

Given the following conditions:

- Unit 1 is at 100% power
- A unit trip occurred
- Safety Injection is not required

Which ONE of the following completes both statements in accordance with 1-ES-0.1, Reactor Trip Response, step 8?

VERIFY ALL IRPIs - (1) STEPS OR LESS

And

If the answer to step 8 is NO, THEN the RNO will require the operator to (2).

- A. (1) 10
(2) open the rod drive MG set output breakers
- B. (1) 12
(2) open the rod drive MG set output breakers
- C. (1) 10
(2) emergency borate
- D. (1) 12
(2) emergency borate

Distractor Analysis:

A. Incorrect - The first part is correct. The procedure action is to verify all IRPIs are less than 10 steps. The second part is incorrect but plausible because this would cause a reactor trip if one did not occur as required.

B. Incorrect - The first part is incorrect but is plausible because the Technical Specifications require IRPIs to be within 12 steps of group step counters. The second part is incorrect but plausible because this would cause a reactor trip if one did not occur as required.

C. Correct - The first part is correct. The procedure action is to verify all IRPIs are less than 10 steps. The second part is correct. Emergency boration is required to ensure adequate shutdown margin.

D. Incorrect - The first part is incorrect but is plausible because the Technical Specifications require IRPIs to be within 12 steps of group step counters. The second part is correct. Emergency boration is required to ensure adequate shutdown margin.

K/A:

007EA2.06 - Ability to determine or interpret the following as they apply to a reactor trip:
Occurrence of a reactor trip

Technical References:

1-ES-0.1, Reactor Trip Response

References provided to applicants: None

Learning Objective:

U12481 - Explain the following concepts concerning verifying that all control rods are fully inserted in 1-ES-0.0: Condition requiring emergency boration

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:55.41.b.7

Comments:

Unit 2 was operating at 100% power when a Reactor Trip occurs and the following conditions exist:

- 2-RC-SV-2551B, B Przr Safety, has failed open.
- Pressurizer pressure is 1020 psig.
- PRT pressure rises to 55 psig.
- Core Exit Thermocouples read 560°F.

Which one of the following completes the statements below?

2-RC-TI-2467, B Przr Safety Valve Line Temperature, will indicate approximately ____ (1) ____.

and

2-RC-LI-2459, Pressurizer Level Channel I, indication will be ____ (2) ____.

- A. (1) 546°
(2) rising
- B. (1) 546°
(2) lowering
- C. (1) 320°
(2) lowering
- D✓ (1) 320°
(2) rising

WOG Executive Guideline - During situations where a steam vent path is established from the pressurizer vapor space and where RCS subcooling is not indicated, pressurizer level may not be a true indication of RCS inventory. This can result from steam generated in the reactor vessel, passing through the pressurizer surge line and preventing the water inventory of the pressurizer from draining into the RCS loops. This holdup of water can result in a stable or even increasing indicated pressurizer level while RCS water inventory is actually decreasing. Pressurizer level should be relied on only with hot leg or core exit subcooling present. In SI termination steps in the ERGs, pressurizer level is only checked after adequate RCS subcooling is confirmed.

Distracter analysis

A. Incorrect. First part is incorrect. Plausible if applicant believes that the temperature of the steam in the Pressurizer is the same temperature as the steam entering the PRT. 546°F is the approximate saturation temperature for 1035 psia. This was the error made at the TMI accident.
Second part is correct.

B. Incorrect. First part is incorrect (See above).
Second part is incorrect. This is initially true but in the scenario given, subcooling is lost in the core and a bubble is formed in the vessel upper head. This will result in the Pzr level rising instead of lowering as one would expect. Plausible since during a LOCA event the normal response is that Pzr level decreases.

C. Incorrect. First part is correct.
Second part is incorrect (See above).

D. Correct. First part is correct. Using the steam tables and the following pressures:
1020 psig + 15 = 1035 psia (RCS)
55 psig + 15 = 70 psia (PRT) ~320°F
Second part is correct. Since the break is at the top of the pressurizer, the pressurizer level will be rising. This scenario was run on the desktop simulator. Pressurizer level was rising at 1020 psig.

K/A:

008AK1.01

Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Thermodynamics and flow characteristics of open or leaking valves

Technical References:

WOG Executive Backgrounds

Steam Table

References provided to applicants: None

Learning Objective:

Objective 3507: Explain the following concepts with pressurizer Power operated relief valves and safety valves

Objective 14373: Describe the Three Mile Island accident including the following events and their consequences

Question Source:

Farley 2013 NRC Exam

Question History:

Farley 2013

Question Cognitive Level: Comprehensive

10 CFR Part 55 Content:

Comments:

Given the following conditions:

- Unit 1 tripped from 100% power
- CETCs indicate 618 °F
- RCS pressure is 2,235 psig
- Containment pressure is 22 psia
- RVLIS full range indicates 45%
- RCPs are off

Which ONE of the following identifies the appropriate Functional Restoration Procedure in accordance with 1-F-0, Critical Safety Function Status Trees?

- A✓ 1-FR-C.2, Response to Degraded Core Cooling (Orange path)
- B. 1-FR-C.1, Response to Inadequate Core Cooling (Orange path)
- C. 1-FR-C.1, Response to Inadequate Core Cooling (Red path)
- D. Core Cooling Critical Safety Function Satisfactory (Green path)

Distractor analysis:

A. Correct.

B. Incorrect. 1-FR-C.1 does not have an Orange path. Plausible because 1-FR-S.1, 1-FR-P.1 and 1-FR-Z.1 all can be entered as either Orange or Red path. The candidate must know the Orange and Red path entry conditions to determine the correct procedure.

C. Incorrect. This is plausible because with the given information the candidate must determine the status of the RCPs and must know the Orange and Red path entry conditions to determine the correct procedure.

D. Incorrect. This is plausible because with the given information the candidate must determine the status of the RCPs and must know the Orange and Red path entry conditions to determine the correct procedure. If they do not realize that adverse containment conditions exist then this would be the correct answer.

K/A:

009EG2.4.21

Small Break LOCA

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

Technical References:

WOG ERG background documents

1-F-0

1-FR-C.2

1-FR-C.1

References provided to applicants: None

Learning Objective:

11670

List the following information associated with 1-FR-C.1, "Response to Inadequate Core Cooling."

- Purpose of the procedure
- Modes of applicability
- Entry conditions
- Major action categories
- Conditions that result in leaving the procedure

14306

Evaluate a set of plant conditions associated with the FR Procedures in light of the following issues:

- Procedure entry conditions
- Major action categories
- Step bases
- Proper procedure usage

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7/43.5

Comments:

Given the following:

- Unit 1 was at 100% power when a LOCA occurred
- 1-E-1, Loss of Reactor or Secondary Coolant, is in progress
- The operating crew is currently performing step 22 - "Check if SI Accumulators should be isolated"

Which ONE of the choices below completes the following statements?

___(1)___ indication is used to determine if SI Accumulators will be isolated?

AND

If the SI accumulator isolation valve cannot be closed then the accumulator will be vented to the ___(2)___.

- A. (1) Safety Injection Accumulator Level
(2) Process vents
- B. (1) Safety Injection Accumulator Level
(2) Gas Stripper
- C. (1) RCS Hot leg temperature
(2) Process vents
- D. (1) RCS Hot leg temperature
(2) Gas Stripper

Distractor Analysis:

A. Incorrect. The first part is incorrect but plausible because the reason is to prevent the SI accumulator from blowing down and injecting nitrogen into the RCS and creating a void in the vessel head. The second part is correct.

B. Incorrect. The first part is incorrect but plausible because the reason is to prevent the SI accumulator from blowing down and injecting nitrogen into the RCS and creating a void in the vessel head. The second part is incorrect but plausible because other equipment such as the VCT is vented to the gas stripper. It also requires the candidate to know the flow path for venting the SI accumulators and it would be logical to capture anything vented from the containment following a LOCA into the the gas stripper which is then sent to the waste gas decay tanks.

C. Correct.

D. Incorrect. The first part is correct. The second part is incorrect but plausible because other equipment such as the VCT is vented to the gas stripper. It also requires the candidate to know the flow path for venting the SI accumulators and it would be logical to capture anything vented from the containment following a LOCA into the the gas stripper which is then sent to the waste gas decay tanks.

K/A:

011EA1.09

Large Break LOCA

Ability to operate and monitor the following as they apply to a Large Break LOCA:

Core flood tank initiation

Technical References:

1-E-1

WOG ERG background documents

References provided to applicants: None

Learning Objective:

13434

Explain the following concepts as they apply to isolating SI accumulators following a LOCA

- Criteria for isolating accumulators
- Why the accumulators are isolated during post-accident conditions
- Why unisolable accumulators are vented

Question Source: New

Question History: New

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

1. 05 - 022AA2.02 001/RO/T1/G1/3.2/3.7/NEW//

Unit 1 is at 100%

- The "C" charging pump is running powered from the 1J emergency bus (15J7)
- The "A" charging pump (1-CH-P-1A) is in AUTO
- The "B" charging pump (1-CH-P-1B) is in AUTO

The "C" charging pump trips due to an electrical fault in the motor

Which ONE of the choices below completes the following statements?

___(1)___ charging pump(s) will automatically start

AND

The crew ___(2)___ have to restore letdown.

- A. (1) Only B
(2) will
- B. (1) Both A and B
(2) will
- C. (1) Only B
(2) will not
- D. (1) Both A and B
(2) will not

Distractor Analysis:

A. Incorrect. First part is incorrect but plausible since the B pump is powered from the same bus as the C alternate pump and it could be assumed that only the pump associated with that bus will start. Second part is correct due to all charging pump breakers will be open at the same time..

B. Correct. Both CH pumps will receive an auto start signal and letdown will isolate due to all charging pump breakers being open at the same time before the standby pumps start.

C. Incorrect. First part is incorrect but plausible as noted above. Second part is incorrect but plausible since the examinee must realize that for a short period of time the circuitry will see no CH pumps running which will cause the letdown valves to close.

D. Incorrect. First part is correct. Second part is incorrect but plausible since the examinee must realize that for a short period of time the circuitry will see no CH pumps running which will cause the letdown valves to close.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

022AA2.02

Loss of Reactor Coolant Makeup

Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup:

Charging pump problems

Technical References:

1-AP-49

References provided to applicants: None

Learning Objective:

347

List the interlocks associated with the following CH pump actions.

- Automatically starting each pump

320

List the following associated with the letdown orifice isolation valves

- Interlocks associated with the automatic closure of the valves

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

2. 06 - 025AK1.01 001/RO/T1/G1/3.9/4.3/BANK/NAPS 2008/

Given the following:

- Unit 1 has just entered Mode 4 with cooldown to Mode 5 in progress.
- RHR Pump 1A is in service.

The OATC notes the following:

- RHR Pump 1A motor amps indicate 10 and stable.
- 1-RH-FCV-1605 is in automatic indicates 100% demand.

Which ONE of the following identifies the status of the 1-RH-FCV-1605, RHR Heat Exchanger Bypass Valve AND predicts the trend on Core Exit TCs?

- A✓ 1-RH-FCV-1605 operating as designed;
Core Exit TCs rising.
- B. 1-RH-FCV-1605 operating as designed;
Core Exit TCs lowering.
- C. 1-RH-FCV-1605 failed;
Core Exit TCs lowering.
- D. 1-RH-FCV-1605 failed;
Core Exit TCs rising.

QUESTIONS REPORT

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A Correct. As given amps are low but stable indicating a sheared shaft. For low flow 1-RH-FCV-1605 would be expected to open to try and maintain flow. Inadequate flow would cause temperature to increase.

B Incorrect. The value of 10 and stable is indicative of a sheared shaft NOT a pump that is operating normally. For the sheared shaft 1-RH-FCV-1605 would be expected to open to try and maintain flow. Inadequate flow would cause temperature to increase. Plausible since the candidate may conclude that the reason amps are low is the control valve failed closed (lower overall flow means less load on pump) and also the FCV failure would force more water thru the HCV causing temperature to decrease.

C Incorrect. Normal amps would be around 35, the value of 10 and stable is indicative of a sheared shaft. For the sheared shaft 1-RH-FCV-1605 would be expected to open to try and maintain flow. Inadequate flow would cause temperature to increase. Plausible since the candidate may conclude that the reason amps are low is the control valve failed closed (lower overall flow means less load on pump) and also the FCV failure would force more water thru the HCV causing temperature to decrease.

D Incorrect. Similar to the above the candidate may conclude that the FCV is the cause of amps being low and may conclude that the lower flow would mean less heat removal resulting in core exit TCs increasing.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

028AK1.01

Knowledge of the operational implications of the following concepts as they apply to

Loss of Residual Heat Removal System:

Loss of RHRS during all modes of operation

Technical References:

AP-11, Pages 2-13 actions

References provided to applicants: None

Learning Objective:

U 12006

Given a set of plant conditions, evaluate RHR system operations in light of the following issues:

- Effect of a failure, malfunction, or loss of a related system or component on this system
- Effect of a failure, malfunction, or loss of components in this system on related systems
- Expected plant or system response based on RHR component interlocks or design features
- Impact on the Technical Specifications
- Response if limits or setpoints associated with this system or its components have been exceeded
- Proper operator response to the condition as stated

Question Source: BANK

Question History: North Anna 2008 RO Exam

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.10

Comments:

Initial conditions:

- Rx heatup is in progress following a refueling outage
- All RCPs are running
- RCS pressure = 1800 psig
- The Przr PORVs and spray valves are in AUTO

Current conditions:

- The Pressurizer Master Pressure Controller, 1-RC-PCV-1444J, output fails high

Which ONE of the choices below completes the following statements?

As a result of the failure, ___(1)___ will open.

AND

In accordance with 1-AP-44, Loss of Reactor Coolant System Pressure, if 1-RC-PCV-1455A, A Przr Spray valve, cannot be closed then the first RCP that will be secured is ___(2)___.

- A. (1) 1-RC-PCV-1455C and both Przr spray valves
(2) 1-RC-P-1A
- B. (1) Both Przr spray valves only
(2) 1-RC-P-1A
- C. (1) 1-RC-PCV-1455C and both Przr spray valves
(2) 1-RC-P-1C
- D✓ (1) Both Przr spray valves only
(2) 1-RC-P-1C

Distractor Analysis:

A. Incorrect. First part is incorrect. Spray valves will open but 1-RC-PCV-1455C will not open due to RCS pressure is below 2000 psig (P-11). Requires knowledge of operation for the Prsr pressure control system to determine which valves will be effected. Plausible if the examinee does not realize pressure is below P-11. The second part is incorrect but plausible because the A RCP supplies flow to the A spray valve but in accordance with 1-AP-44 the first pump to be secured is the C RCP. If pressure does not stop lowering after securing the C RCP then the A RCP is secured .

B. Incorrect. The first part is correct. The second part is incorrect but plausible because the A RCP supplies flow to the A spray valve but in accordance with 1-AP-44 the first pump to be secured is the C RCP. If pressure does not stop lowering after securing the C RCP then the A RCP is secured .

C. Incorrect. First part is incorrect. Spray valves will open but 1-RC-PCV-1455C will not open due to RCS pressure is below 2000 psig (P-11). Requires knowledge of operation for the Prsr pressure control system to determine which valves will be effected. Plausible if the examinee does not realize pressure is below P-11. The second part is correct.

D. Correct.

K/A:

027AK2.03

Pressurizer Pressure Control System (PZR PCS) Malfunction

Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following:

Controllers and positioners

Technical References:

1-AP-44

References provided to applicants: None

Learning Objective:

18046

Perform the following actions of 1-AP-44

- Explain the purpose
- Identify the modes of applicability and/or plant conditions
- Recognize symptoms and entry conditions
- List the immediate operator actions
- Apply applicable Tech Specs
- Explain the high level action
- Recognize plant conditions that result in a transition to or from 1-AP-44

Question Source:New

Question History:None

Question Cognitive Level:Comprehension/Analysis

10 CFR Part 55 Content:41.7/45.7

Comments:

Unit 1 was at 100% power when a reactor trip signal occurred

The reactor failed to trip automatically or manually

The crew is responding to an ATWS in accordance with 1-FR-S.1, Response to Nuclear Power Generation/ATWS.

After initiating emergency boration flow, the crew determines that adequate negative reactivity insertion is NOT occurring due to control rods not inserting in AUTO or MANUAL.

Which ONE of the choices below describes the following:

(1) The method used to inject the BIT

And

(2) The reason this method is used.

A. (1) Manually initiate Safety Injection

(2) Starts a second charging pump and injects the BIT more quickly than manually aligning the BIT

B. (1) Manually inject the BIT

(2) Prevents loss of emergency boration flow due to isolating normal charging

C. (1) Manually initiate Safety Injection

(2) Starts AFW pumps for heat removal

D. (1) Manually inject the BIT

(2) Prevents loss of MFW

Distractor analysis:

A. Incorrect. The first part is incorrect. Plausible if the examinee does not realize that initiating SI will cause a loss of Main FW which is not desired due to loss of heat sink concerns. The second part is incorrect but is plausible because SI will start a second CH pump and cause more flow to the RCS.

B. Incorrect. The first part is correct. The second part is incorrect but is plausible because the examinee must know the flow path of emergency boration.

C. Incorrect. The first part is incorrect. Plausible if the examinee does not realize that initiating SI will cause a loss of Main FW which is not desired due to loss of heat sink concerns. Second part is incorrect but plausible because SI will start the AFW pumps.

