0.2.

C. The cooldown rate will have to be greater than the maximum allowed rate of 25°F/hour, transition to EOP E-0.3, Natural Circulation Cooldown With Steam Void In Vessel (With RVLIS).

D. The cooldown rate will have to be greater than the maximum allowed rate of 50°F/hour, transition to EOP E-0.3, Natural Circulation Cooldown With Steam Void In Vessel (With RVLIS).

Proposed Answer: D. The cooldown rate will have to be greater than the maximum allowed rate of 50°F/hour, transition to EOP E-0.3, Natural Circulation Cooldown With Steam Void In Vessel (With RVLIS).

**Explanation:**

A. Incorrect. Plausible - This is the Unit 1 rate. If the curves are not used or misread and wrong unit number applied, this would be correct.
B. Incorrect. Plausible - Using the wrong curve could make it appear there is adequate volume.
C. Incorrect. Plausible - If the unit 1 rate is used, and the proper curve, this would be correct.
D. Correct. At the unit 2 rate, it will take approximately 4 hours, there is not adequate CST level (requires greater than 50%).

**Technical References**: IF-2, IF-4 and IF-5, E-0.2 Unit 1 and E-0.2 Unit 2

**References to be provided to applicants during exam:** IF-2, IF-4 and IF-5

**Learning Objective**: 3552 - Given initial conditions, assumptions, and symptoms, determine the correct Emergency Operating Procedure to be used to mitigate an operational event

| | | |
|---|---|---|
| **Question Source:** | Bank #89 L161 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.7

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)
(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 1 |
| **APE 036 G2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.** | | **Group #** | 2 |
| | | **K/A #** | APE 036 G2.4.2 |
| | | **Rating** | 4.6 |

**Question 91**

Unit 1 refueling is in progress.

The Refueling SRO observes bubbles coming to the surface of the refueling cavity and suspects the assembly being lifted is damaged.

In accordance with OP AP-21, Irradiated Fuel Damage, __________________ is an/are additional symptom(s)?

1. Containment Evacuation automatically alarms
2. Z-Z tape indicates the full down
3. Auto stop of upward hoist movement

A. 2 only

B. 3 only

C. 1 and 2

D. 1 and 3

Proposed Answer: B. 3 only

**Explanation:**

A. Inorrect. This is not an entry condition and is used to verify an assembly has been fully inserted into its core location.
B. Correct. This is an indication and is the only one listed.
C. Incorrect. The tape is not an indication. Containment evacuation, unlike FHB alarm does not actuate on high radiation. Plausible if its believed it does.
D. Incorrect. Containment evacuation alarm must be manually activated.

**Technical References**: OP AP-21

**References to be provided to applicants during exam:** None

**Learning Objective**: 3478 - Given initial conditions, assumptions, and symptoms, determine the correct abnormal operating procedure to be used to mitigate an operational event

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.7 | |

Difficulty: 3.1

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | |
|---|---|---|
| **Examination Outline Cross-Reference** | **Level** | SRO |
| | **Tier #** | 1 |
| **E08 EA2.1 - Ability to determine and interpret the following as they apply to the (Pressurized Thermal Shock) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.** | **Group #** | 2 |
| | **K/A #** | E08 EA2.1 |
| | **Rating** | 4.2 |

**Question 92**

GIVEN:
- Safety Injection actuated due to a steam break on one steam generator 10 minutes ago
- All ESF equipment started
- All Steam Generator Narrow Range levels are offscale low
- The TDAFW pump has tripped
- Tcold on the affected loop is 200°F and lowering
- Intermediate Range Startup Rate on both channels is +0.1 DPM and stable

What procedure should the Shift Foreman transition to from EOP E-0, Reactor Trip or Safety Injection?

A. EOP E-1, Loss of Reactor or Secondary Coolant

B. EOP FR-H.1, Response to Loss of Secondary Heat Sink

C. EOP FR-P.1, Response to Imminent Pressurized Thermal Shock Condition

D. EOP FR-S.1, Response to Nuclear Power Generation/ATWS

Proposed Answer: C. EOP FR-P.1, Response to Imminent Pressurized Thermal Shock Condition

**Explanation:**

A. Incorrect. There are challenges to critical safety functions that must be addressed first.
B. Incorrect. Motor Driven AFW pumps provide adequate flow to prevent a challenge to heat sink.
C. Correct. Temperatures are to the left of limit A and are a Red path, which is currently the highest priority
D. Incorrect. Positive IR SUR is a MAGENTA condition. Although Subcriticality is a higher priority, by the rules of usage, the red path on RCS integrity must be addressed.

**Technical References**: F-0

**References to be provided to applicants during exam:** None

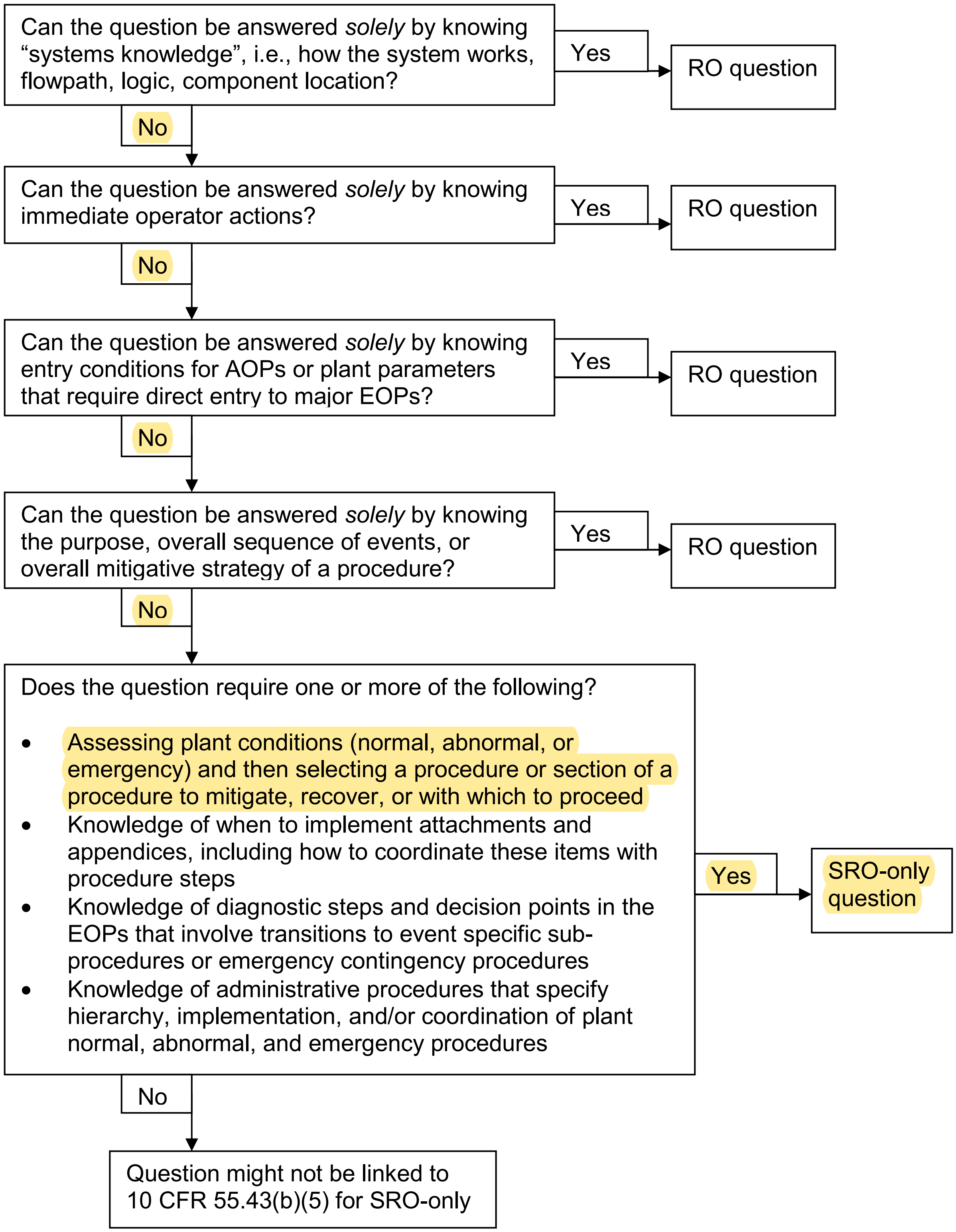
**Learning Objective**: 37107 - Apply the Rules of Usage in EOPs for the CSFSTs and FRGs, including:
the six status trees
the priority of use of the status trees
the priority of use of the color of each CSF
when to monitor and/or implement the CSFSTs and FRGs

| | | |
|---|---|---|
| **Question Source:** | Bank #99 L061C 02/2009 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 02/2009 | Yes |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.5 | |

Difficulty: 3.0

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**



| **Examination Outline Cross-Reference** | **Level** | SRO |
|---|---|---|
| | **Tier #** | 1 |
| **APE 024 G2.4.6 Emergency Boration: Knowledge of EOP mitigation strategies.** | **Group #** | 2 |
| | **K/A #** | APE 024 G2.4.6 |
| | **Rating** | 4.7 |

**Question 93**

GIVEN:

- The crew is performing EOP E-0.1, Reactor Trip Response
- A 10% steam dump valve is leaking by
- RCS temperature is 540°F and decreasing at a rate of approximately 2°F/minute
- RCS pressure is 2235 psig and lowering slowly
- Pressurizer level is 35% and stable
- AFW flow is throttled to approximately 440 gpm
- Steam Generator narrow range levels are 7% and stable
- MSIVs are closed

Which of the following actions should be taken by the Shift Foreman?

A. Continue in EOP E-0.1 and refer to OP AP-6, Emergency Boration.

B. Continue in EOP E-0.1 and have another watchstander initiate emergency boration by implementing OP AP-6, Emergency Boration

C. Direct the operator to initiate Safety Injection and go to EOP E-0, Reactor Trip or Safety Injection.

D. Direct the operator to initiate Safety Injection and go to EOP E-2, Faulted Steam Generator Isolation..

Proposed Answer: B. Continue in EOOP E-0.1 and have another watchstander initiate emergency boration by implementing OP AP-6, Emergency Boration.