D. Correct.

K/A:

029EK3.03

Anticipated Transient Without Scram (ATWS)

Knowledge of the reasons for the following responses as they apply to the ATWS:

Opening BIT inlet and outlet valves

Technical References:

References provided to applicants: None

Learning Objective:

11586

Explain the following concepts associated with emergency borating in response to nuclear generation ATWS

- Why the BIT is aligned manually instead of initiating SI

Question Source: Modified

The crew is responding to an ATWS per 1-FR-S.1, Response to Nuclear Power Generation/ATWS.

After initiating emergency boration flow, the crew determines that adequate negative reactivity insertion is NOT occurring.

Which ONE of the following describes the **actions required** and includes **the basis**?

A. Manually inject the BIT; ensures adequate negative reactivity insertion while avoiding initiating SI and unnecessarily isolating all MFW.

B. Manually inject the BIT; ensures adequate negative reactivity insertion while avoiding initiating SI and unnecessarily starting the EDGs.

C. Manually inject the BIT; ensures adequate negative reactivity insertion while avoiding initiating SI and unnecessarily dumping control room bottled air.

D. Manually initiate SI; injects the BIT more quickly than manually aligning the BIT, thereby ensuring adequate negative reactivity insertion.

Question History:None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.5/41.10/45.6/45.13

Comments:

Given the following conditions:

- Unit 1 is at 100% power
- High capacity steam generator blowdown is in service
- A large tube leak occurs on the A Steam Generator
- 1-SS-RM-125, High Capacity SG Blowdown Radiation Monitor receives a High-High radiation alarm

To protect against release of radiation to the environment, which ONE of the following automatic actions occur due to the radiation alarm?

- A. Closes 1-BD-LCV-101, SG Blowdown Flash Tank Drain Cooler outlet
- B. Closes 1-BD-FCV-102A,B & C, SG High Capacity Blowdown flow control valves
- C. Closes 1-BD-TV-100A - F, SG Blowdown Containment Isolation trip valves
- D. Opens 1-BD-PCV-101, SG Blowdown flash Tank Outlet to Condenser

Distractor Analysis:

A. INCORRECT - 1-BD-LCV-101, SG Blowdown Flash Tank Drain Cooler outlet will OPEN due to the hi-hi alarm to prevent a high level in the flash tank. This is plausible because it would be logical to close the outlet valve to prevent release to the environment.

B. CORRECT - All 3 High Capacity blowdown flow control valves close on a high radiation condition in the blowdown system.

C. INCORRECT - The containment isolation trip valves will close on phase A isolation signal and the inside valves will close on high flow signal. This is plausible because it will stop release of radiation from the SG.

D. INCORRECT - 1-BD-PCV-101 will close due to the hi-hi rad signal. This is plausible because it would vent the flash tank to the condenser which would subsequently be diverted to containment to prevent radioactive release..

K/A:

038EK3.03

Steam Generator Tube Rupture (SGTR)

Knowledge of the reasons for the following responses as they apply to the SGTR: Automatic actions associated with high radioactivity in S/G sample lines

Technical References:

UFSAR 10.4.6.2 - SG Blowdown

UFSAR 11.4.2.14 - SG Blowdown Radiation Monitors

NCRODP 37 - SG Blowdown System

NCRODP 46 - Radiation Monitoring System

References provided to applicants: None

Learning Objective:

Objective 15971

Explain the following concepts associated with a High-Capacity SG Blowdown System trip:

- Purpose
- Initiating signals
- System response

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 55.41.b.7

Comments:

QUESTIONS REPORT
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3. 10 - 040AK2.01 001/RO/T1/G1/2.6/2.5/NEW//

Unit 2 is currently heating up following a refueling outage

- RCS Tavg = 520°F
- A Steam line break occurs on the "B" SG just downstream of the steam flow venturi
- The Main Steam Trip Valves receive an automatic close signal

Which ONE of the choices below completes the following statement?

The signal that caused the Main Steam Trip Valves to close is _____.

- A. High Steam flow coincident with Lo-Lo Tavg
- B. High Steam Line Differential Pressure
- C. High Steam flow coincident with Lo Steam Pressure
- D. Intermediate Hi-Hi Containment pressure

Distractor Analysis:

A. Incorrect. Plausible because this signal will cause the MS trip valves to close if the leak causes 2 MS lines to receive a Hi flow condition. Had the unit been at a higher power level then this would have occurred due to increased steam flow from the other 2 MS lines. The examinee must determine that the leak is upstream of the MS trip valves and non-return valves which will prevent this condition from occurring.

B. Incorrect. Plausible because this signal will be reached and cause an SI signal and Phase A isolation but will not close the MS trip valves.

C. Incorrect. Plausible because this signal will cause the MS trip valves to close if the leak causes 2 MS lines to receive a Hi flow condition. Had the unit been at a higher power level then this would have occurred due to increased steam flow from the other 2 MS lines. The examinee must determine that the leak is upstream of the MS trip valves and non-return valves which will prevent this condition from occurring.

D. Correct. The fault is inside containment which causes containment pressure to rise to 17.8 psia giving the MS isolation signal.

QUESTIONS REPORT
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K/A:

040AK2.01

Steam Line Rupture

Knowledge of the interrelations between the Steam Line Rupture and the following:
Valves

Technical References:

NCRODP - 23, Main Steam

NCRODP - 52, Safety Injection

References provided to applicants: None

Learning Objective:

4065

List the actuation signals that will initiate an automatic close signal to the main steam trip valve

Question Source:New

Question History:None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7/45.7

Comments:

QUESTIONS REPORT
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4. 11 - 054AG2.4.20 001/RO/T1/G1/3.8/4.3/NEW//

Unit 1 is at 65%

- “A” and “B” Main Feed pumps are running
- “C” Main Feed pump is tagged out
- The “B” Main Feed pump trips
- Main Feedwater Pump suction pressure is 290 psig and stable
- The crew is performing 1-AP-31, Loss of Main Feedwater

Which ONE of the choices below completes the following statements in accordance with 1-AP-31?

An additional Condensate Pump ___(1)___ required to be started

AND

Turbine ramp rates must be limited to ___(2)___ %/minute or less

- A. (1) is
(2) 4
- B. (1) is not
(2) 4
- C✓ (1) is
(2) 5
- D. (1) is not
(2) 5

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Distractor Analysis:

A. Incorrect. The first part is correct. The second part is incorrect. The CAUTION in 1-AP-31 states ramp rates must be maintained $\leq 5\%$ /minute.

B. Incorrect. The first part is incorrect. The procedure requires suction pressure to be >300 psig and stable to be adequate or start and additional CN pump. This is plausible because the initial condition of stable pressure can be interpreted as being adequate since the subsequent ramp will cause the pressure to rise. The second part is correct.

C. Correct.

D. Incorrect. Both parts are incorrect as noted above.

K/A:

054AG2.4.20

Loss of Main Feedwater

Knowledge of the operational implications of EOP warnings, cautions, and notes.

Technical References:

References provided to applicants: None

Learning Objective:

14561

List the following information associated with 1-AP-31

- Purpose of the procedure
- Modes of applicability
- Entry Conditions
- Immediate operator actions

Question Source:New

Question History:None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.10/43.5

Comments:

Given the following:

- A station blackout event has occurred
- The crew is attempting to restore power to the 1H emergency bus in accordance with 1-ECA-0.0, "Loss of All AC Power."
- The 1H EDG is running but the output breaker (15H2) is not closed.

While performing attachment #5 of 1-ECA-0.0, which of the following items will prevent the operator from closing the output breaker manually?

- A. Output voltage = 3980 volts
- B. Breaker 15H2 synchronizing switch in OFF
- C. Residual voltage on the 1H bus > 25%
- D. emergency diesel generator speed at < 880 RPM

Distractor Analysis:

A. Incorrect. Plausible because EDG output voltage must be >95% to manually close the output breaker. A calculation must be performed to determine that the stated voltage is above the required voltage.

B. Correct.

C. Incorrect. Plausible because residual bus voltage must be <25% for an automatic closure of the output breaker and the candidate may believe that this would prevent manual operation.

D. Incorrect. Plausible because this would constitute an underfrequency condition which may be considered a condition that would prevent manual operation of the breaker..

K/A:

055EA1.02

Loss of Offsite and Onsite Power (Station Blackout)

Ability to operate and monitor the following as they apply to a Station Blackout:

Manual ED/G start

Technical References:

NCRODP - 55, Station EDG

References provided to applicants: None

Learning Objective:

6296

List the conditions required for the EDG output breaker to respond in each manner listed below:

- Close automatically
- Open automatically
- Close manually

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

5. 13 - 056AK3.01 001/RO/T1/G1/3.5/3.9/BANK//

Given the following:

Unit 1 was in MODE 5 when a Loss of Offsite Power occurred

All Emergency Diesel Generators start and re-energize the emergency busses

When power is restored following the undervoltage condition, the Stub Bus breaker will automatically re-close after a ___(1)___ second time delay provided the associated ___(2)___ pump breaker is open

- A. (1) 30
(2) Residual Heat Removal
- B. (1) 30
(2) Component Cooling
- C✓ (1) 15
(2) Residual Heat Removal
- D. (1) 15
(2) Component Cooling

Distractor Analysis:

A. Incorrect. First part is incorrect. Plausible because there are numerous time delay sequencing setpoints from 10 to 120 seconds (i.e. 10, 15, 20, 25, 30, 35 & 120 seconds) for various peices of equipment. The candidate must determine the correct time delay from memory. The second part is correct, the RHR pump breaker must be open for the stub bus breaker to close.

B. Incorrect. First part is incorrect. Plausible because there are numerous time delay sequencing setpoints from 10 to 120 seconds (i.e. 10, 15, 20, 25, 30, 35 & 120 seconds) for various peices of equipment. The candidate must determine the correct time delay from memory. The second part is incorrect but plausible because the only equipment powered from the stub bus are the CC pumps and the RHR pumps. The candidate must know which component prevents the stub bus breaker from closing.

C. Correct

D. Incorrect. The first part is correct. The second part is incorrect but plausible because the only equipment powered from the stub bus are the CC pumps and the RHR pumps. The candidate must know which component prevents the stub bus breaker from closing.

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K/A:

056AK3.01

Loss of Offsite Power

Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power:

Order and time to initiation of power for the load sequencer

Technical References:

11715-ESK-5AQ, 5AR - Stub Bus Bkr

References provided to applicants: None

Learning Objective:

5520

List the following information associated with the Emergency Electrical Dist. system stub bus.

- Conditions required for a stub bus breaker to re-close automatically when power is restored following and undervoltage

Question Source: Bank

Question History: None

Question Cognitive Level:Memory

10 CFR Part 55 Content:

Comments:

A loss of the 1-III Vital AC Bus has just occurred due to a fault on the bus.

Which ONE of the following describes the reason that 0-AP-10, Loss of Electrical Power, requires the operators to trip the reactor?

Losing the vital bus causes a loss of _____.

- A✓ CC to the RCP lube oil coolers.
- B. Condenser Vacuum.
- C. RCP seal cooling
- D. Main and bypass Feed Regulating Valve Control.

Distractor Analysis:

- A. Correct. Loss of vital bus 1-III would cause a loss of cooling to the RCPs.
- B. Incorrect. Plausible because condenser vacuum would be lost if vital AC bus 1-I was lost.
- C. Incorrect. Plausible since CC is lost to the RCP thermal barrier but does not require a Reactor trip if charging is operating to maintain seal cooling
- D. Incorrect. Plausible because a loss of the vital DC bus 1-III would cause all Main and Bypass Feed Reg valves to close.

K/A:

057AA2.19

Loss of Vital AC Electrical Instrument Bus - Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus:

The plant automatic actions that will occur on the loss of a vital ac electrical instrument bus

Technical References:

11715-ESK-6MC, 6MD

References provided to applicants: None

Learning Objective:

12019

Given a set of plant conditions, evaluate vital and Emergency Distribution System operations in light of the following issues:

- Effect of a failure, malfunction or loss of components in this system on related systems

Question Source:Bank

Question History: Surry 2012

Question Cognitive Level: Memory

10 CFR Part 55 Content:43.5

Comments:

Unit 1 is in Mode 3 following a loss of the 1-III Vital DC bus and subsequent trip.

The appropriate attachment of 0-AP-10, LOSS OF ELECTRICAL POWER, is being performed for the loss of the 1-III Vital DC bus.

In accordance with 0-AP-10, equipment powered from which ONE of the following 4160 volt electrical busses will have to be operated locally at the breaker due to loss of control power.

- A. C Station Service bus
- B. 1J Emergency bus
- C. 1G bus
- D. 1H Emergency bus

Distractor analysis:

The 1-III DC bus supplies control power to the A station service bus and the J emergency bus.

A. Incorrect. The C station service bus control power is supplied from the 1-I DC bus, the B station service bus control power is from the 1-II DC bus and the A Station service bus control power is supplied from the 1-III DC bus. Plausible because it would be logical if the bus control power corresponded to the DC bus number (i.e. 1-I for A bus, 1-II for B bus...)

B. Correct.

C. Incorrect. Plausible as stated above.

D. Incorrect. Plausible as stated above.

K/A:
058AG2.4.11
Loss of DC Power
Knowledge of abnormal condition procedures.

Technical References:
0-AP-10, Loss of electrical power

References provided to applicants: None

Learning Objective:
5522
List the following information associated with the vital 125-volt DC batteries.
•Major loads supplied from each DC vital bus

Question Source: Bank

Question History: None

Question Cognitive Level:Memory

10 CFR Part 55 Content: 41.10/43.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

6. 16 - WE04EK1.1 001/RO/T1/G1/3.5/3.9/BANK//

At 0835, Unit 1 experienced a LOCA outside of containment

The crew has transitioned to 1-ECA-1.1, Loss of Emergency Coolant Recirculation, and is at the RNO step "Establish minimum SI flow to remove decay heat."

The current time is 0950

Which ONE of the following states the minimum amount of SI flow required to remove decay heat.

Reference Provided

- A. 265 gpm
- B. 273 gpm
- C✓ 290 gpm
- D. 310 gpm

Distractor analysis:

A. Incorrect. Candidate must calculate time since trip and determine correct answer from a logarithmic graph. Plausible if wrong time since trip is calculated or wrong point on graph is picked.

B. Incorrect. Candidate must calculate time since trip and determine correct answer from a logarithmic graph. Plausible if wrong time since trip is calculated or wrong point on graph is picked.

C. Correct.

D. Incorrect. Candidate must calculate time since trip and determine correct answer from a logarithmic graph. Plausible if wrong time since trip is calculated or wrong point on graph is picked.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

WE04EK1.1

LOCA Outside Containment

Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment)

Components, capacity, and function of emergency systems.

Technical References:

1-ECA-1.1

References provided to applicants: Provide copy 1-ECA-1.1, Att. 3

Learning Objective:

9628

Explain why ECA-1.1 contains a continuous action for terminating or minimizing flow.

Question Source:Bank

Question History:None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.8/41.10

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

7. 17 - WE05EA1.1 001/RO/T1/G1/4.1/4.0/BANK//

Unit 1 was at 100% power when a loss of all Main and Auxilliary Feedwater flow has occurred

1-FR-H.1, Response to Loss of Secondary Heat Sink, is in progress

The crew is currently depressurizing Steam Generators (SG) to restore feedwater flow from the Condensate System

The following indications are observed:

- Feed flows:
 - 0.3×10^6 lbm/hr to "A" SG
 - 0.4×10^6 lbm/hr to "B" SG
 - 0.2×10^6 lbm/hr to "C" SG.
- SG pressures - 530 psig

In accordance with 1-FR-H.1, which one of the following statements is correct concerning adequate heat sink?

(Assume that Reactor Coolant System bleed and feed has not been initiated and is not yet required.)

- A. Total feed flow rate is 0.9×10^6 lbm/hr, secondary heat sink is restored.
- B. SG depressurization will continue until either SG wide range levels rising OR Core Exit TCs lowering
- C. Continue SG depressurization until Feed flow to at least one SG is $>0.7 \times 10^6$ lbm/hr
- D. Abandon attempts to restore flow from the Condensate System. Attempt to establish feedwater flow from the Fire Protection System or the Service Water System

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Distractor analysis:

A. Incorrect. Plausible because total FW is $>0.7 \times 10^6$ lbm/hr and the candidate may believe that adequate feed flow exists.

B. Incorrect. Plausible because the criteria is that BOTH core exits decreasing AND wide range levels increasing must exist to have adequate heat.

C. Correct

D. Incorrect. Plausible because AFW can be supplied with FP or SW and the candidate may determine that the process is not working and the next procedure flow path should be selected.

K/A:

WE05EA1.1

Loss of Secondary Heat Sink

Ability to operate and / or monitor the following as they apply to the (Loss of Secondary Heat Sink)

Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Technical References:

1-FR-H.1

References provided to applicants: None

Learning Objective:

11257

Explain the following concepts associated with establishing SG FW flow from the Main CN system in response to a loss of secondary heat sink.

- Why FW flow indication of less than 0.7×10^6 lbm/hr to an individual SG is considered to be zero lbm/hr with respect to the minimum required flow

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:

Comments:

Given the following conditions:

- A LOCA has occurred on Unit 1
- The crew is performing 1-ECA-1.1, Loss of Emergency Coolant Recirculation
- RWST level is 7% and slowly lowering
- Containment pressure is 19 psia
- The crew is at step 34 - Depressurize all intact SGs to inject SI accumulators as necessary

Which ONE of the choices below completes the following statements?