**Explanation:**

A. Incorrect. The strategy is to initiate OP AP-6 but it is implemented, not referred to.
B. Correct. The proper action is to implement OP AP-6 and initiate emergency boration
C. .Incorrect. Plausible to believe that SI is required and return to E-0 warranted. There are criteria for SI actuation in E-01, but none are met at this time.
D. Incorrect. Per the foldout page, if SI is initiated, the action is to go to E-0. There are procedures that direct going to EOP E-2 but in those procedures, SI has actuated and the diagnostic steps of E-0 have been performed. In EOP E-0.1, the SI steps must first be verified in EOP E-0. Additionally, the foldout page for SI actuation has not been met. There is adequate subcooling and pressurizer level.

**Technical References**: EOP E-0.1

**References to be provided to applicants during exam:** None

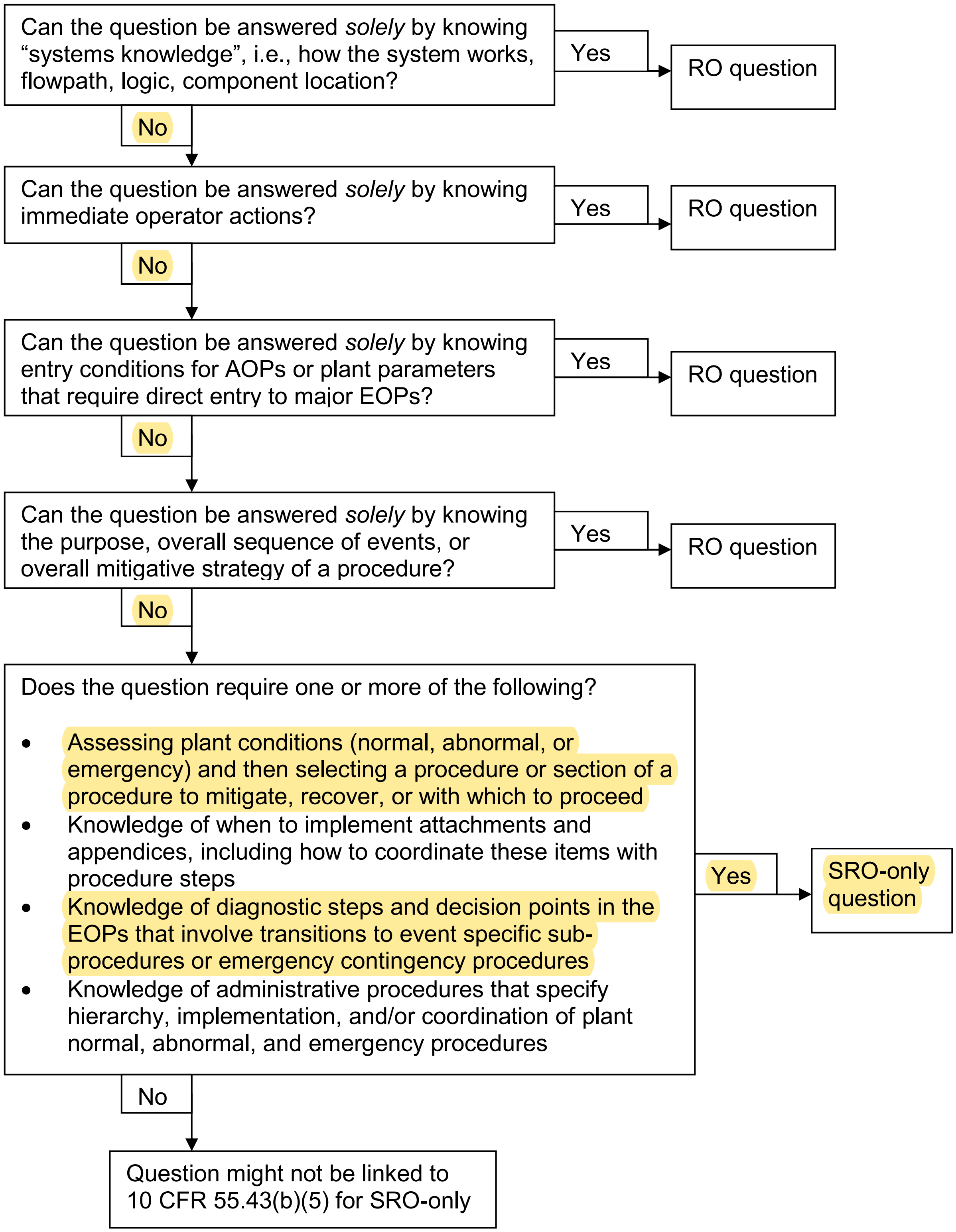
**Learning Objective**: 3478 - Given initial conditions, assumptions, and symptoms, determine the correct abnormal operating procedure to be used to mitigate an operational event

| **Question Source:** | Bank #99 L091 07/2011 | X |
|---|---|---|
| (note changes; attach parent) | Modified Bank # | |

| | | |
|---|---|---|
| | New | |
| | Past NRC Exam DCPP NRC 07/2011 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43. | |

Difficulty: 2.8

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5) (Assessment and selection of procedures)**



| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.1.34 Knowledge of primary and secondary plant chemistry limits.** | | **Group #** | 1 |
| | | **K/A #** | G2.1.34 |
| | | **Rating** | 3.5 |

**Question 94**

The crew has just completed a rapid load reduction of 20% in 30 minutes.

In accordance with LCO 3.4.16, RCS Specific Activity, a RCS sample must be taken within _________1)________ to determine if the limit for DOSE EQUIVALENT______2)______ has been exceeded.

A. 1) 2 to 6 hours 2) I-131

B. 1) 2 to 6 hours 2) Xe-133

C. 1) 8 to 10 hours 2) I-131

D. 1) 8 to 10 hours 2) Xe-133

Proposed Answer: A. 1) 2 to 6 hours 2) I-131

**Explanation:**

A. Correct. The potential for an iodine spike occurs when power is changed quickly (greater than 15% in one hour). The sample is drawn for Iodine within 2 to 6 hours, when the spike should occur.
B. Incorrect. First part is correct. Second part is incorrect, it is Iodine, not Xenon the sample is taken.
C. Incorrect. First part incorrect. The sample must be drawn within 2 to 6 hours. Second part is correct.
D. Incorrect. Both parts incorrect. Sample must be taken within 2 to 6 hours. Xe-133 is part of the LCO but not the reason the sample is required.

**Technical References**: LCO 3.4.16, SR 3.4.16.2

**References to be provided to applicants during exam:** None

**Learning Objective**: 9694D - Apply TS 3.4 Technical Specification bases

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.2 | |

Difficulty: 3.0

## Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)

Can question be answered *solely* by knowing ≤ 1 hour TS/TRM Action?

Yes → RO question

No ↓

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes → RO question

No ↓

Can question be answered *solely* by knowing the TS Safety Limits?

Yes → RO question

No ↓

Does the question involve one or more of the following for TS, TRM, or ODCM?

- Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)
- Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)
- Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(2) for SRO-only

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.2.43 Knowledge of the process used to track inoperable alarms.** | | **Group #** | 2 |
| | | **K/A #** | G2.2.43 |
| | | **Rating** | 3.3 |

**Question 95**

In accordance with OP1.DC24, Control of Annunciator System Problems, the ______1)________ is responsible for conducting a ______2)_________ audit of annunciator problem logs.

A. 1) Shift Manager 2) weekly

B. 1) Shift Manager 2) monthly

C. 1) Shift Foreman 2) weekly

D. 1) Shift Foreman 2) monthly

Proposed Answer: A. 1) Shift Manager 2) weekly

**Explanation:**

A. Correct. Per the procedure, step 4.2, the SM is responsible conducting a weekly audit of the problem logs.
B. Incorrect. First part is correct. Second part is plausible as monthly is a normal amount of time for surveillances and reports
C. Incorrect. The SFM has many responsibilities and reviews, but the SM has the responsibility for reviewing the annunciator problem logs. Second part correct.
D. Incorrect. Both incorrect. The review is the responsibility of the SM and it is done weekly.

**Technical References**: OP1.DC24

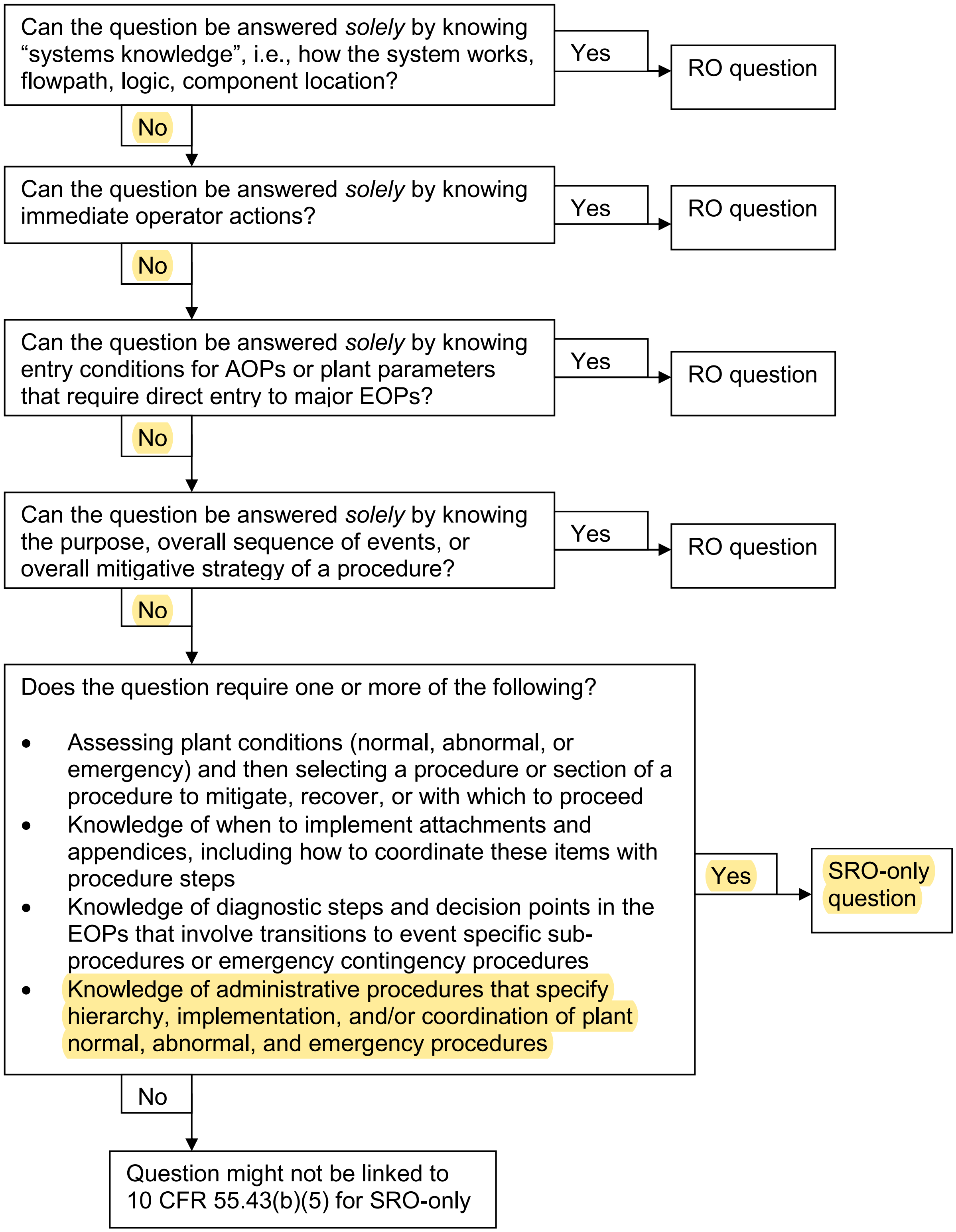
**References to be provided to applicants during exam:** None