The ___(1)___ will be used to dump steam as required to maintain ___(2)___ level indication.

- A. (1) SG PORVs
(2) Pressurizer
- B✓ (1) SG PORVs
(2) RVLIS
- C. (1) Main steam dumps
(2) Pressurizer
- D. (1) Main steam dumps
(2) RVLIS

Distractor Analysis:

A. Incorrect. The first part is correct. Containment pressure is above the intermediate HI-HI setpoint giving a MS line isolation signal and preventing use of the main steam dumps. The second part is incorrect. RVLIS level is used to monitor the injection of the SI accumulators into the RCS while depressurizing the SGs. Pressurizer level is plausible since the purpose of the action is to maintain water level in the RCS.

B. Correct. SG PORVs are the available steam flow path and RVLIS level is monitored during depressurization.

C. Incorrect. The first part is incorrect. Containment pressure is above the intermediate HI-HI setpoint giving a MS line isolation signal and preventing use of the main steam dumps. The second part is incorrect. RVLIS level is used to monitor the injection of the SI accumulators into the RCS while depressurizing the SGs. Pressurizer level is plausible since the purpose of the action is to maintain water level in the RCS.

D. Incorrect. The first part is incorrect. Containment pressure is above the intermediate HI-HI setpoint giving a MS line isolation signal and preventing use of the main steam dumps. The second part is correct.

K/A:

WE11EK2.2

Loss of Emergency Coolant Recirculation

Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) 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.

Technical References:

1-ECA-1.1

WOG background document

References provided to applicants: None

Learning Objective:

9627

Explain why SGs are depressurized in 1-ECA-1.1 once the RWST is depleted.

Question Source: Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.8/41.10

Comments:

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8. 19 - 028AK1.01 001/RO/T1/G2/2.8/3.1/BANK//

Unit 1 is operating at 100%

Pressurizer level control is in automatic and the level channel defeat switch is selected to the 459/460 position

A small leak develops on the reference leg of 1-RC-LT-1459, Channel III Pressurizer level transmitter.

The crew enters 1-AP-3, Loss of Vital Instrumentation

Which ONE of the choices below describes the response of the Pressurizer level control system and the actions that will be taken?

In accordance with 1-AP-3, the operator will place controller ___(1)___ in manual and depress the ___(2)___ button to restore pressurizer level to program.

- A. (1) 1-RC-LCV-1459G
(2) Lower
- B. (1) 1-RC-LCV-1459G
(2) Raise
- C. (1) 1-CH-FCV-1122
(2) Lower
- D. (1) 1-CH-FCV-1122
(2) Raise

Distractor analysis:

A. Incorrect. The first part is incorrect. 1-AP-3 states to place 1-CH-FCV-1122 in manual and control Przr level at program. Plausible because taking control of 1-RC-LC-1459G will control pressurizer level but is not in accordance with 1-AP-3 actions. The second part is incorrect. The reference leg leak will cause indicated level to rise and therefore cause charging flow to lower which requires the operator to raise flow in manual. Plausible because the examinee must determine the failure mode for a reference leg leak.

B. Incorrect. The first part is incorrect as stated above. The second part is correct.

C. Incorrect. The first part is correct. The second part is incorrect as stated above.

D. Correct

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K/A:

028AK1.01

Pressurizer (PZR) Level Control Malfunction

Knowledge of the operational implications of the following concepts as they apply to

Pressurizer Level Control Malfunctions:

PZR reference leak abnormalities

Technical References:

1-AP-3

References provided to applicants: None

Learning Objective:

10656

Explain how the Pressurizer Level Control System would respond to a level channel failure.

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.8/41.10

Comments:

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for RO Exam Jan Submittal

9. 20 - 032AA2.04 001/RO/T1/G2/3.1/3.5/NEW//

Unit 1 is in MODE 2 with a reactor start up in progress in accordance with 1-OP-1.5, Unit Startup From MODE 3 To MODE 2

The RO is verifying proper overlap between Source range and Intermediate range NIs

Source range and Intermediate range NIs are indicating as follows:

•N-31 = 6×10^4 CPS

•N-32 = 1×10^4 CPS

•N-35 = 2×10^{-10} amps

•N-36 = 1.5×10^{-10} amps

Which ONE of the choices below completes the following statements?

In accordance with 1-OP-1.5, overlap between source range and intermediate range detectors ___(1)___ adequate

And

If N-32 failed high at this time, the reactor ___(2)___ trip

- A. (1) is
(2) will not
- B✓ (1) is
(2) will
- C. (1) is not
(2) will not
- D. (1) is not
(2) will

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for RO Exam Jan Submittal

Distractor Analysis:

A. Incorrect. The first part is correct. 1-OP-1.5 requires both IR instruments to be greater than 1×10^{-11} amps and both SR instruments on scale. The second part is incorrect but plausible because this is the point in the startup where SR instruments are blocked (>P-6) and it may be assumed that this has already occurred.

B. Correct.

C. The first part is incorrect. 1-OP-1.5 requires both IR instruments to be greater than 1×10^{-11} amps and both SR instruments on scale which is met. The second part is incorrect but plausible because this is the point in the startup where SR instruments are blocked (>P-6) and it may be assumed that this has already occurred.

D. The first part is incorrect. 1-OP-1.5 requires both IR instruments to be greater than 1×10^{-11} amps and both SR instruments on scale which is met. The second part is correct.

K/A:

032AA2.04

Loss of Source Range Nuclear Instrumentation

Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation:

Satisfactory source-range/intermediate-range overlap

Technical References:

1-OP-1.5

References provided to applicants: None

Learning Objective:

11980

Given a set of plant conditions, evaluate Ex-core NI System operations in light of the following issues:

- Expected plant or system response based on ex-core nuclear instrumentation interlocks or design features.

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:43.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

10. 21 - 033AK3.01 001/RO/T1/G2/3.2/3.6/NEW//

Unit 2 is in MODE 1 starting up in accordance with 2-OP-2.1, Unit Startup From MODE 2 To MODE 1

Power is currently stable at 8%

The control power fuse blows on Intermediate Range Channel N-36.

Which ONE of the following identifies the actions required to be taken and the reason.

- A. Lower power to <P-6. N36 is not required below P-6.
- B. Raise power to >P-10. N36 is not required above P-10.
- C. Verify all rods are inserted due to reactor trip
- D. Stop Power increase and maintain power stable until N36 is repaired due to intermediate range rod block (C-1)

Distractor analysis:

A. Incorrect. Plausible because this is an allowed required action in accordance with Tech Specs.

B. Incorrect. Plausible because this is an allowed required action in accordance with Tech Specs.

C. Correct. A blown control power fuse will cause a reactor trip signal to be generated at this point in the startup. The examinee must know the difference between the control power and instrument power fuses and the effect of each being blown.

D. Incorrect. Plausible because the first step in 1-AP-4.2, Loss of IR instrumentation, is to stop the power increase.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

033AK3.01

Loss of Intermediate Range Nuclear Instrumentation

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

Technical References:

2-AP-4.2

Technical Specifications

References provided to applicants: None

Learning Objective:

11980

Given a set of plant conditions, evaluate Ex-core NI System operations in light of the following issues:

- Effect of a failure, malfunction, or a loss of components in this system on related systems
- Expected plant or system response based on ex-core nuclear instrumentation interlocks or design features.
- Impact on technical specifications

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.5, 41.10

Comments:

Both Units are at 100% power.

In accordance with 0-OP-23.2, WGDT and Waste Gas Diaphragm Compressors, nitrogen is being added to the "A" Waste Gas Decay Tank (WGDT) due to high oxygen level

Due to a distraction, the WGDT is overpressurized causing the rupture disc to rupture and the relief valve to open

The following annunciators are received on Unit 2:

- 2B-A5 - PROCESS VENT VNT STACK A&B LOW RAD MON ALERT/RAD
- 2B-B5 - PROCESS VENT VNT STACK A&B HI HI RADIATION

Which one of the choices below completes the following statements?

The radiation monitor that alarmed due to this event is ___(1)___

And

Once the release has been stopped and radiation levels return to normal, the affected radiation monitor ___(2)___ from the accident range back to the normal range.

- A. (1) 1-RM-RMS-179, Vent Stack A Rad Monitor
(2) will automatically swap
- B. (1) 1-RM-RMS-179, Vent Stack A Rad Monitor
(2) must be manually swapped
- C. (1) 1-RM-RMS-180, Vent Stack B Rad Monitor
(2) will automatically swap
- D✓ (1) 1-RM-RMS-180, Vent Stack B Rad Monitor
(2) must be manually swapped

Distractor Analysis:

A. Incorrect. The first part is incorrect but plausible because the candidate must know which vent stack the WGDT reliefs are directed to. The second part is incorrect but plausible because these rad monitors are unique in that they will swap to an accident range instrument when a hi-hi signal is reached but must be manually reset to return to the normal range.

B. Incorrect. The first part is incorrect but plausible because the candidate must know which vent stack the WGDT reliefs are directed to. The second part is correct.

C. Incorrect. The first part is correct. The WGDTs relief valves flow to the Vent Stack B. The second part is incorrect but plausible because these rad monitors are unique in that they will swap to an accident range instrument when a hi-hi signal is reached but must be manually reset to return to the normal range.

D. Correct.

K/A:

060AK2.01

Accidental Gaseous Radwaste Release

Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following:

ARM system, including the normal radiation-level indications and the operability status

Technical References:

NCRODP - 45, Gaseous Waste

NCRODP - 46, Radiation Monitoring System

0-AP-5.2, MGP Rad Monitoring System

References provided to applicants: None

Learning Objective:

4311

Explain the following information associated with waste gas tanks

- Where the discharge of the relief valves and rupture discs is directed

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.7

Comments:

A fire has occurred in the Main Control Room requiring evacuation.
The crew is performing 0-FCA-1, Control Room Fire.
Operators have been dispatched to perform attachment 9, Establish Auxiliary Building Ventilation

Which ONE of the choices below completes the following statement on how the Appendix R flexible duct is routed?

The flexible duct is routed from the Appendix R ventilation locker _____.

- A✓ to the ladder ways of the running charging pump on each unit
- B. to the ladder ways of all 3 charging pumps on each unit
- C. and connected to the ventilation duct supplying all charging pumps
- D. and connected to the ventilation duct supplying the running charging pump on each unit

Distractor Analysis:

A. Correct

B. Incorrect. Plausible because the candidate must know the capabilities of the App R ventilation and where the procedure directs the duct to be placed.

C. Incorrect. Plausible because the candidate must know the capabilities of the App R ventilation and where the procedure directs the duct to be placed.

D. Incorrect. Plausible because the candidate must know the capabilities of the App R ventilation and where the procedure directs the duct to be placed.

K/A:

067AA1.05

Plant fire on site

Ability to operate and / or monitor the following as they apply to the Plant Fire on Site:

Plant and control room ventilation systems

Technical References:

0-FCA-1

References provided to applicants: None

Learning Objective:

4564

Describe the Appendix-R Ventilation System flow paths, including the following components.

Auxiliary building Appendix-R supply fans

Auxiliary building flexible ducting

Areas serviced by the Auxiliary Building Appendix-R Ventilation System

Fuel building Appendix-R supply fan

Areas serviced by the Fuel Building Appendix-R Ventilation System

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.7

Comments:

Unit 2 was operating at 100% power

The crew was forced to evacuate the main control room due to a spill of cleaning solvents.

The crew is performing 2-AP-20, Operation From The Auxiliary Shutdown Panel, and is at step 12 – Check If Emergency Boration Is Required

An emergency boration will be required if ___(1)___ IRPI(s) indicate greater than 10 steps

AND

2-CH-MOV-2350, Emergency Boration Valve, ___(2)___ be operated from the Auxiliary Shutdown Panel.

- A✓ (1) at least 2 or more
(2) can not
- B. (1) any ONE
(2) can not
- C. (1) at least 2 or more
(2) can
- D. (1) any ONE
(2) can

Distractor Analysis:

A. Correct.

B. Incorrect. The first part is incorrect but is plausible since the safety analysis assumes that 1 control rod is stuck full out which would make any additional rod stuck out not within the analysis. Also, the procedure states "All IRPIs indicated - LESS THAN 10 STEPS WITHDRAWN", in the ACTION/EXPECTED RESPONSE column and the candidate must know that the RNO column requires 2 or more IRPIs >10 steps to require boration. The second part is correct.

C. Incorrect. The first part is correct. The second part is incorrect but is plausible because they must have knowledge of the controls available in the aux shutdown panel. The boric acid transfer pump is controlled in the ASD panel but the emergency boration valve must be locally operated.

D. Incorrect. The first part is incorrect but is plausible since the safety analysis assumes that 1 control rod is stuck full out which would make any additional rod stuck out not within the analysis. Also, the procedure states "All IRPIs indicated - LESS THAN 10 STEPS WITHDRAWN", in the ACTION/EXPECTED RESPONSE column and the candidate must know that the RNO column requires 2 or more IRPIs >10 steps to require boration. The second part is incorrect but is plausible because they must have knowledge of the controls available in the aux shutdown panel. The boric acid transfer pump is controlled in the ASD panel but the emergency boration valve must be locally operated.

K/A:

068AK3.17

Control Room Evacuation

Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation:

Injection of boric acid into the RCS

Technical References:

2-AP-20

References provided to applicants: None

Learning Objective:

11097

Explain the following concepts associated with 1/2-AP-20, Operation from the Aux SD Panel.

- Action required if one or more control rods are not fully inserted

Question Source: Modified

Assume the following conditions.

Unit 2 was operating at 100% power

A spill of cleaning solvents in the main control room forced its evacuation at 1735, Sunday evening

The operating crew has successfully shut down the reactor and have been maintaining stable plant conditions at the auxiliary shutdown panel for 15 hours in accordance with 2-AP-20, OPERATION FROM THE AUXILIARY SHUTDOWN PANEL

The crew is at step 17 – Maintain Shutdown Margin

2-PT-10 (SHUTDOWN MARGIN DETERMINATION) is not available

2-AP-20 requires emergency boration for a minimum of ____ (1) ____ minutes and the reason for the boration is to ____ (2) ____.

- A. (1) 194 (2) borate for Cold Shutdown conditions
- B. (1) 194 (2) compensate for Xenon decay
- C. (1) 50 (2) compensate for Xenon decay
- D. (1) 50 (2) borate for Cold Shutdown conditions

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.5, 41.10

Comments:

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11. 25 - 076AA2.03 001/RO/T1/G2/2.5/3/MODIFIED/SURRY 2014/

Unit 2 is shutdown and has been borated to Cold Shutdown boron concentration in preparation for Cooldown to Cold Shutdown for a Refueling outage.

A crud burst has been initiated in the RCS.

Which ONE of the choices below describes the following:

(1) The FIRST Radiation monitor that will detect the increased RCS Activity caused by the crud burst.

AND

(2) The actions that should be taken to minimize dose during the outage.

A✓ (1) Letdown Radiation Monitor

(2) Maximize letdown flow

B. (1) Letdown Radiation Monitor

(2) Minimize letdown flow

C. (1) Auxiliary Building Control Area Radiation Monitor

(2) Maximize letdown flow

D. (1) Auxiliary Building Control Area Radiation Monitor

(2) Minimize letdown flow

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Distractor analysis:

When the RCS crud burst begins, the increased RCS activity will be sensed on the Letdown RM. The Aux Bldg Control Area RM is located just outside the VCT cubicle in the Aux Bldg, since the RCS coolant with higher activity is flowing through the VCT, increased RM reading is probable. The crud will be transported throughout the RCS and into the letdown system. This will cause higher local dose rates in the auxiliary building but maximizing letdown flow is preferred to reduce overall dose rates during the refueling outage.

A. Correct.

B. Incorrect. The first part is correct. The second part is incorrect. Plausible since minimizing letdown flow rates will reduce the activity in the letdown filters and demins and therefore reduce local dose rates in the aux building.

C. Incorrect – The first part is incorrect. Plausible since the Aux Bldg Control Area RM will see the effect of increased RCS activity, but will follow the trend of the Letdown RM. The second part is correct.

D. Incorrect – Both parts are incorrect. Plausible since the Aux Bldg Control Area RM will see the effect of increased RCS activity, but will follow the trend of the Letdown RM and since minimizing letdown flow rates will reduce the activity in the letdown filters and demins and therefore reduce local dose rates in the aux building.

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for RO Exam Jan Submittal

K/A:

076AA2.03 High Reactor Coolant Activity - Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity:
RCS radioactivity level meter

Technical References:

1-OP-3.2

References provided to applicants: None

Learning Objective:

12958

Explain the following concepts associated with Reactor Coolant System cleanup

- Why maximum letdown flow should be maintained during Reactor Coolant System cooldown

Question Source: Modified from Surry 2014 exam

Unit 2 is shutdown and has been borated to CSD boron concentration in preparation for Cooldown to CSD for a Refueling outage.

Chemistry has notified the Team that the RCS crud burst has been initiated.

Which ONE of the following describes:

- 1) The FIRST Radiation monitor that will detect the increased RCS Activity caused by the crud burst.
- 2) Which CVCS filter is monitored for differential pressure during the crud burst cleanup?
 - A. 1) Letdown Radiation monitor.
2) Reactor Coolant filter.
 - B. 1) Letdown Radiation Monitor.
2) Letdown filter.
 - C. 1) Auxiliary Building Control Area Radiation Monitor.
2) Reactor Coolant filter.
 - D. 1) Auxiliary Building Control Area Radiation Monitor.
2) Letdown filter.