**Learning Objective**: 77187 - From memory, discuss the miscellaneous Ops department policies and administrative procedures per the guidance listed in the lesson references.

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #69 L161 10/2017 | X |
| | New | |
| | Past NRC Exam DCPP NRC 10/2017 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.3 | |

Difficulty: 2.1

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**



| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.4.29 Knowledge of the emergency plan.** | | **Group #** | 4 |
| | | **K/A #** | G2.4.29 |
| | | **Rating** | 4.4 |

**Question 96**

When is the Shift Manager first required to notify the US Coast Guard of applicable Protective Action Recommendations?

A. At the SAE declaration, after notifying the county, state and NRC.

B. At the SAE declaration, after notifying the county and state but prior to notifying the NRC.

C. At the GE declaration, after notifying the county, state and NRC.

D. At the GE declaration, after notifying the county and state but prior to notifying the NRC.

Proposed Answer: D. At the GE declaration, after notifying the county and state but prior to notifying the NRC

**Explanation:**

PARs are declared for GE (unless dose assessment or field measurements exceed PAG criteria. This could be the case if the EOF is manned. If this was the case, the SM would not be making the call). Recent plant change to PARs removed any PAR below GE. Previously, at SAE PARs were possible.

A. Incorrect. USCG is not notified until after notifying the county and state, at the GE level. Desired outcome is all are notified within 15 minutes. This is done prior to notifying the NRC.
B. Incorrect. Required at the GE level, notification sequence is correct
C. Incorrect. Correct level of PAR declaration.County and state notifications made first and the Coast Guard is done prior to the NRC.
D. Correct. USCG is notified after county and state at the GE level (above 2.0 E+1) and prior to the NRC.

**Technical References**: LEP-2, LEP-3, EP-G3, EAL wall chart (All page)

**References to be provided to applicants during exam:** None

**Learning Objective**: 42287 - As described in EP G-3, state the requirements for the following: Initial Notifications (Time Critical)

| | | |
|---|---|---|
| **Question Source:** | Bank #84 L141 04/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP NRC 04/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.1 | |

Difficulty: 2.8

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**

Can the question be answered *solely* by knowing "systems knowledge", i.e., how the system works, flowpath, logic, component location?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing immediate operator actions?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs?

Yes → RO question

No ↓

Can the question be answered *solely* by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure?

Yes → RO question

No ↓

Does the question require one or more of the following?

- Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed
- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps
- Knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(5) for SRO-only

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.1.41 Knowledge of the refueling process.** | | **Group #** | 1 |
| | | **K/A #** | G2.1.41 |
| | | **Rating** | 3.7 |

**Question 97**

1) In accordance with ECG 42.1, Refueling Operations – Decay Time, prior to beginning a core offload, reactor must have been subcritical for a minimum of __________hours.
2) In accordance with OP L-6, Cold Shutdown/Refueling, unlatching RCCA drive shafts ___________ considered a CORE ALTERATION.

A. 1) 72 2) is

B. 1) 72 2) is NOT

C. 1) 100 2) is

D. 1) 100 2) is NOT

**Proposed Answer:** C. 1) 100 2) is

**Explanation:**

A. Incorrect. First part is incorrect. 72 hours is the time for many Technical Specifications to reach MODE 5, additionally a fuel handling accident is assumed to occur 72 hours after shutdown. Second part is correct.
B. Incorrect. Both parts are incorrect.
C. Correct. ECG 42.1 requires a decay time of at least 100 hours. OP L-6 states: NOTE: Unlatching RCCA drive shafts IS a CORE ALTERATION.
D. Incorrect. First part is correct. Second part incorrect.

**Technical References**: OP L-6, ECG 42.1

**References to be provided to applicants during exam:** None

**Learning Objective**: 66070 - Apply the requirements of System 42 ECGs.

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank # | |
| | New | X |
| | Past NRC Exam | No |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.7 | |

Difficulty: 2.3

**Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)**

Can question be answered *solely* by knowing ≤ 1 hour TS/TRM Action?

Yes → RO question

No ↓

Can question be answered *solely* by knowing the LCO/TRM information listed "above-the-line?"

Yes → RO question

No ↓

Can question be answered *solely* by knowing the TS Safety Limits?

Yes → RO question

No ↓

Does the question involve one or more of the following for TS, TRM, or ODCM?

- Application of Required Actions (Section 3) and Surveillance Requirements (Section 4) in accordance with rules of application requirements (Section 1)
- Application of generic LCO requirements (LCO 3.0.1 thru 3.0.7 and SR 4.0.1 thru 4.0.4)
- Knowledge of TS bases that is required to analyze TS required actions and terminology

Yes → SRO-only question

No ↓

Question might not be linked to 10 CFR 55.43(b)(2) for SRO-only

| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.2.37 Ability to determine operability and/or availability of safety related equipment.** | | **Group #** | 2 |
| | | **K/A #** | G2.2.37 |
| | | **Rating** | 4.6 |

**Question 98**

GIVEN:

- A degraded or non-conforming condition that might have an impact on applicable Systems, Structures, or Components (SSC) operability has just been reported to the Shift Foreman
- The SSC has a Technical Specification LCO ACTION completion time of 8 hours

The Shift Manager determines that a Prompt Operability Assessment (POA) is required.

In accordance with OM7.ID12, Operability Determination:

1) While the POA is being performed, the SSC is considered to be ________________.

2) The POA must be completed within __________________.

A. 1) inoperable 2) 8 hours

B. 1) inoperable 2) 24 hours

C. 1) OPERABLE 2) 8 hours

D. 1) OPERABLE 2) 24 hours

Proposed Answer: D. 1) OPERABLE 2) 24 hours

**Explanation:**

A. Incorrect. For a POA to be done, the immediate determination must be *OPERABLE* but more detailed investigation, evaluation or analysis is necessary to demonstrate the basis. The POA must be completed within a time frame based on its associated completion time. If less than 24 hours, the POA must be done within 24 hours. Plausible to think the CT is the time for the POA (as it is for CTs times between 24 and 72 hours).
B. Incorrect. For a POA to be performed, the determination is the expected condition is OPERABLE. Plausible because it may be viewed that the conservative action is to declare the equipement inoperable until the POA is complete.
C. Incorrect.The SSC is considered OPERABLE while the POA is performed. Plausible, the CT is correct for POA with times of greater than 24 hours.
D. Correct. The SSC is considered OPERABLE while the POA is performed. Additionally, the time for the POA is 24 hours if the POA is less than 24 hours.