Proposed Answer: A.

Question History: Surry 2014

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:43.5/45.13

Comments:

Given the following:

- Unit 1 was at 100% power
- A main steam line break occurred inside containment
- All systems operated as designed
- The operating crew is now in 1-FR-P.1, "Response to Imminent Pressurized Thermal Shock"
- They have been directed by the procedure to perform a "soak".

Which one of the following evolutions can be performed during the soak?

- A✓ Place auxiliary spray in service
- B. Place Residual Heat Removal System in service
- C. Increase AFW flow
- D. Energize the pressurizer heaters.

Distractor Analysis:

Requires candidate to have knowledge of FR-P.1 soak period requirements and how operating equipment can negatively affect RCS temperature and pressure.

- A. Correct. This action will depressurize the RCS and can cause a cooldown of the pressurizer but this is not the area of concern for a soak period.
- B. Incorrect. This could cause the RCS to cooldown. Plausible because this is an action that will be required following the soak period to cool down to cold shutdown conditions.
- C. Incorrect. This would cause a cooldown of the RCS. Plausible because it is desired to raise SG level in order to transfer feed to the main FW system and stop the AFW pumps.
- D. Incorrect. This would cause RCS pressure to rise. Plausible because it would add heat to the pressurizer.

K/A:

WE08EA1.1

Pressurized Thermal Shock -

Ability to operate and / or monitor the following as they apply to the (Pressurized Thermal Shock):

Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Technical References:

1-FR-P.1

References provided to applicants: None

Learning Objective:

12656

Explain the following concepts associated with 1-FR-P.1, "Response to Imminent Pressurized Thermal Shock Condition."

- How to determine which actions from other guidelines may be performed during the Reactor Coolant System temperature soak

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.7/45.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

12. 27 - WE09EG2.4.31 001/RO/T1/G2/4.2/4.1/NEW//

Unit 1 was at 100% power when a loss of all offsite power occurred.

The crew is responding in accordance with 1-ES-0.1, Reactor Trip Response, and has initiated attachment 2 to monitor natural circulation.

Which ONE of the following would be an indication of inadequate natural circulation flow?

(Consider each choice separately)

- A. RCS T_{HOT} is 551°F and stable
- B. RCS T_{COLD} is 554°F with Steam Generator pressure at 1035 psig
- C. Core exit TCs are 560°F and stable
- D. Steam Generator pressure is 1050 psig and stable

Distractor Analysis:

A. Incorrect. Plausible because this temperature is above the normal temperature that steam dumps would maintain at 547°F if they were available.

B. Correct. The criteria is for RCS Cold leg temperature to be at saturation temperature for SG pressure. A pressure of 1050 PSIA would correlate to a saturation temperature of 551.5°F.

C. Incorrect. Plausible because this temperature is above the expected temperature when SG PORVs are controlling. Core exit temperatures are expected to be greater than average RCS temperature during natural circulation conditions.

D. Incorrect. Criteria is SG pressures stable or lowering. This is plausible because it could be assumed that a higher SG pressure than expected is an indication of inadequate NC cooling.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

WE09EG2.4.31

Natural Circulation Operations

Knowledge of annunciator alarms, indications, or response procedures.

Technical References:

1-ES-0.1

WOG background documents

References provided to applicants: None

Learning Objective:

13435

Explain how each of the following parameters are used to indicate that natural circulation exist

- RCS subcooling
- SG pressure
- RCS hot leg temperature
- core exit TC temperature
- RCS cold leg temperature

Question Source:New

Question History:None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.10/45.3

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

13. 28 - 003K5.02 001/RO/T2/G1/2.8/3.2/BANK//

Given the following conditions:

- Unit 1 is starting up following a mid-cycle forced outage.
- The crew has commenced slowly raising power in preparations for placing the unit on line
- At approximately 4% power, the "B" RCP trips.

Which ONE of the following identifies the effect of the RCP trip on the Departure from Nucleate Boiling Ratio (DNBR), AND includes the action the crew will perform in response to the failure.

- A. DNBR has decreased; insert Control Bank D rods to less than 5 steps then trip the reactor.
- B. DNBR has decreased; immediately trip the reactor
- C. DNBR has increased; insert Control Bank D rods to less than 5 steps then trip the reactor.
- D. DNBR has increased; immediately trip the reactor

Distractor analysis:

A. Incorrect. The first part is correct. When the RCP trips it will cause DNBR to decrease due to lower flow through the core. The second part is incorrect but is plausible since this is an action in the 1-OP-1.5, mode 3 to mode 2 startup procedure and the Tech Spec action for not having 3 loops in operation is to be in Mode 3 in 6 hours.

B. Correct. DNBR will lower and in accordance with 1-AR-C-H6, RC LOOP 1B LO FLOW, the reactor will be tripped.

C. Incorrect. The first part is incorrect. Plausible since the candidate must be able to determine the effect of the RCP trip on DNBR. The second part is incorrect but is plausible since this is an action in the 1-OP-1.5, mode 3 to mode 2 startup procedure and the Tech Spec action for not having 3 loops in operation is to be in Mode 3 in 6 hours.

D. Incorrect. The first part is incorrect. Plausible since the candidate must be able to determine the effect of the RCP trip on DNBR. The second part is correct.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

003K5.02

Reactor Coolant Pump System (RCPS)

Knowledge of the operational implications of the following concepts as they apply to the RCPS:

Effects of RCP coastdown on RCS parameters

Technical References:

1-AR-C-H6, RC LOOP 1B LO FLOW

1-OP-1.5, Unit Startup from mode 3 to mode 2

References provided to applicants: None

Learning Objective:

12002

Given a set of plant conditions, evaluate Reactor Coolant System operations in light of the following issues.

Effect of a failure, malfunction, or loss of a related system or component on this system

Effect of a failure, malfunction, or loss of components in this system on related systems

Expected plant or system response based on reactor coolant component interlocks or design features

Impact on the technical specifications

Response if limits or setpoints associated with this system or its components have been exceeded

Proper operator response to the condition as stated

Question Source: Bank

Question History: 2010 North Anna License Exam

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.5

Comments:

Unit 2 is in MODE 5 following a refueling outage

- The pressurizer is solid
- RCS temperature = 130°F
- RCS pressure = 300psig
- VCT pressure = 30psig

Conditions have been established to start 2-RC-P-1C, C Reactor Coolant Pump, in accordance with 2-OP-5.2, Reactor Coolant Pump Startup and Shutdown.

Which ONE of the following conditions would require the crew to trip the RCP after it is started?

- A✓ RCS pressure lowers to 220 psig
- B. Proximity vibrations rise to 6 mils
- C. Motor Stator temperature rises to 230°F
- D. Motor current is 900 amps

Distractor analysis:

A. Correct. 2-OP-5.2 "RCS pressure less than 240 psig" as a trip criteria.

B. Incorrect. Proximity vibration trip criteria is 20 mils. Plausible because there is a trip criteria for "seismic" vibration at 5 mils. Candidate must know trip criteria for each parameter.

C. Incorrect. Plausible because there is a trip criteria for RCP pump bearing >225°F.

D. Incorrect. The trip criteria is "RCP starting current not decreasing within 30 seconds after breaker closure". Plausible because the normal motor amps is 750 amps at NOT/NOP but are elevated at cold shutdown conditions.

K/A:

003K6.14

Reactor Coolant Pump System (RCPS)

Knowledge of the effect of a loss or malfunction on the following will have on the RCPS:

Starting requirements

Technical References:

2-OP-5.2, RCP startup and shutdown

References provided to applicants: None

Learning Objective:

9845

Explain the following concepts associated with starting a reactor coolant pump with a Westinghouse seal package.

- Parameters that are monitored following the start of a pump (1-OP-5.2)

9840

List the following information associated with reactor coolant pump vibration instrumentation.

- Setpoints for the RCP 1A (1B/1C) VIBRATION ALERT/DANGER alarm

9572

List the motor and bearing temperature limits that require tripping the reactor coolant pump.

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7

Comments:

Unit 2 has been ramped down to 50% power for equipment repairs

Tave is being maintained high in accordance with the ramp plan for subsequent ramp back to 100%

- Tave is 568 °F
- Tref is 564 °F
- Charging flow is 64 gpm
- Letdown flow is 79 gpm
- Seal injection flows are:
 - A = 8.1 gpm, B = 7.9 gpm, C = 8.2 gpm
- RCP Seal leak off flows are:
 - A = 2.4 gpm, B = 2.2 gpm, C = 2.6 gpm
- RCS total leak rate is 0.12 gpm

Based on the current conditions, which ONE of the choices below completes the following statement?

Pressurizer level will ____ (1) ____

AND

Current Pressurizer program level is ____ (2) ____

- A✓ (1) rise
(2) 50.8%
- B. (1) rise
(2) 46.5%
- C. (1) lower
(2) 50.8%
- D. (1) lower
(2) 46.5%

Distractor Analysis:

A. Correct. With the given flow rates, there is an excess charging flow of about 2 gpm. The Przr program level goes from 28.4% to 64.5% as Tave rises from 547° to 580.8°. $(64.5\% - 28.4\%) / (580.8^\circ - 547^\circ) \times (568^\circ - 547^\circ) + 28.4\% = 50.8\%$

B. Incorrect. The first part is correct. The second part is incorrect but is plausible if the candidate believes that Przr level is based on power or Tref.

C. Incorrect. The first part is incorrect but is plausible since the candidate must calculate the difference between what is going into the RCS and what is coming out to determine the Przr level trend.

D. Incorrect. Both parts are incorrect but plausible as noted above.

K/A:

004A2.22

Chemical and Volume Control System (CVCS)

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:

Mismatch of letdown and charging flows

Technical References:

NCRODP-41 - Chemical and Volume control

NCRODP-74 - Pressurizer Control

References provided to applicants: None

Learning Objective:

8837

List the following setpoints associated with pressurizer level control.

No-load pressurizer level

Full-load pressurizer level

Question Source: New

Question History: None

Question Cognitive Level: Comprehensive/Analysis

10 CFR Part 55 Content:41.5, 43.5

Comments:

Unit 1 is defueled and preparing for core on load

The RO is performing 1-PT-78.4, Valve Inservice Inspection (RHR System), for post maintenance testing. with the following stroke times.

1-RH-MOV-1700, RHR Inlet Isolation Valve - 1 minute 55 seconds

1-RH-MOV-1701, RHR Inlet Isolation Valve - 1 minute 27 seconds

1-RH-MOV-1720A, RHR Outlet Isolation Valve - 35 seconds

1-RH-MOV-1720B, RHR Outlet Isolation Valve - 26 seconds

Which ONE of the choices below completes the following statements?

The acceptance criteria ___(1)___ met

AND

During valve stroke timing, the stopwatch is started when ___(2)___.

(Reference provided)

- A. (1) is
(2) when the OPEN (RED) indicating light comes on
- B. (1) is
(2) the OPEN button is depressed
- C. (1) is not
(2) when the OPEN (RED) indicating light comes on
- D. (1) is not
(2) the OPEN button is depressed

Distractor analysis:

A. INCORRECT. The first part is incorrect. This is plausible because the stroke times have to be compared to the acceptance criteria to determine if they are within the band. The candidate may misinterpret the graph and use the reference value for acceptance instead of the Required time or use the wrong valve data. The second part is incorrect but plausible because the stroke time is stopped when the RED open light goes out.

B. INCORRECT. The first part is incorrect. This is plausible because the stroke times have to be compared to the acceptance criteria to determine if they are within the band. The candidate may misinterpret the graph and use the reference value for acceptance instead of the Required time or use the wrong valve data. The second part is correct.

C. INCORRECT. The first part is correct. The second part is incorrect but plausible because the stroke time is stopped when the RED open light goes out.

D. CORRECT.

K/A:

005A1.07

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHR controls including:

Determination of test acceptability by comparison of recorded valve response times with Tech-Spec requirements

Technical References:

1-PT-78.4, Valve Inservice Inspection (RHR System)

TRM TSR 3.7.8.2

References provided to applicants:

1-PT-78.4, Valve Inservice Inspection (RHR System)

Learning Objective:

Objective 17507:

Explain the following concepts associated with the RHR System - Operating TRM and bases (TR-3.7.8_

- Tech Requirement
- Applicability
- Required actions
- Surveillance requirements

Question Source: NEW

Question History: None

Question Cognitive Level: Comprehensive

10 CFR Part 55 Content:55.41(b)(5)

Comments:

The following conditions exist:

- Unit 1 is in mode 5
- RHR is in service maintaining a stable RCS temperature
- 1-CC-MOV-100A and 1-CC-MOV-100B (CC to the RHR heat exchangers) are throttled open approximately 5%
- The RHR flow control valve (1-RH-FCV-1605) is controlling in **MANUAL**
- An instrument technician inadvertently isolates air to the RHR heat exchanger outlet valve (1-RH-HCV-1758).

Which ONE of the following describes the effect of this failure on the RHR system?

RHR outlet temperature will ___(1)___ and the operator will ___(2)___ 1-RH-FCV-1605 output to maintain a stable flow rate.

- A. (1) Rise
(2) Raise
- B. (1) Rise
(2) Lower
- C. (1) Lower
(2) Lower
- D. (1) Lower
(2) Raise

Distractor Analysis:

A. Incorrect. 1-RH-FCV-1605 fails closed. The candidate could mistakenly think that 1-RH-HCV-1758 also fails closed. This assumption would make this answer correct.

B. Incorrect. RHR temperature will decrease since 1758 fails open. 1-RH-FCV-1605 output will be lowered to throttle the valve closed in order to restore RHR flow to normal. Candidate could mistakenly think that 1758 failed closed and that 1605 is a reverse acting valve.

C. Correct. 1-RH-HCV-1758 fails open. This will cause full flow through the heat exchanger(s). RHR outlet temperature will decrease. 1-RH-FCV-1605 output will be lowered to throttle the valve closed in order to restore RHR flow to normal.

D. Incorrect. 1-RH-FCV-1605 output will be lowered to throttle the valve closed in order to restore RHR flow to normal.

K/A:

005A2.01

Residual Heat Removal System (RHRS)

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

Failure modes for pressure, flow, pump motor amps, motor temperature, and tank level instrumentation

Technical References:

1-AP-11

References provided to applicants: None

Learning Objective:

12006

Given a set of plant conditions, evaluate Residual Heat Removal System operations in light of the following issues (SOER-88-3).

Effect of a failure, malfunction, or loss of a related system or component on this system

Effect of a failure, malfunction, or loss of components in this system on related systems

Expected plant or system response based on residual heat removal component interlocks or design features

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.5, 43.5

Comments:

Unit 1 has been operating at 100% power for approximately 150 days

A large break LOCA occurs.

All emergency equipment operates as designed.

In accordance with the Safety Injection System design criteria contained in 10-CFR-50.46, which ONE of the choices below completes the following statements?

Peak clad temperature will not exceed ____ (1) ____ °F

AND

Maximum Cladding Oxidation shall not exceed ____ (2) ____ % of the total of cladding thickness prior to the oxidation.

A✓ (1) 2200
(2) 17

B. (1) 2000
(2) 17

C. (1) 2200
(2) 1

D. (1) 2000
(2) 1

Distractor Analysis:

There are five criteria used to evaluate the system's design (10-CFR-50.46):

- Peak Clad temperature shall not exceed 2200 °F.

- Maximum Cladding Oxidation shall not exceed 0.17 of the total of cladding thickness prior to the oxidation.

- Maximum Hydrogen Generation from chemical reaction, of the clad, shall not exceed 0.01 of the amount generated if all the clad were to be oxidized.

- A coolable geometry of the core must be maintained.

- Long term cooling must be maintainable so we can remove the core's decay heat.

A. Correct.

B. Incorrect. Plausible because the candidate must know the criteria as stated above

C. Incorrect. Plausible because the candidate must know the criteria as stated above

D. Incorrect. Plausible because the candidate must know the criteria as stated above

K/A:

006 K5.07

Emergency Core Cooling System

Knowledge of the operational implications of the following concepts as they apply to ECCS:
Expected temperature levels in various locations of the RCS due to various plant conditions

Technical References:

UFSAR

1-CFR-50.46

WOG backgrounds

References provided to applicants: None

Learning Objective:

3881

List the following information associated with the Safety Injection System.

- Four accidents that the system is designed to mitigate
- Five criteria which are used to evaluate the system's design (10-CFR-50.46)

Question Source: Modified

Unit 1 has been operating at 100% power for approximately 150 days when an automatic reactor trip and safety injection actuates due to a large-break LOCA. In accordance with the Safety Injection System design criteria contained in 10-CFR-50.46, if all equipment operated properly, _____.

A. peak fuel clad temperature will not exceed 2,200°F

B. at least one steam generator will be available to maintain long-term core cooling

C. the maximum hydrogen concentration in the containment will not exceed 0.17 (17%) due to all forms of hydrogen generation

D. the maximum fuel clad oxidation will not exceed 0.02 (2%) of the total thickness of the clad

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.5

Comments:

Unit 2 was at 100% power when a LOCA occurred inside containment

RCS pressure is 450 psig and slowly lowering

Containment pressure peaked at 24 psia and is slowly lowering

Containment radiation has remained less than 1 R/hr

RWST level is 70%

A complete loss of Service Water occurs and cannot be immediately restored

Which ONE of the following identifies the status of Safety Injection and Containment Depressurization equipment due to the loss of service water?