**Technical References**: OM7.ID12

**References to be provided to applicants during exam:** None

**Learning Objective**: Explain the use of Prompt Operability Assessments. (35481)

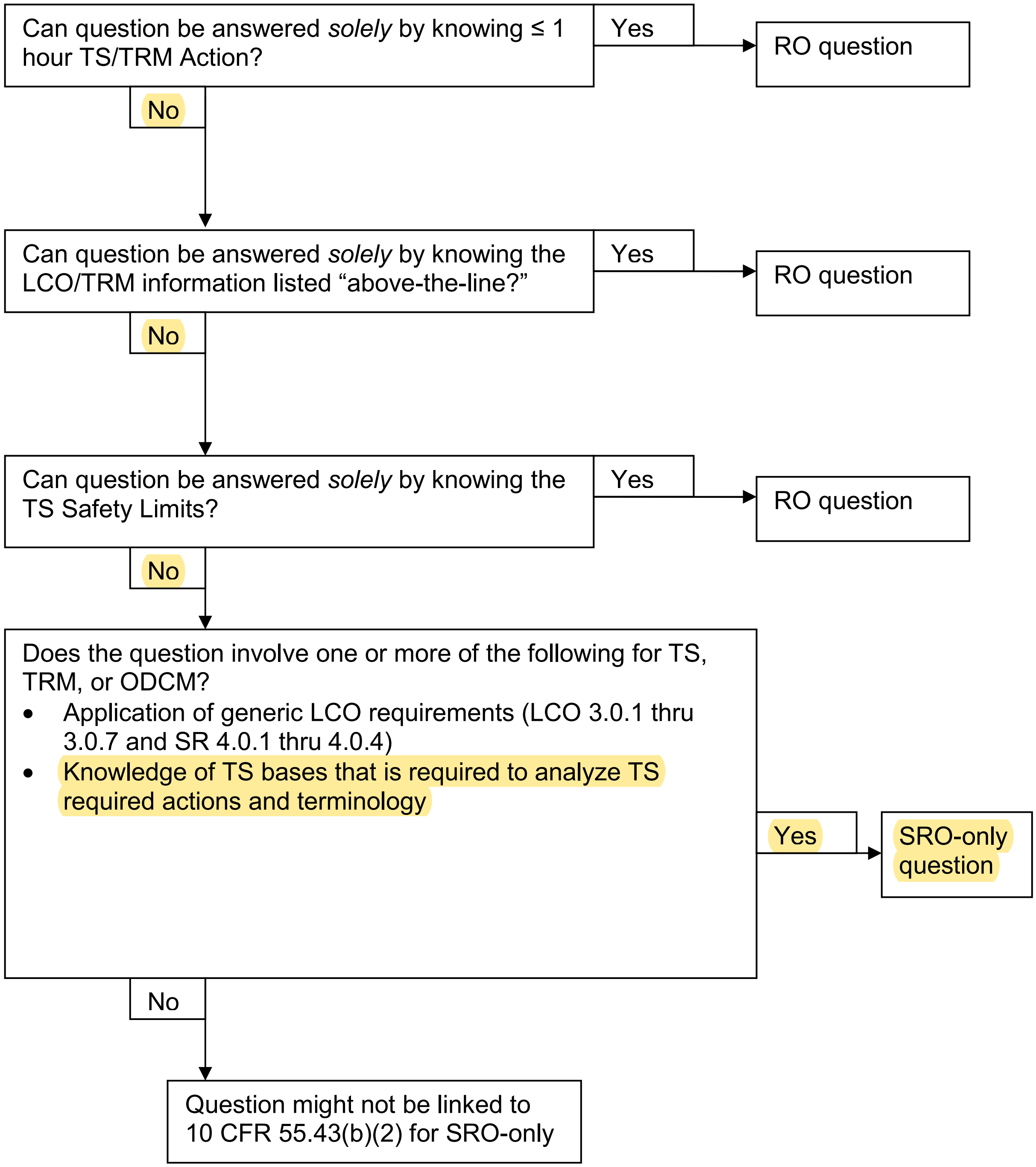
| | | |
|---|---|---|
| **Question Source:** | Bank #97 L161 10/2016 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |

| | | |
|---|---|---|
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | |
| | Comprehensive/Analysis | X |
| **10CFR Part 55 Content:** | 55.43.3 | |

Difficulty: 2.5

## Question 98

**Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)**



| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, *containment entry requirements*, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.** | | **Group #** | 3 |
| | | **K/A #** | G2.3.13 |
| | | **Rating** | 3.8 |

**Question 99**

Unit 1 is in MODE 1. Plant and radiological conditions are stable.

Operators are preparing to make multiple containment entries per RCP D-230, Radiological Control for Containment Entry.

1) ______________________ is responsible for authorizing the Containment Entry.

2) ______________________ is responsible for conducting the Containment Pre-Entry Tailboard

A. 1) Shift Manager 2) Shift Foreman

B. 1) Shift Manager 2) Radiation Protection

C. 1) Shift Foreman 2) Shift Manager

D. 1) Shift Foreman 2) Radiation Protection

Proposed Answer: D. 1) Shift Foreman 2) Radiation Protection

**Explanation:**

A. Incorrect. Shift manager has overall responsibility of the units, however, the SFM authorizes the entry. RP, not the SFM does the brief.
B. Incorrect. First part incorrect. Second part correct.
C. Incorrect. First part is correct. Second part incorrect. Plausble, per OP AP-31, the SM conducts the brief for rapid containment entry. For normal entry, RP does the brief.
D. Correct. SFM authorizes and RP does the brief.