- A. Low Head SI pumps are currently supplying adequate flow to maintain core cooling, the charging pumps can be secured
- B✓ The Charging pumps will be cycled to prevent overheating until alternate cooling water can be established.
- C. The Recirc Spray heat exchangers will not have cooling water flow when the RS pumps automatically start
- D. Quench Spray is currently providing adequate containment cooling

Distractor analysis:

A. Incorrect. The LHSI pumps shut off head is below the given RCS pressure and will not have adequate flow to cool the core. Plausible because it requires the candidate to know the operating parameters of the LHSI and determine flow is inadequate.

B. Correct. In accordance with 0-AP-12, Ch pumps will be cycled to prevent overheating until another cooling water source can be aligned.

C. Incorrect. The RS pumps will receive an auto start signal if a CDA signal has been received (Containment pressure >27.75 psia) and RWST level <60%. Plausible because the candidate must determine that RS pumps will not auto start given the current conditions.

D. Incorrect. The QS pumps will auto start if a CDA signal occurs or are manually started in accordance with 1-E-0 if containment radiation exceeds 1R/hr. Plausible because the candidate must determine that QS pumps will not be running given the current conditions.

K/A:

006K6.05

Emergency Core Cooling System (ECCS)

Knowledge of the effect of a loss or malfunction on the following will have on the ECCS:
HPI/LPI cooling water

Technical References:

0-AP-12

1-E-0

References provided to applicants: None

Learning Objective:

18011

Perform the following actions of 0-AP-12, Loss of Service Water

- Explain the high level actions, major action categories, key mitigating strategies, and their basis

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.7

Comments:

Given the following:

Unit 1 is at 100% power

1-RC-SV-1551A, A Pressurizer Safety Valve, is leaking by requiring the PRT to be drained and vented every 2 weeks.

In accordance with 1-OP-5.7, Operation of the PRT, the PRT will be vented directly to the ___(1)___ and the minimum PRT pressure is ___(2)___ psig.

- A. (1) Process vents
(2) 8
- B. (1) Gas stripper
(2) 12
- C. (1) Gas stripper
(2) 8
- D. (1) Process vents
(2) 12

Distractor analysis:

A. Incorrect. The first part is incorrect but plausible because the PRT can be vented to using the PRT gas space sample line which is then directed to the process vents but cannot be directly vented to the process vents.

B. Incorrect. The first part is correct. The second part is incorrect but plausible because 12 psig is the maximum required pressure during normal operations.

C. Correct.

D. Incorrect. The first part is incorrect but plausible because the PRT can be vented to using the PRT gas space sample line which is then directed to the process vents but cannot be directly vented to the process vents. The second part is incorrect but plausible because 12 psig is the maximum required pressure during normal operations.

K/A:
007G2.1.20
Pressurizer Relief Tank / Quench Tank System
Ability to interpret and execute procedure steps.

Technical References:
1-OP-5.7, Operation of the PRT

References provided to applicants: None

Learning Objective:
3512
Describe the following pressurizer relief tank flow paths, including all major components.
•Normal tank vent

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.10/43.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

14. 36 - 008K2.02 001/RO/T2/G1/3.0/3.2/NEW//

Both units are at 100%

1-CC-P-1A and 2-CC-P-1A are running

1-CC-P-1B and 2-CC-P-1B are in Auto after Stop

The C Reserve Station Service Transformer (RSST) deenergizes due to a fault in the transformer

All equipment operates as designed

Which one of the choices below lists the CC pumps that will be running ONE (1) minute after the loss of the C RSST?

- A. 1-CC-P-1B and 2-CC-P-1A ONLY
- B. 1-CC-P-1A, 1-CC-P-1B and 2-CC-P-1A ONLY
- C. 1-CC-P-1A, 2-CC-P-1A and 2-CC-P-1B ONLY
- D. All 4 CC pumps

Distractor Analysis:

The CC pumps receive an auto start signal if an undervoltage condition occurs on either emergency bus on that unit. If the pump is in Auto then it will start immediately upon a UV condition on the other bus on that unit. It will also start in Auto 15 seconds after a UV condition clears on it's own bus. If the pump was running prior to the UV condition on it's bus then it will trip and restart 15 seconds after the bus is reenergized by it's associated EDG.

When the C RSST deenergizes, the 1H and 2J emergency busses will deenergize. 1-CC-P-1A will trip, 1-CC-P-1B will auto start immediately and 2-CC-P-1A will remain running. The EDGs will start and reenergize the busses. 15 seconds after their associated bus UV condition clears, 1-CC-P-1A will restart and 2-CC-P-1B will start.

A. Incorrect. Plausible because the candidate must determine which emergency busses will de-energize and then determine which CC pumps will auto start.

B. Incorrect. Plausible because the candidate must determine which emergency busses will de-energize and then determine which CC pumps will auto start.

C. Incorrect. Plausible because the candidate must determine which emergency busses will de-energize and then determine which CC pumps will auto start.

D. Correct

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

008K2.02

Component Cooling Water System (CCWS)

Knowledge of bus power supplies to the following:

CCW pump, including emergency backup

Technical References:

NCRODP-51, Component Cooling System

11715-ESK-5P,5Q - CC pump elect schematic

References provided to applicants: None

Learning Objective:

3656

List the following information associated with the component cooling water pumps.

- Interlocks associated with automatically starting a pump

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

15. 37 - 010K6.02 001/RO/T2/G1/3.0/3.2/BANK//

Unit 2 is in MODE 3

An event occurs that causes Pressurizer level to lower

Pressurizer heaters will deenergize when Pressurizer level goes below a setpoint of ___(1)___ %

and

the ___(2)___ group heaters require operator action to re-energize when level is restored.

- A. (1) 15
(2) backup
- B. (1) 15
(2) control
- C. (1) 5
(2) backup
- D. (1) 5
(2) control

Distractor analysis:

A. Incorrect. The first part is correct. The second part is incorrect but is plausible because the backup heaters powered from the station service busses will re-energize automatically following a loss of power.

B. Correct.

C. Incorrect. The first part is incorrect but is plausible because 5% level in the pressurizer does have an automatic actuation associated with it and will cause an automatic letdown isolation. The second part is correct.

D. Incorrect. The first part is incorrect but is plausible because 5% level in the pressurizer does have an automatic actuation associated with it and will cause an automatic letdown isolation. The second part is incorrect but is plausible because the backup heaters powered from the station service busses will re-energize automatically following a loss of power.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

010K6.02

Pressurizer Pressure Control System

Knowledge of the effect of a loss or malfunction of the following will have on the PZR

PCS:

PZR

Technical References:

1-AP-3

References provided to applicants: None

Learning Objective:

10647

Explain the following concepts concerning the operation of the pressurizer heaters.

- How the heaters respond to a low pressurizer level.
- How the heaters are restored following a low pressurizer level condition.

Question Source:Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

16. 38 - 012K4.04 001/RO/T2/G1/3.1/3.3/NEW//

Unit 2 is at 100% power

The crew is performing 2-PT 36.1A, Train A Reactor Protection And ESF Logic Actuation Logic Test

A Reactor trip occurs during the test

The Reactor trip and bypass breaker positions indicate as follows:

Reactor Trip Breaker A (RTA) - GREEN light lit.

Reactor Trip Breaker B (RTB) - RED light lit

Bypass Trip Breaker A (BYA) - RED light lit

Bypass Trip Breaker B (BYB) - GREEN light lit

Which of the choices below completes the following statements?

The Reactor ___(1)___ tripped

And

The train "A" P-4 Reactor Trip signal ___(2)___ satisfied.

- A. (1) is
 (2) is
- B✓ (1) is not
 (2) is not
- C. (1) is
 (2) is not
- D. (1) is not
 (2) is

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor analysis:

A. Incorrect. Plausible because the candidate must know what breaker positions are required to cause a reactor trip and which breakers are required for a P-4 Reactor trip signal. The A train trip signal goes to RTA and BYB and the B train trip signal goes to RTB and BYA. The P-4 signal is from RTA and BYA for train A and RTB and BYB for train B.

B. Correct.

C. Incorrect. Plausible because the candidate must know what breaker positions are required to cause a reactor trip and which breakers are required for a P-4 Reactor trip signal. The A train trip signal goes to RTA and BYB and the B train trip signal goes to RTB and BYA. The P-4 signal is from RTA and BYA for train A and RTB and BYB for train B

D. Incorrect. Plausible because the candidate must know what breaker positions are required to cause a reactor trip and which breakers are required for a P-4 Reactor trip signal. The A train trip signal goes to RTA and BYB and the B train trip signal goes to RTB and BYA. The P-4 signal is from RTA and BYA for train A and RTB and BYB for train B

K/A:

012K4.04

Reactor Protection System

Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following:
Redundancy

Technical References:

2-PT-36.1A

NCRODP - 77, Reactor Protection

References provided to applicants: None

Learning Objective:

8969

Explain the following concepts as they apply to the reactor trip bypass breakers.

- Why the breaker that bypasses the train A reactor trip breaker is opened by a train B reactor trip signal

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

17. 39 - 013A4.01 001/RO/T2/G1/4.5/4.8/MODIFIED//

Given the following conditions:

- Unit 1 is at 100% power.
- A large-break LOCA occurs.
- RWST level decreases as expected and automatic swapover to containment suction commences at the required level.
- 1-SI-MOV-1885C, LHSI Pump "A" Recirc Valve, breaker trips and the valve fails to close during the automatic swapover sequence

Based on these conditions, which ONE of the choices below completes the following statements?

Swapover to Recirc Mode automatically occurs below a level setpoint of ___(1)___% level in the RWST

and

___(2)___ Low Head Safety Injection pump(s) will automatically align to containment suction

- A. (1) 23
(2) Both
- B. (1) 23
(2) Only the "B"
- C. (1) 16
(2) Both
- D. (1) 16
(2) Only the "B"

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor Analysis:

A. Incorrect. The first part is incorrect but is plausible because 1-E-1 directs the crew to transition to 1-ES-1.3, transfer to cold leg recirc, at 23%. The second part is correct.

B. Incorrect. The first part is incorrect but is plausible because 1-E-1 directs the crew to transition to 1-ES-1.3, transfer to cold leg recirc, at 23%. The second part is incorrect but is plausible because the candidate may believe that both recirc valves are required to be closed when only one recirc valves in each train is required for auto swapover to occur.

C. Correct.

D. Incorrect. The first part is correct. The second part is incorrect but is plausible because the candidate may believe that both recirc valves are required to be closed when only one recirc valves in each train is required for auto swapover to occur.

K/A:

013A4.01

Engineered Safety Features Actuation System (ESFAS)

Ability to manually operate and/or monitor in the control room:

ESFAS-initiated equipment which fails to actuate

Technical References:

1-E-1

References provided to applicants: None

Learning Objective:

3411

List the interlocks associated with the following low-head safety injection flow path components' automatic actions (GSI-191).

- Switchover from the injection mode to the recirculation mode

Question Source: Modified

Given the following conditions:

- Unit 1 is at 100% power.
- The breaker for 1-SI-MOV-1885C, LHSI Pump "A" Recirc Valve, was found open.
- The crew was not able to re-close the breaker.
- The crew locally verified 1-SI-MOV-1885C to be open.
- A large-break LOCA occurs.
- RWST level decreases as expected.
- The RWST level is 15%, but the crew is not able to take any local actions.

Based on these conditions, which ONE of the following identifies the final alignment of the LHSI pumps?

QUESTIONS REPORT
for RO Exam Jan Submittal

- A. Both LHSI pumps will align to Recirc Mode.
- B. ONLY the "A" LHSI pump will align to Recirc Mode.
- C. ONLY the "B" LHSI pump will align to Recirc Mode.
- D. Neither LHSI pump will align to Recirc Mode.

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

18. 40 - 022K4.03 001/RO/T2/G1/2.6/2.7/BANK/NAPS 2009/

Given the following conditions:

- The crew has tripped Unit 1 and initiated Safety Injection due to a loss of RCS inventory
- Conditions continue to degrade and CDA automatically actuates

Based on the above conditions, which ONE of the choices below completes the following statements?

The Containment Air Recirc Fans (CARF) tripped when ___(1)___ was initiated

and

Cooling water to the CARFs isolated when ___(2)___ was initiated.

A. (1) Safety Injection

(2) Safety Injection

B. (1) Safety Injection

(2) CDA

C. (1) CDA

(2) Safety Injection

D. (1) CDA

(2) CDA

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor Analysis:

A. Incorrect. Plausible since neither the CARFs nor the CRDM fans are needed for accident mitigation.

B. Incorrect. Plausible since the candidate may mistakenly assume that cooling water to CARFs are phase A valves, these are in fact Phase B valves that will remain open until CDA.

C. Incorrect. Plausible since as noted above CARFs are not needed for accident mitigation, additionally they trip on UV/DV on their associated emergency bus and candidate may conclude that under SI conditions the CARFs would be tripped; cooling water isolation is correct.

D. Correct. Actuation of CDA will result in CARFs tripping and cooling water isolation.

K/A:

022K4.03

Containment Cooling System (CCS)

Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following:
Automatic containment isolation

Technical References:

NCRODP - 47, Primary ventilation

References provided to applicants: None

Learning Objective:

4478

List the following information as it applies to the containment air recirculation units.

- Interlock conditions which will automatically stop a fan

Question Source: Bank

Question History: North Anna 2009 exam

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

19. 41 - 026A1.06 001/RO/T2/G1/2.7/3.0/NEW//

Given the following conditions:

- Unit 2 is at 100% power
- A large break LOCA occurs inside containment

Which ONE of the choices below completes the following statements?

The Outside RS pumps start ___(1)___ upon 60% level in the RWST

And

NPSH to the Outside RS pumps is maintained by water from the ___(2)___ system.

- A. (1) after a 120 second time delay
(2) Quench spray
- B. (1) after a 120 second time delay
(2) Casing cooling
- C. (1) immediately
(2) Quench spray
- D. (1) immediately
(2) Casing cooling

Distractor analysis:

A. Incorrect. The first part is incorrect but plausible because the time delay for the inside RS pumps is 120 seconds. The second part is incorrect but plausible because QS supplies the inside recirc spray pumps with flow to help NPSH.

B. Incorrect. The first part is incorrect but plausible because the time delay for the inside RS pumps is 120 seconds. The second part is correct.

C. Incorrect. The first part is correct. The second part is incorrect but plausible because QS supplies the inside recirc spray pumps with flow to help NPSH.

D. Correct.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

026A1.06

Containment Spray System (CSS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including:

Containment spray pump cooling

Technical References:

NCRODP - 54, Recirc Spray

References provided to applicants: None

Learning Objective:

6278

List the following information associated with the Unit-1 inside recirculation spray pumps.

Time delay associated with starting the pump following an undervoltage condition

6238

Explain the following concepts associated with the outside recirculation spray pumps.

How the net positive suction head is physically increased

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

20. 42 - 039K5.08 001/RO/T2/G1/3.6/3.6/BANK/HARRIS 2011/

Given the following plant conditions:

- A Unit startup is in progress following a mid-cycle outage
- The Reactor is critical at 10-8 amps
- The Bypass MFRVs are in manual
- 1-MS-PCV-101A ("A" SG PORV) fails open

Which ONE of the choices below completes the following statements?

The "A" SG level will initially ____ (1) ____ after the MS PORV opens

and

The final Reactor power will be ____ (2) ____.

(Assume NO operator actions have been taken by the operating crew)

- A. (1) lower
(2) at the Point of Adding Heat
- B. (1) lower
(2) above the POAH
- C. (1) rise
(2) at the Point of Adding Heat
- D. (1) rise
(2) above the POAH

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor analysis:

A. Incorrect. The first part is incorrect but plausible if the candidate believes that with feed flowcontrol in manual the level will lower and does not take into account the effects of SG swell due to increased steam flow. The second part is incorrect. The power will be above the POAH in order for MTC and FTC to offset the positive reactivity added by the cooldown. Plausible because the candidate may think that power will stabilize at the POAH.

B. Incorrect. The first part is incorrect but plausible if the candidate believes that with feed flowcontrol in manual the level will lower and does not take into account the effects of SG swell due to increased steam flow. The second part is correct.

C. Incorrect. The first part is correct. The second part is incorrect. The power will be above the POAH in order for MTC and FTC to offset the positive reactivity added by the cooldown. Plausible because the candidate may think that power will stabilize at the POAH.

D. Correct.

K/A:

039K5.08

Main and Reheat Steam System

Knowledge of the operational implications of the following concepts as they apply to the MRSS:

Effect of steam removal on reactivity

Technical References:

Reactor theory

References provided to applicants: None

Learning Objective:

11992

Given a set of plant conditions, evaluate Main Steam System operations in light of the following issues

Effect of a failure, malfunction, or loss of components in this system on related systems

Question Source: Bank

Question History: Harris 2011 exam

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.5

Comments:

Given the following conditions:

- Unit 1 is at 100%
- Rod control is in MANUAL
- Steam generator level control is in AUTO
- Steam generator level control inputs (steam flow, feed flow, turbine first stage pressure) are selected to channel III
- 1-MS-PT-1446, Turbine First Stage Pressure, fails to 10%

With NO OPERATOR ACTION, which one of the following conditions describes the effect on plant operation due to the instrument failure?