**Technical References**: RCP D-230, OP AP-31

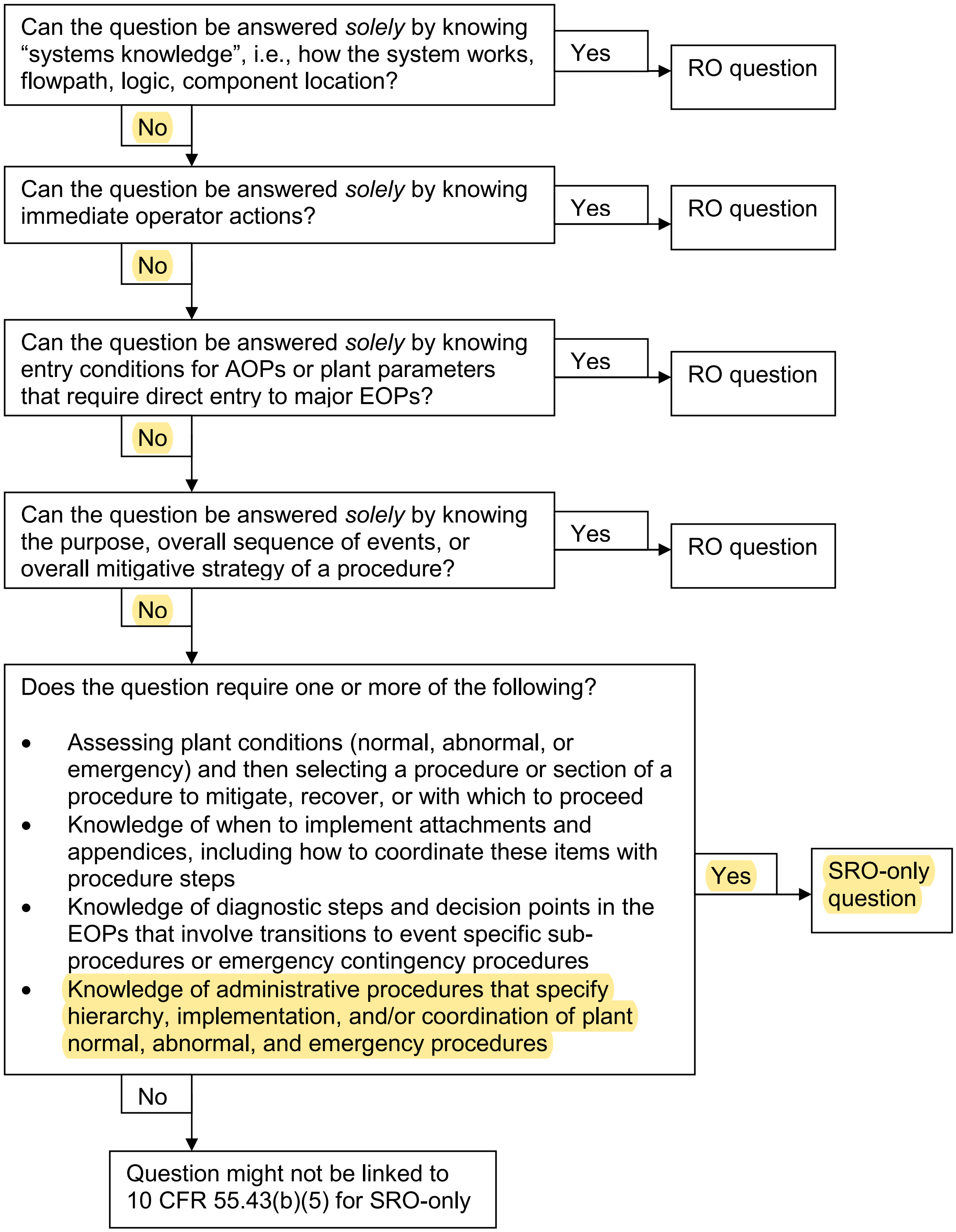
**References to be provided to applicants during exam:** None

**Learning Objective**: 3101 - Demonstrate the ability to assume the responsibilities of the Shift Manager

| | | |
|---|---|---|
| **Question Source:** | Bank # | |
| (note changes; attach parent) | Modified Bank #98 L161 10/2016 | X |
| | New | |
| | Past NRC Exam DCPP 10/2016 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.4 | |

Difficulty: 2.0

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)**
**(Assessment and selection of procedures)**



| | | | |
|---|---|---|---|
| **Examination Outline Cross-Reference** | | **Level** | SRO |
| | | **Tier #** | 3 |
| **G2.4.40 Knowledge of SRO responsibilities in emergency plan implementation.** | | **Group #** | 4 |
| | | **K/A #** | G2.4.40 |
| | | **Rating** | 4.5 |

**Question 100**

GIVEN:

- The Shift Manager has just declared an Alert
- The Emergency Operations Facility and the Technical Support Center are manned, however, they have NOT yet been activated and no turnovers have occurred

For the purpose of Radiological Assessment Sampling, workers will be exposed to radiation levels in excess of the 10 CFR Part 20 exposure limits.

For the current plant conditions, the ____________ can authorize the dose on an EP RB-2, Attachment 9.7, Emergency Exposure Permit.

A. Shift Manager only

B. Shift Manager and the Site Emergency Coordinator

C. Site Emergency Coordinator and the Emergency Director

D. Emergency Director only

Proposed Answer: A. Shift Manager only

**Explanation:**

A. Correct. Only the Emergency Director or in this case, the Shift Manager (acting ED) has the has the unilateral authority and non delegable responsibility for authorizing an individual emergency worker to exceed normal 10 CFR 20 exposure limits.
B. Incorrect. The TSC is not yet activated, the SEC is not yet taken control.
C. Incorrect. The Shift Manger has Command and Control of the emergency response for the given plant conditions and until a turnover happens with the SEC or ED.
D. Incorrect. The ED would be the person responsible if in command and control..

**Technical References**: EP RB-2

**References to be provided to applicants during exam:** None

**Learning Objective**: State who may authorize emergency doses. (9848)

| | | |
|---|---|---|
| **Question Source:** | Bank #97 L111 11/2012 | X |
| (note changes; attach parent) | Modified Bank # | |
| | New | |
| | Past NRC Exam DCPP 11/2012 | Yes |
| **Question History:** | Last Two NRC Exams | No |
| **Question Cognitive Level:** | Memory/Fundamental | X |
| | Comprehensive/Analysis | |
| **10CFR Part 55 Content:** | 55.43.1 | |

Difficulty: 2.3

**Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)
(Assessment and selection of procedures)**