- A. The Main Feed Regulating Valves will modulate to control SG level at 33% level.
- B. The Main Feed Regulating Valves will close and the unit will trip on Lo-Lo SG level
- C. The Main Feed Regulating Valves will modulate to control SG level at 38% level.
- D. There will no effect on SG water level control.

Distractor Analysis:

A. Incorrect. Plausible because the program level is 33% - 44% from 0% to 20% first stage pressure. Candidate must determine the program level that will be produced with a 10% first stage pressure output.

B. Incorrect. Plausible because the valves will receive a signal to throttle closed but should not go full closed as is the case with other instrument failures in the SG level control system. The candidate may believe that the valves will not open back up in time to prevent the Lo-Lo trip from occurring which happens with other failures.

C. Correct.

D. Incorrect. Plausible because this would occur if the channel IV first stage pressure failed instead of channel III.

K/A:

059A3.02

Main Feedwater (MFW) System

Ability to monitor automatic operation of the MFW, including:

Programmed levels of the S/G

Technical References:

Westinghouse logic diagram

References provided to applicants: None

Learning Objective:

8812

Explain the following concepts as they apply to the Steam Generator Level Control and Protection System.

- Why the programmed level setpoint for hot-zero power is 33%
- Why the programmed level setpoint is increased as turbine power increases to 20%

8818

Explain how the following instrument failures affect automatic operation of the feedwater bypass valves

12015

Given a set of plant conditions, evaluate Steam Generator Level Control and Protection System operations in light of the following issues.

Question Source: Modified

The following plant conditions exist:

-Reactor power is 100%

-Rod control is in AUTO -Steam generator level control is in AUTO

-Steam generator level control inputs (steam flow, feed flow, turbine first stage pressure) are selected to channel **III**

With **NO OPERATOR ACTION**, which one of the following conditions describes the effect on plant operation when channel **III** steam pressure in "A" low?

A. Increased feed flow results in steam generator shrink, steam stabilizes at a slightly higher level.

B. Decreased feed flow results in steam generator swell, steam stabilizes at a slightly lower level.

C. Decreased feed flow results in a reactor trip.

D. Increased feed flow results in a Hi-Hi steam generator level.

Question History: NAPS 2002

Question Cognitive Level: comprehension/Analysis

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

21. 44 - 061K2.01 001/RO/T2/G1/3.2/3.3/NEW//

Given the following conditions:

- Unit 2 is at 100%
- A loss of all offsite power occurs
- The 2J EDG fails to start
- No SI has occurred
- All other equipment starts as required

Which one of the choices below completes the following statements concerning Auxiliary Feedwater (AFW)?

There will be NO AFW flow to the ___(1)___ SG

And

AFW flow to the "A" SG ___(2)___ be controlled from the control room

(Assume no operator actions have occurred)

- A. (1) B
(2) can
- B✓ (1) B
(2) can not
- C. (1) C
(2) can
- D. (1) C
(2) can not

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor analysis:

AFW pumps are aligned to flow to the SGs as follows:

2-FW-P-3A (A motor driven) is aligned to feed the C SG through HCV-200C

2-FW-P-3B (B motor driven) is aligned to feed the B SG through MOV-200B

2-FW-P-2 (turbine driven) is aligned to feed the A SG through MOV-200D

The A and B SG AFW flow is controlled by MOVs and the C SG AFW flow is controlled by an HCV. The MOVs are both powered from the 2J bus.

A. Incorrect. Plausible because the candidate must determine which AFW pump is lost due to the loss of 2J bus and then is required to know which AFW pump is aligned to each SG and must know that the MOV for controlling the A SG has lost power and cannot be controlled from the control room.

B. Correct.

C. Incorrect. Plausible because the candidate must determine which AFW pump is lost due to the loss of 2J bus and then is required to know which AFW pump is aligned to each SG and must know that the MOV for controlling the A SG has lost power and cannot be controlled from the control room.

D. Incorrect. Plausible because the candidate must determine which AFW pump is lost due to the loss of 2J bus and then is required to know which AFW pump is aligned to each SG and must know that the MOV for controlling the A SG has lost power and cannot be controlled from the control room.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

061K2.01

Auxiliary / Emergency Feedwater (AFW) System

Knowledge of bus power supplies to the following:

AFW system MOVs

Technical References:

References provided to applicants: None

Learning Objective:

5967

List the following information associated with the Auxiliary Feedwater System discharge paths.

- Steam generator to which each auxiliary feedwater pump is normally aligned
- Discharge valve that is normally used to control flow from each auxiliary feedwater pump to its respective steam generator

11965

Given a set of plant conditions, evaluate Auxiliary Feedwater System operations in light of the following issues.

- Effect of a failure, malfunction, or loss of a related system or component on this system

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7

Comments:

Given the following conditions:

- Unit 1 is in Mode 5
- 1H EDG PT is in progress with EDG load at 2550 KW and VARS at 0
- A Loss of offsite power occurs
- After all automatic equipment actuations are complete and load has stabilized on the 1H bus, VARS are reading 1000 kVARS out

Which ONE of the choices below correctly completes the following statements?

Following any automatic load changes, 1H EDG load will be ___(1)___ than 2550 kw

AND

VARS ___(2)___ be adjusted using voltage control

- A. (1) LESS
(2) can
- B✓ (1) LESS
(2) cannot
- C. (1) GREATER
(2) can
- D. (1) GREATER
(2) cannot

Distractor analysis:

A. Incorrect. The first part is correct. Load will be less than 2550 kw without all emergency SI and CDA equipment running. The second part is incorrect but is plausible because during a PT the VARS are adjusted using the voltage regulator control.

B. Correct.

C. Incorrect. The first part is incorrect but is plausible because there are several pieces of equipment that will load onto the emergency bus following a loss of offsite power (i.e. CH pumps, CC pumps, AFW pumps & SW pumps). The second part is incorrect but is plausible because during a PT the VARS are adjusted using the voltage regulator control.

D. Incorrect. The first part is incorrect but is plausible because there are several pieces of equipment that will load onto the emergency bus following a loss of offsite power (i.e. CH pumps, CC pumps, AFW pumps & SW pumps). The second part is correct.

K/A:

062A2.11

A.C. Electrical Distribution

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

Aligning standby equipment with correct emergency power source (D/G)

Technical References:

References provided to applicants: None

Learning Objective:

12019

Given a set of plant conditions, evaluate Vital and Emergency Electrical Distribution System operations in light of the following issues.

- Expected plant or system response based on vital and emergency electrical distribution component interlocks or design features

6306

Explain how each of the following parameters is controlled, both in parallel and non-parallel diesel generator operations

- Reactive load (vars)

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:

Comments:

Given the following conditions:

- Unit 1 is at 100% power
- The 1H 4160-Volt emergency bus normal feeder breaker 15H11 tripped open
- The 1H EDG has started and re-energized the bus.

After diagnosing the electrical system, the crew began configuring 1H bus loads using 0-AP-10, Loss of Electrical Power, attachment 21.

Configuring 1H bus loads is done as a high priority in order to _____.

- A. facilitate restoration of the emergency bus from the normal feeder
- B. ensure that charging flow is maintained in the event that off-site power is lost to the 1J bus
- C. prevent EDG overload if SI/CDA are subsequently initiated
- D. restore operability of load sequencing timers

Distractor Analysis:

A. Incorrect. Plausible because the logical next step is to transfer the emergency bus back to the normal feeder.

B. Incorrect. Plausible because part of the procedure to configure loads is to start the CH pump on the bus that has an EDG as the sole source of power.

C. Correct. Loads are configured onto the bus that has an EDG as the sole source of power to prevent overloading the EDG if SI/CDA are actuated.

D. Incorrect. Plausible because it requires the candidate to know that the load sequencing timers are inoperable when the EDG is connected to the bus.

K/A:
062G2.4.11
AC Electrical Distribution System
Knowledge of abnormal condition procedures.

Technical References:

References provided to applicants: None

Learning Objective:

18009

Perform the following actions of 0-AP-10, "Loss of Electrical Power."

Explain the purpose

Explain the high level actions, major action categories, key mitigating strategies, and their basis

Question Source: Bank

Question History: None

Question Cognitive Level:Memory

10 CFR Part 55 Content: 41.10/43.5

Comments:

Given the following:

- A lightning strike has occurred resulting in a loss of the North Anna Switchyard.
- Simultaneously with loss of offsite power, the 1J EDG Battery and Battery Charger are BOTH lost.
- 125 Vital DC Bus 1-I is lost.
- A spurious SI occurs.
- The crew has entered 1-E-0, Reactor Trip or Safety Injection, and manually actuated SI.

Which ONE of the following describes the reason that no J Train ESF equipment is running?

- A. 1J EDG did NOT start due to loss of the DC fuel oil pump.
- B. 1J EDG started, but the EDG output breaker did NOT close due to loss of DC field flash capability.
- C. 1J EDG did NOT start due to loss of power to both start circuits.
- D. 1J EDG started and the EDG output breaker is closed, but no control power is available to 1J Bus load breakers.

A Incorrect. Plausible since although the EDG Aux Fuel Oil pump is not needed to start the EDG the candidate who is unfamiliar with the EDG System may assume this constitutes a valid reason for the EDG not starting.

B Incorrect. Plausible because the candidate may assume that the EDG is capable of starting but that DC for field flash is unavailable. While the later part is true, as discussed above the EDG will not attempt to start based on the total loss of DC support.

C Correct. Without the EDG Battery or Battery Charger there is no power available to the start circuits and thus the EDG will not attempt to start despite the presence of automatic start signals.

D Correct. Plausible because the candidate may assume that the EDG is capable of starting and obtaining required voltage and frequency. The candidate who is unfamiliar with DC control power to the ESF busses may conclude that this is a logical reason for none of the ESF equipment to be loaded. The control power to 1J Bus is from DC Bus 1-III.

K/A:

063K3.01

D.C. Electrical Distribution

Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following:

ED/G

Technical References:

References provided to applicants: None

Learning Objective:

6310

State the following information concerning the diesel generator batteries.

- Purpose
- Major loads supplied
- Source of charging power

Question Source: Bank

Question History: North Anna 2008

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

22. 48 - 064A4.01 001/RO/T2/G1/4.0/4.3/BANK//

Given the following conditions.

- The operating crew is completing a periodic test of the 1J emergency diesel
- The diesel ran for the required amount of time and the crew has just shut it down
- The operator dispatched to roll the diesel with air enters the 2H diesel room by mistake

Which one of the following statements describe the effect on the 2H emergency diesel if the operator opens the emergency diesel generator (EDG) air start SOV using its manual override?

- A✓ The diesel will start and the EDG generator field will flash.
- B. The diesel will not start, due to the air vent SOV is open.
- C. The diesel will not start, due to the fuel racks are in the shutdown position.
- D. The diesel will start but the EDG generator field will not flash due to no auto start signal

Distractor analysis:

- A. Correct. Rolling the EDG with air will cause the EDG to start without a start signal
- B. Incorrect. Plausible because the air vent SOV downstream of the air start SOVs will be de-energized and open. The candidate must know that there is an orifice in the vent line to restrict loss of air start pressure if the vent SOV is not close.
- C. Incorrect. Plausible because the fuel racks are in the min fuel position while the EDG is shutdown. The candidate must know that air is ported to an air/oil piston on the governor to cause it to open the fuel racks when the air SOVs open.
- D. Incorrect. Plausible if the candidate believes that there must be a start signal present to flash the generator field.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

064A4.01

Emergency Diesel Generators (ED/G)

Ability to manually operate and/or monitor in the control room:

Local and remote operation of the ED/G

Technical References:

Fairbanks Morris EDG tech manual

References provided to applicants: None

Learning Objective:

9130

For a given plant condition, describe the response of the emergency diesel if the air-start valve is manually overridden (bypassed).

6342

Explain how the diesel generator would respond to a failure of the air-start vent valve to close.

Question Source: Bank

Question History: None

Question Cognitive Level:

10 CFR Part 55 Content:Comprehension/Analysis

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

23. 49 - 064K3.03 001/RO/T2/G1/3.6/3.9/NEW//

Given the following conditions:

- Both units were at 100% power when a loss of all offsite power occurred
- All Emergency Diesel Generators started and energized their respective busses
- The 1H EDG subsequently developed a coolant leak and was secured
- The crew is preparing to reenergize the 1H bus with the SBO diesel in accordance with 0-OP-6.4, Operation Of The SBO Diesel (SBO Event)

Which ONE of the choices below completes the following statements:

The flow path to reenergize the 1H bus is from the M bus to the (1)

AND

When power is restore to the 1H bus from the SBO diesel, equipment (2) onto the bus

- A. (1) L bus to the F bus to the 1H bus
 (2) is allowed to automatically sequence
- B. (1) L bus to the F bus to the 1H bus
 (2) must be manually loaded
- C. (1) F bus to the 1H bus
 (2) is allowed to automatically sequence
- D✓ (1) F bus to the 1H bus
 (2) must be manually loaded

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor Analysis:

A. Incorrect. The first part is incorrect but plausible because the other 2 transfer busses are powered from the L bus. Only the F transfer bus is powered directly from the M bus. The second part is incorrect since the loads are procedurally placed in pull to lock before loading the SBO onto the bus but is plausible because when the emergency busses are repowered from the EDGs the loads will sequence onto the bus automatically.

B. Incorrect. The first part is incorrect but plausible because the other 2 transfer busses are powered from the L bus. Only the F transfer bus is powered directly from the M bus. The second part is correct.

C. Incorrect. The first part is correct. The second part is incorrect since the loads are procedurally placed in pull to lock before loading the SBO onto the bus but is plausible because when the emergency busses are repowered from the EDGs the loads will sequence onto the bus automatically.

D. Correct

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

064K3.03

Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following:

ED/G (manual loads)

Technical References:

References provided to applicants: None

Learning Objective:

10782

List the following electrical distribution subsystem components in the sequence required to supply power from the station blackout (SBO) diesel generator to 1H emergency bus.

- SBO diesel generator output breaker 05M1
- SBO 0M bus to "F" transfer bus feeder breaker 05M2
- "F" transfer bus SBO feeder breaker 15F5
- "F" transfer bus to 1H emergency bus feeder breaker 15F3
- 1H emergency bus normal feeder breaker 15H11

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.7

Comments:

Unit 1 was at 100% power when a LOCA occurs inside containment

Which ONE of the choices below completes the following statements concerning the Recirculation Spray Heat Exchanger service water return radiation monitor sample pumps.

The Recirculation Spray Heat Exchanger service water return radiation monitor sample pumps (1-SW-P-5, 6, 7 and 8) will automatically start ___(1)___ seconds after a Phase B signal

AND

The RECIRC SPRAY HEAT EXCHANGER 1A-1B-1C-1D RM PP LO FLOW annunciator will alarm if flow is not detected for ___(2)___ seconds after the pump starts.

- A✓ (1) 120
(2) 30
- B. (1) 30
(2) 30
- C. (1) 30
(2) 120
- D. (1) 120
(2) 30

Distractor analysis:

There is a 2 minute time delay after the Phase B signal to allow SW to fill the RS heat exchanger piping due to the SW side is maintained empty for corrosion concerns. The low flow alarm has a 30 second time delay. Plausible because the candidate must remember the 2 times.

- A. Correct
- B. Incorrect. Plausible as stated above
- C. Incorrect. Plausible as stated above
- D. Incorrect. Plausible as stated above

K/A:

073K1.01

Process Radiation Monitoring (PRM) System

Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems:

Those systems served by PRMs

Technical References:

11715-ESK-6JP

References provided to applicants: None

Learning Objective:

5245

List the following information as it applies to the recirculation spray heat exchanger service water return radiation monitors.

Interlocks associated with automatically starting the sample pumps

Means provided in the control room to determine sample pump low flow

Question Source: Modified

The Recirculation Spray Heat Exchanger service water return radiation monitor sample pumps (1-SW-P-5, 6, 7 and 8) will automatically start _____ after the receipt of a _____.

- A. 2 minutes, Phase B signal
- B. 30 seconds, Phase B signal
- C. 30 seconds, Phase A signal
- D. 2 minutes, Phase A signal

Question History:None

Question Cognitive Level:Memory

10 CFR Part 55 Content:41.2

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

24. 51 - 076A3.02 001/RO/T2/G1/3.7/3.7/NEW//

Given the following conditions:

- Unit 1 is at 100% power when a large-break LOCA occurs
- All automatic actions have occurred.

Which ONE of the choices below completes the following statements?

The Service Water supply and return MOVs for the Recirc Spray Heat Exchangers will open when a (1) signal is received

AND

The status of the recirc spray heat exchanger service water supply valves (1-SW-MOV-103A/B/C/D) will indicate (2) on the safeguards panel.

- A. (1) SI
 (2) full open.
- B. (1) CDA
 (2) mid-position
- C. (1) SI
 (2) mid-position
- D. (1) CDA
 (2) full open.

Distractor analysis:

A. Incorrect. The first part is incorrect but is plausible because an SI signal will cause other SW actions (i.e. SW pump start, spray array MOVs, spray bypass MOVs). The second part is correct. The MOVs will indicate full open even though they are in a throttled condition.

B. Incorrect. The first part is correct. The second part is incorrect but is plausible because the physical position of the valve is stopped in mid-position when opened to provide throttling of the SW flow.

C. Incorrect. The first part is incorrect but is plausible because an SI signal will cause other SW actions (i.e. SW pump start, spray array MOVs, spray bypass MOVs). The second part is incorrect but is plausible because the physical position of the valve is stopped in mid-position when opened to provide throttling of the SW flow.

D. Correct.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

076A3.02

Service Water System (SWS)

Ability to monitor automatic operation of the SWS, including:

Emergency heat loads

Technical References:

1-PT-75.6 - SW flow balance

References provided to applicants: None

Learning Objective:

7676

Explain the following concepts concerning the service water supply and return motor-operated isolation valves for the recirculation spray heat exchangers.

- Normal position of each valve (1-SW-MOV-101s, 102s, 103s, 104s, 105s, and 106s)
- Expected positions of each valve during accident conditions
- How a heat exchanger tube leak would be isolated during an accident
- How 1-SW-MOV-103A, 103B, 103C, and 103D aid in preventing run-out of a service water pump during accident conditions

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

25. 52 - 076A4.01 001/RO/T2/G1/2.9/2.9/BANK//

Given the following conditions:

- Both units at 100%
- 1-SW-P-1A and 2-SW-P-1A pumps are running
- A Large Break LOCA inside containment on Unit 1
- The “B” train of SI fails to actuate automatically or manually

Which ONE of the choices below lists SW pumps that will be running?

(assume no further operator actions have occurred)

- A. All 4 SW pumps running
- B. 1-SW-P-1A and 2-SW-P-1A ONLY
- C. 1-SW-P-1A, 2-SW-P-1A and 2-SW-P-1B ONLY
- D. 1-SW-P-1A, 1-SW-P-1B and 2-SW-P-1A ONLY

Distractor Analysis:

Safety injection from either unit will start all four SW pumps (with LOCAL-REMOTE transfer switch in REMOTE). The SI signal is train specific:

Unit 1 A train SI starts the A and B SW pumps on unit 1, and the A SW pump on unit 2.

Unit 1 B train SI starts the A and B SW pumps on unit 1, and the B SW pump on unit 2.

Unit 2 A train SI starts the A and B SW pumps on unit 2, and the A SW pump on unit 1.

Unit 2 B train SI starts the A and B SW pumps on unit 2, and the B SW pump on unit 1.

A. Incorrect. Plausible since the candidate must know which SI signal starts the pumps.

B. Incorrect. Plausible since the candidate must know which SI signal starts the pumps.

C. Incorrect. Plausible since the candidate must know which SI signal starts the pumps.

D. Correct.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

076A4.01

Ability to manually operate and/or monitor in the control room:
SWS pumps

Technical References:

References provided to applicants: None

Learning Objective:

7670

Explain the following concepts concerning the service water pumps.
Automatic start signals

Question Source: Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.7

Comments:

Given the following conditions:

- Both Units are at 100% power
- 1-IA-C-1, Unit 1 IA Compressor is running in HAND (AUTO button is NOT depressed)
- 2-IA-C-1 is in AUTO standby

If the Unit 1 OATC placed 1-IA-C-1 HAND control switch in OFF, the compressor will ____ (1) ____.

And

The Unit 2 IA compressor will start ____ (2) ____.

- A. (1) unload and trip after a 4 second time delay
(2) immediately
- B✓ (1) unload and trip after a 4 second time delay
(2) when IA pressure lowers to 98 psig
- C. (1) run unloaded for 20 minutes, then trip
(2) immediately
- D. (1) run unloaded for 20 minutes, then trip
(2) when IA pressure lowers to 98 psig

Distractor analysis:

A. Incorrect. The first part is correct. The second part is incorrect but is plausible because it would be logical for the standby piece of equipment to start as soon as the running equipment is stopped which is true for other pieces of equipment throughout the plant (i.e. CH pumps).

B. Correct.

C. The first part is incorrect but is plausible because this is what occurs when the compressors are placed from hand to auto. The second part is incorrect but is plausible because it would be logical for the standby piece of equipment to start as soon as the running equipment is stopped which is true for other pieces of equipment throughout the plant (i.e. CH pumps).

D. The first part is incorrect but is plausible because this is what occurs when the compressors are placed from hand to auto. The second part is correct.

K/A:

078G2.1.31

Instrument Air System (IAS)

Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.

Technical References:

References provided to applicants: None

Learning Objective:

4271

Explain the following concepts associated with the instrument air compressor's controls. How each position of the compressor control switch in the control room affects compressor operation 4270

Explain the following concepts associated with the instrument air compressors. How compressor responds when control switch placed to the OFF position, including the time delay

Question Source: Modified

If the Unit 1 OATC placed the running (in "HAND") Instrument Air Compressor (1-IA-C-1) control switch in OFF, the compressor would _____.

- A. unload and trip after a 4 second time delay
- B. run unloaded for 20 minutes, then trip
- C. trip immediately
- D. be unaffected since "OFF" only works with the control switch in "AUTO"

Question History: None

Question Cognitive Level: Comprehensive

10 CFR Part 55 Content:41.10

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

26. 54 - 078K1.05 001/RO/T2/G1/3.4/3.5/MODIFIED/NAPS 2012/

Select the choice that completes the description of how Instrument Air (IA) is provided for Main Steam Trip Valves and the effect of losing IA to one trip valve.

The SOVs ___(1)___ to vent IA to close the MSTVs

AND

If IA was vented from one main steam trip valve while the unit is at 100% power, the SI signal that would be generated is ___(2)___.

- A✓ (1) energize
(2) High steam flow coincident with low steam pressure
- B. (1) de-energize
(2) High steam flow coincident with low steam pressure
- C. (1) energize
(2) High steam line differential pressure
- D. (1) de-energize
(2) High steam line differential pressure

Distractor analysis:

A. Correct.

B. Incorrect. The first part is incorrect but is plausible since most safety related functions are de-energize to actuate whereas the MS trip valves are energize to actuate. The second part is correct. Closing of one MS trip valve will cause a High flow in the other 2 steam lines coincident with a low steam pressure.

C. Incorrect. The first part is correct. The second part is incorrect but plausible since it will cause a differential pressure between the line with the closed trip valve and the other 2 lines but it is in the wrong direction since the effected line will be higher pressure and the SI is caused when one line is at a lower pressure than the other 2 lines.

D. Incorrect. The first part is incorrect but is plausible since most safety related functions are de-energize to actuate whereas the MS trip valves are energize to actuate. The second part is incorrect but plausible since it will cause a differential pressure between the line with the closed trip valve and the other 2 lines but it is in the wrong direction since the effected line will be higher pressure and the SI is caused when one line is at a lower pressure than the other 2 lines.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

078K1.05

Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems:

MSIV air

Technical References:

References provided to applicants: None

Learning Objective:

4067

Explain the following concepts associated with the main steam trip valve's pneumatic operator.

How the valve fails on a loss of instrument air

18031

Perform the following actions of 1-AP-28, "Loss of Instrument Air."

Explain the high level actions, major action categories, key mitigating strategies, and their basis

Question Source: Modified

Select the choice that completes the description of how instrument air is provided for "B" Main Steam Trip Valve, 2-MS-TV-201 B.

Instrument air is supplied to "B" Main Steam Trip Valve, 2-MS-TV-201 B, via _____ solenoid operated valves (SOVs), and

_____ any one of the SOVs will close 2-MS-TV-201 B.

A. 2 ; energizing

B. 2; de-energizing

C. 6 ; energizing

D. 6; de-energizing

Question History: NAPS 2012

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.2 - 41.9

Comments:

Given the following conditions:

- Unit 2 is in Mode 6
- Core off-load is in progress
- Containment equipment hatch is open
- Containment Purge is in service with one supply fan and two exhaust fans running

The Containment Purge supply fan trips, but the exhaust fans continue to run.

Which ONE of the following describes the initial plant response to this event?

(Assume NO operator actions.)

- A. Reactor cavity water level lowers.
- B. Unmonitored release of containment atmosphere via containment equipment hatch.
- C. Spent Fuel Pool water level lowers.
- D. Containment gaseous and particulate radiation monitor is rendered non-functional.

Distractor analysis:

A. Incorrect. Plausible because the candidate must determine the effect of losing the supply fan will have on cavity water level.

B. Incorrect. Plausible because the candidate must determine the effect of losing the supply fan will have on containment pressure and resulting air flow through the equipment hatch.

C. Correct.

D. Incorrect. Plausible because a loss of containment air recirc fans will cause the containment rad monitor to become inoperable.

K/A:

103K1.03

Containment System

Knowledge of the physical connections and/or causeeffect relationships between the containment system and the following systems:

Shield building vent system

Technical References:

References provided to applicants: None

Learning Objective:

9040

Explain the possible effect on spent fuel pit and reactor cavity level due to the following conditions during refueling operations.

- Decreasing the number of containment exhaust fans
- Decreasing the number of fuel building exhaust fans

Question Source:Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.2 to 41.9

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

27. 56 - 002K5.10 001/RO/T2/G2/3.6/4.1/NEW//

Due to an equipment problem, Unit 1 was ramped down from 100% power for repairs. Operators are maintaining power less than 5%.

The following indications are noted by the RO:

- Main steam flow - 0.2×10^6 LBM/HR and stable
- Steam Dump demand - 4% and stable
- Intermediate range NIs - 8×10^{-7} amps and slowly lowering
- Loop DeltaT - 3% and stable

Which one of the choices below completes the following statement?

Reactor power is currently ___(1)___ and the crew will be required to ___(2)___.

- A. (1) 3%
(2) dilute to maintain power
- B. (1) below the point of adding heat
(2) withdraw control rods to raise power
- C. (1) 3%
(2) withdraw control rods to maintain power
- D✓ (1) below the point of adding heat
(2) commence reactor shutdown

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor analysis:

At low power levels, Delta T will falsely indicate that the reactor is at power due to decay heat and RCP work energy being added to the RCS.

A. Incorrect. Plausible because there are several indications including Delta T which show the Unit is at 3% power and stable. The candidate must determine that these indications are due to core decay heat and RCP work. Diluting to maintain power is a valid evolution to offset negative reactivity from rising Xenon concentration following the ramp.

B. Incorrect. Plausible because withdrawing control rods will add required positive reactivity to raise reactor power back to 3% but this is not allowed by procedures due to the reactor being subcritical and a start up has not been authorized.

C. Incorrect. Plausible because there are several indications including Delta T which show the Unit is at 3% power and stable. The candidate must determine that these indications are due to core decay heat and RCP work. withdrawing control rods to maintain power is a valid evolution to offset negative reactivity from rising Xenon concentration following the ramp.

D. Correct. The IR NIs indicate that the reactor is subcritical and must be shut down.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

002K5.10

Reactor Coolant System (RCS)

Knowledge of the operational implications of the following concepts as they apply to the RCS:

Relationship between reactor power and RCS differential temperature

Technical References:

1-OP-2.2, Unit power operation from mode 1 to mode 2

References provided to applicants: None

Learning Objective:

17376

Explain the required operator response if reactor power goes below the Point of Adding Heat (SEN-253).

If reactor power goes below the POAH power must be maintained below the POAH.

This procedure is written for unit shutdown and does not provide guidance for a reactor startup.

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

28. 57 - 011K4.05 001/RO/T2/G2/3.7/4.1/MODIFIED//

Given the following conditions:

- Unit 1 is at 7% power
- 1-RC-LT-1460, Przr level channel II, failed and was placed in trip
- Pressurizer level control is in automatic and controlling on program
- 1-RC-LT-1459, Przr level channel I, fails high

Which one of the following actuations will occur due to this condition?

(Assume no operator actions)

- A. Przr Hi level Reactor trip
- B. Przr Hi pressure Reactor trip
- C. Przr Low pressure Reactor trip
- D. No Reactor trip signals will be generated

Distractor analysis:

A. Incorrect. Plausible since the Przr High level trip coincidence will be met but power is less than P-7 which blocks the at power trips.

B. Incorrect. Plausible since actual Przr level will lower until letdown isolates then rise until the Przr is solid but the high pressure trip will not be reached due to the Przr PORVs lifting to limit pressure.

C. Incorrect. Plausible since actual Przr level will lower which can cause pressure to lower but the low pressure trip is also blocked below P-7.

D. Correct.

K/A:

011K4.05

Pressurizer Level Control System (PZR LCS)

Knowledge of PZR LCS design feature(s) and/or interlock(s) which provide for the following:

PZR level inputs to RPS

Technical References:

QUESTIONS REPORT

for RO Exam Jan Submittal

References provided to applicants: None

Learning Objective:

8841

List the following information associated with pressurizer level protection
Interlock that will block the high-level reactor trip

8964

List the automatic reactor trips including the following information as it applies to each
of them.

Interlocks associated with enabling and/or disabling the trip

16182

Explain the following concepts associated with the low power reactor trips block, P-7
reactor trip system interlock function of the reactor trip system (RTS) instrumentation
technical specification and bases

Question Source: Modified

The following plant conditions exist.

The unit is operating at 100% power

PRESS LEVEL CHANNEL DEFEAT switch is in the 459/460 position

Pressurizer level channel 1-RC-LT-1459 has just failed low

Select the response that correctly describes the unit's response to this failure. (assume
no operator action)

A. Letdown isolates, backup heaters de-energize, charging flow increases, actual level
increases, and the reactor trips on high pressurizer level.

B. Letdown isolates, backup heaters turn on, charging flow decreases, actual level
decreases, and the reactor trips on low pressurizer pressure.

C. Letdown temperature increases, backup heaters turn on when actual level increases
above program, charging flow decreases, and the reactor trips on high pressurizer
level.

D. Letdown temperature increases, backup heaters de-energize when actual level
decreases below program, charging flow decreases, and the reactor trips on low
pressurizer pressure.

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

29. 58 - 014A1.02 001/RO/T2/G2/3.2/3.6/BANK//

Which ONE of the choices below completes the following statement:

In order to ensure adequate shutdown margin during operations at various power levels, control rod insertion limits must be constantly monitored. This monitoring is accomplished by comparing rod position from the output of the ___(1)___ and comparing it to the insertion limit that is derived from ___(2)___.

- A. (1) pulse-to-analog converter
(2) Tave
- B. (1) individual rod position indicators
(2) Tave
- C✓ (1) pulse-to-analog converter
(2) Delta T
- D. (1) individual rod position indicators
(2) Delta T

Distractor analysis:

A. Incorrect. The first part is correct. The second part is incorrect but is plausible since Tave is used in most control systems.

B. Incorrect. The first part is incorrect but is plausible since the pupose of the insertion limits is to ensure that actual rod position is adequate to maintain shutdown margin following a trip. The second part is incorrect but is plausible since Tave is used in most control systems.

C. Correct.

D. Incorrect. The first part is incorrect but is plausible since the pupose of the insertion limits is to ensure that actual rod position is adequate to maintain shutdown margin following a trip. The second part is correct

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

014A1.02

Rod Position Indication System (RPIS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including:

Control rod position indication on control room panels

Technical References:

References provided to applicants: None

Learning Objective:

6540

List the following information associated with the control rod insertion limits.

Input signals

Question Source: Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.5

Comments:

Given the following conditions:

- Unit 1 was at 100% power when a loss of offsite power occurred
- The crew has transitioned to 1-ES-0.1, Reactor Trip Response
- Natural circulation verification is in progress.
- 2 Core Exit Thermocouples (CETC) are failed due to open circuits.

Which ONE of the choices below completes the following statement:

The input from these CETCs to the Subcooling Monitor are failed (1) and the calculated subcooling will be (2)

- A. (1) low
(2) lower
- B✓ (1) low
(2) unaffected
- C. (1) high
(2) lower
- D. (1) high
(2) unaffected

Distractor Analysis:

A. Incorrect. Indication fails low but the subcooling monitor only uses the 5 highest reading CETCs for the calculation. The candidate must determine which direction the CETCs will be failed and the effect on the RCS subcooling.

B. Correct.

C. Incorrect. An RTD fails high on an open circuit. In this case the thermocouple indication fails low but the subcooling monitor only uses the 5 highest reading CETCs for the calculation. The candidate must determine which direction the CETCs will be failed and the effect on the RCS subcooling.

D. Incorrect. An RTD fails high on an open circuit. In this case the thermocouple indication fails low but the subcooling monitor only uses the 5 highest reading CETCs for the calculation. The candidate must determine which direction the CETCs will be failed and the effect on the RCS subcooling.

K/A:

017K6.01

In-Core Temperature Monitor System (ITM)

Knowledge of the effect of a loss or malfunction of the following ITM system components:

Sensors and detectors

Technical References:

References provided to applicants: None

Learning Objective:

7735

Explain the following concepts as they apply to the Core Exit Temperature Monitoring Subsystem.

- How a thermocouple is used to generate a temperature signal

7737

Explain the purpose of the following inputs to the Subcooled Margin Monitor Subsystem microprocessor.

Average of five highest thermocouples

Question Source: Bank

Question History: Vogtle 2011

Question Cognitive Level: Comprehensive

10 CFR Part 55 Content:

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

30. 60 - 027K2.01 001/RO/T2/G2/3.1/3.4/BANK/NAPS 2012/

The Containment Iodine Filtration Fans are powered from ___(1)___ and are placed in operation to ___(2)___ .

- A. (1) Emergency Busses
(2) reduce airborne radioactivity in Containment prior to opening Containment for outages
- B. (1) Emergency Busses
(2) minimize release during a postulated fuel handling accident inside Containment.
- C✓ (1) Station Service Busses
(2) reduce airborne radioactivity in Containment prior to opening Containment for outages.
- D. (1) Station Service Busses
(2) minimize release during a postulated fuel handling accident inside Containment.

Distractor Analysis:

A. Incorrect. First part incorrect but plausible since some things (like flux mapper drives) that aren't required to function during an accident do receive power from emergency busses because of the benefits that can be derived by using them if conditions permit. Second part is correct, these fans were supplied based on the potential for buildup of Iodine in Containment from minor RCS leakage.

B. Incorrect. First part incorrect as discussed above. Second part is incorrect but plausible since procedures such as FR-Z.3, Response to High Containment Radiation Level, mention the ability to use these based on recommendations from Health Physics and other members of plant staff; the candidate who lacks detailed knowledge of the design basis document may conclude that they are installed for the reason given in this distractor.

C. Correct. First part is correct there are 2 fans, each one receiving power from a separate station service motor control center (MCC), one or both can be operated at a time. Second part is correct as discussed in "A".

D. Incorrect. First part is correct as noted above. Second part is incorrect but plausible as discussed in "B".

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:
027K2.01
Containment Iodine Removal System (CIRS)
Knowledge of bus power supplies to the following:
Fans

Technical References:

References provided to applicants: None

Learning Objective:

4489
List the following information as it applies to the containment iodine filtration unit components.

Question Source: Bank

Question History: North Anna 2012 exam

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.7

Comments:

Given the following conditions:

- Unit 2 is in Mode 6
- Core off-load is ready to commence
- The Core Alterations Checklist verifies that at least one Containment air recirculation fan is in service.

Which of the following describes why this verification is performed.

- A✓ Maintain automatic isolation function of containment purge and exhaust
- B. Checks cooling fan running to maintain containment temp < 115 degrees prior to commencing core off-load
- C. Verify the digital containment Partial Air Pressure indicators are operable
- D. To allow installation of PDTT vent hose to an in-service containment exhaust purge duct

Distractor Analysis:

This requires the examinee to know 1-RM-RMS-159 / 160 receives its sample flow from the Containment Air Recirc fan duct work. If no containment recirc fans are in service, Then 1-RM-RMS-159/160 are not operable.

A) CORRECT

Maintain automatic isolation function of containment purge and exhaust,

1-RM-RMS-159 / 160 "Containment gases and particulate Radiation Monitors" initiate automatic functions which affects the purge and exhaust system. High radiation levels in containment will close the containment purge system butterfly valves.

The containment gases and particulate Radiation Monitors take a suction from the Containment air recirc fan duct work so at least one containment Air Recirc fan must be in operation to provide a representative sample for 1-RM-RMS-159 / 160

B) INCORRECT

Checks cooling fan running to maintain containment temp < 115 degrees prior to commencing core off-load

Plausible because this is the third step in 1-AP-35 "Loss if containment air recirculation cooling" Containment average air temperature is an initial condition used in the DBA analyses that establishes the containment environmental qualifications for both pressure and temperature. Based on the given information Mode 6, In Modes 5 and 6 the consequences of an event that would violate the upper temperature limit is reduced due to RCS pressure and temperature limitations and therefore not required.

C) INCORRECT

Verify the digital containment Partial Air Pressure indicators are operable.

Plausible because the first step in 1-AP-35 "Loss of containment air recirculation cooling" directs the operator to declare the partial air pressure indicators inoperable. In Modes 1,2,3, and 4, a DBA could cause a release of radioactive material to containment. And is essential to ensure containment pressure is within its designed limits. Based on the given information Mode 6 , In Modes 5 and 6 the consequences of these events are reduced due to RCS pressure and temperature limitations and therefore not required.

D) INCORRECT

To allow installation of PDTT vent hose to an in-service containment exhaust purge duct

Plausible because Operator may think a containment air recirculation fan needs to be in service to install PDTT vent hose. This operation is performed during the outage by 1-OP-5.4 "Draining the Reactor Coolant System" This is done prior to draining the RCS, to allow proper draining into the PDTT. The installation of the vent hose is from the PDTT level column vent and routed to a containment exhaust purge duct.

K/A:

029K1.05

Containment Purge System (CPS)

Knowledge of the physical connections and/or cause-effect relationships between the Containment Purge System and the following systems:

Containment air cleanup and recirculation system

Technical References:

0-AP-35, Loss of Containment Recirculation Cooling

1-OP-4.1, Controlling procedure for refueling

TRM 3.9.5 Containment Purge and Exhaust Isolation System

TRM 3.9.5 Bases

11715-FM-82N-3

References provided to applicants: None

Learning Objective:

U 4477

Containment Air Recirculation Fan Flowpath

U 17522

(TRM 3.9.5)

U 10705

Automatic action RM-159/160

U 16259

RM-159/160 operability

Question Source: New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content:

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

31. 62 - 033G2.2.3 001/RO/T2/G2/3.8/3.9/NEW//

Both units are at 100% power.

1-FC-P-1A, A Spent Fuel Cooling Pump, trips due to a fault

Spent Fuel Pool temperature reaches the High temperature alarm setpoint

Which one of the choices below completes the following statements?

The annunciator for SFP High temperature is located on Unit ___(1)___ panel.

and

1-FC-P-1B, B Spent Fuel Cooling Pump, can be started from Unit ___(2)___ vertical board.

A. (1) 1
(2) 1

B. (1) 2
(2) 2

C✓ (1) 1
(2) 2

D. (1) 2
(2) 1

Distractor analysis:

A. Incorrect. Plausible because the candidate must know that the SFP cooling pump controls are located on both units (A pump switch on Unit 1 and B pump switch on Unit 2) whereas the alarms are only on Unit 1.

B. Incorrect. Plausible because the candidate must know that the SFP cooling pump controls are located on both units (A pump switch on Unit 1 and B pump switch on Unit 2) whereas the alarms are only on Unit 1.

C. Correct.

D. Incorrect. Plausible because the candidate must know that the SFP cooling pump controls are located on both units (A pump switch on Unit 1 and B pump switch on Unit 2) whereas the alarms are only on Unit 1.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

033G2.2.3

Spent Fuel Pool Cooling System:

(multi-unit license) Knowledge of the design, procedural, and operational differences between units.

Technical References:

References provided to applicants: None

Learning Objective:

3755

List the following information associated with the spent fuel pool cooling pump components.

Normal power supply for each pump

3749

List the following information associated with the spent fuel pool

Means provided in the control room to determine abnormal spent fuel pool temperature

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

32. 63 - 035A4.02 001/RO/T2/G2/2.7/2.8/BANK//

A loss of Main and Auxiliary feed water has occurred on Unit 1

Reactor Coolant system bleed and feed has been established using 1-FR-H.1
"Response to loss of Secondary Heat Sink".

The following plant conditions exist:

- Core Exit Thermocouples are decreasing
- RCS Th's are reading 580°F
- S/G wide range levels are:
 - A = 12%
 - B = 5 %
 - C = 5 %

Auxiliary feedwater capability has just been restored

Which ONE of the following describes how AFW flow should be re-established?

- A. As quickly as possible at maximum available flow rate in order to mitigate the possibility of core damage.
- B. To only one generator at a time, at maximum available flow rate to confine any tube failures to one steam generator
- C. To only one generator at a time, and limit feed flow to 100 gpm to preclude thermal shock to the steam generators
- D. As quickly as possible with a total flow of > to 340 gpm so that RCS bleed and feed can be terminated.

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor Analysis

Conditions for a hot, dry steam generator are listed on 1-FR-H.1 "Response to loss of secondary heat sink" CAP page and is defined as:

Wide Range level < 13% [22%]

AND

RCS Hot leg temperature > 550 degrees

IF CETC's are decreasing then to prevent failure of the Steam Generator due to excessive thermal stress resulting from introduction of cold FW to the hot Steam Generator, feedwater flow is limited to 100gpm.

A) INCORRECT

As quickly as possible at maximum available flow rate in order to mitigate the possibility of core damage.

CETC's are decreasing then to prevent failure of the Steam Generator due to excessive thermal stress resulting from introduction of cold FW to the hot Steam Generator, feedwater flow is limited to 100gpm. Had CETC been increasing then feed flow is not limited and should be established at the maximum rate. If all SG's are hot/dry, flow FW flow should be introduced to only on SG at a time to limit excessive thermal stresses to one S/G

B) INCORRECT

To only one generator at a time, at maximum available flow rate to confine any tube failures to one steam generator

CETC's are decreasing so to prevent failure of the Steam Generator due to excessive thermal stress resulting from introduction of cold FW to the hot Steam Generator, feedwater flow is **limited to 100gpm**.

C) CORRECT

To only one generator at a time, and limit feed flow to 100gpm to preclude thermal shock to the steam generators

D) INCORRECT

As quickly as possible with a total flow of > to 340 gpm so that RCS bleed and feed can be terminated.

RCS feed and bleed termination is determined by having at least on S/G narrow range > 11% along with CETC's and Th temperatures decreasing. CETC's are decreasing so to prevent failure of the Steam Generator due to excessive thermal stress resulting from introduction of cold FW to the hot Steam Generator, feedwater flow is limited to 100gpm.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

035A4.02

Steam Generator System (S/GS)

Ability to manually operate and/or monitor in the control room:

Fill of dry Steam Generator

Technical References:

1-FR-H.1

References provided to applicants: None

Learning Objective:

U 11303 List the definition of hot,dry steam generator associated with restoration of feedwater flow during the response to a loss of secondary heat sink (1-FR-H.1)

U 11304 Explain concept associated with restoration of feedwater flow during the response to a loss of secondary heat sink (1-FR-H.1)

Given a set of plant conditions, evaluate 1-FR-H.1 in light of the following issues:

- Effect of a failure, malfunction, or loss of a related system or component on a system.
- Effect of a failure, malfunction, or loss of components in a system or related systems
- Impact on plant equipment
- Response if limits or setpoints associated with a system or its components have been exceeded
- Proper operator response to the condition as stated

Question Source: Bank

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.7

Comments:

Given the following conditions:

The "B" waterbox is being removed from service for leak repairs in accordance with 1-MOP-48.31, Main Condenser - B Waterbox.

The operator inadvertently closes 1-VP-3, Condenser To CN Air Ejector VP Isol Valve, for the "A" waterbox.

1-VP-4, Condenser To CN Air Ejector VP Isol Valve, for the "B" waterbox, remains open.

CW flow through the "B" waterbox is isolated per the MOP.

Which ONE of the choices below completes the following statements concerning the effect on air ejectors and condenser vacuum?

The ___(1)___ air ejector will become steam bound and vacuum will degrade in ___(2)___.

- A. (1) "A"
(2) "A" condenser only
- B. (1) "A"
(2) Both condensers
- C. (1) "B"
(2) "B" condenser only
- D. (1) "B"
(2) Both condensers

Distractor analysis:

The A air ejector takes suction from the A and B waterboxes which are located in the A condenser. The B air ejector takes suction from the C and D waterboxes which are located in the B condenser. The 2 air ejectors can be cross connected but the valve is closed during normal operations. When CW is isolated from the B waterbox, the A air ejector will start to draw steam into the line which blankets the air ejector and causes a loss of vacuum in both condensers due to the steam space connection between the two condensers. The candidate must know and understand the physical connections of the air ejectors with the waterboxes and determine the expected results of the valve misposition event.

- A. Incorrect. Plausible as noted above.
- B. Correct.
- C. Incorrect. Plausible as noted above.
- D. Incorrect. Plausible as noted above.

K/A:

055K3.01

Condenser Air Removal System (CARS)

Knowledge of the effect that a loss or malfunction of the CARS will have on the following:

Main condenser

Technical References:

1-MOP-48.31

11715-FM-72A sh. 1

References provided to applicants: None

Learning Objective:

4048

Explain how removing a condenser water box from service affects the following parameters. Main condenser pressure, if circulating water flow is secured prior to closing the affected water box's air ejector suction isolation valve

Question Source: Modified

Given the following conditions:

The "A" waterbox is being removed from service for leak repairs

The operator inadvertently closes 1-VP-4, "A" air ejector suction from "**B**" waterbox, instead of 1-VP-3, "A" air ejector suction from "**A**" waterbox

CW flow through "A" waterbox is isolated per the MOP

Which ONE of the following is correct concerning the affect of this on air ejectors and condenser vacuum?

A. "A" air ejector **only** will become steam-bound and vacuum will degrade in **both** "A" and "B" condensers.

B. "A" air ejector **only** will become steam-bound and vacuum will degrade in **only** "A" condenser.

C. "B" air ejector **only** will become steam-bound and vacuum will degrade in **only** "B" condenser.

D. "A" and "B" air ejectors will **both** become steam-bound and vacuum will degrade in **both** "A" and "B" condensers.

Question History: None

Question Cognitive Level:Comprehension/Analysis

10 CFR Part 55 Content:41.7

Comments:

During operation of the Boron Evaporators, the evaporator feed pumps take suction from the (1) and pressure is automatically maintained in the evaporators by controlling (2) flow through the evaporator overhead condenser.

- A✓ (1) Boron Recovery Tanks
(2) Component Cooling Water
- B. (1) Boron Recovery Test Tanks
(2) Component Cooling Water
- C. (1) Boron Recovery Tanks
(2) Chilled Water
- D. (1) Boron Recovery Test Tanks
(2) Chilled Water

Distractor analysis:

A. Correct.

B. Incorrect. First part is incorrect but is plausible because the boron evaporator distillate is discharged to the BRTTs. Second part is correct.

C. Incorrect. First part is correct. Second part is incorrect but is plausible because chilled water is used in the gas stripper system to cool the vent chillers.

D. Incorrect. First part is incorrect but is plausible because the boron evaporator distillate is discharged to the BRTTs. Second part is incorrect but is plausible because chilled water is used in the gas stripper system to cool the vent chillers.

K/A:

068A3.01

Liquid Radwaste System (LRS)

Ability to monitor automatic operation of the Liquid Radwaste System including:

Evaporator pressure control

Technical References:

0-OP-10.4

NCRODP - 42, Boron Recovery System

References provided to applicants: None

Learning Objective: None

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.7

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

33. 66 - G2.1.14 001/RO/T3//3.1/3.1/NEW//

In accordance with OP-AA-100, Conduct of Operations, which ONE of the operations below requires a Plant Announcement to be made prior to performing?

- A. Starting an auxiliary building supply fan
- B. Diverting letdown to the gas stripper
- C. Cross-connecting the 1A1 480 volt bus to the 1C2 480 volt bus
- D✓ Starting a LP Heater Drain Pump uncoupled

QUESTIONS REPORT
for RO Exam Jan Submittal

Distractor analysis:

OP-AA-100

Plant Announcements Standard

Operations personnel make plant announcements to alert personnel working in the plant of changing conditions.

Expectations

Starting or stopping plant equipment (Large 480 volt loads or greater)

Major plant equipment is defined as large 480 volt loads or greater that are operated from the Control Room. It is **NOT** expected that changes in running status be announced for minor loads such as process radiation monitor fans, sump pumps, Turbine Building vent fans, etc. SM/US discretion can be applied.

When starting or stopping plant equipment, Operations personnel will announce the planned activity with direction for plant personnel to stand clear of the equipment. For equipment with electrical switchgear 480 volts or greater, the announcement includes direction to stand clear of its associated electrical switchgear.

Changing radiological conditions

When ongoing activities have the potential to create changing radiological conditions, Operations personnel will announce the planned activity with direction that personnel stand clear of areas potentially impacted. A subsequent announcement will be made when normal area access is restored.

A. Incorrect but plausible because the aux bldg supply fans are 480 volt equipment operated from the control room but are not considered large enough to require announcement prior to starting as noted above.

B. Incorrect. Plausible because diverting letsown to the gas stripper will cause a change in radiological conditions but this only requires contacting the HP shift supervisor.

C. Incorrect. Plausible because cross connecting two 480 volt busses would be considered a large 480 volt load but this operation is performed locally in the switchgear room and an announcement is not required.

D. Correct. Even though the motor is disconnected from the pump it is still announced prior to starting.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

G2.1.14

Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.

Technical References:

OP-AA-100, Conduct of Operations

References provided to applicants: None

Learning Objective: None

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content: 41.10, 43.5

Comments:

Given the following conditions:

- Unit 2 is in Mode 6
- Core off-load is in progress
- A loss of vital AC bus 2-II occurs

Which of the following actions per T.S. and 2-AP-4.1 "Malfunction of SR instrumentation" should be performed?

- A. core off-load may continue provided redundant source range NI is operable
- B. core off-load may continue provided both gamma-metric neutron detectors are operable.
- C. Immediately suspend core off-load and any positive reactivity additions
- D. Immediately suspend any positive reactivity additions core off-load may continue

Distractor Analysis

Core Alteration is defined in Tech Specs as the movement of any fuel sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe condition.

2-AP-4.1 is the abnormal Procedure providing the guidelines for malfunction of source range nuclear instrumentation.

This requires the examinee to know that Core off-load meets the definition of a CORE ALTERATIONS, and that two source range instruments are required to be operable to ensure that redundant monitoring capability is available

A) INCORRECT

"Core off-load may continue provided redundant source range NI is operable"

Vital bus 2-II is the power source for Source Range instrument N-32. T.S. 3.9.3 Two source range neutron flux monitors shall be operable in Mode 6 and with one SR inoperable the required action is to suspend core alterations and suspend positive reactivity additions. Also step 3 and step 4 of 2-AP-4.1 repeat the required actions.

B) INCORRECT

"Core off-load may continue provided both gamma-metric neutron detectors are operable. Core off load mets the T.S. definition of Core Alterations and should be stopped immediately, Neither T.S. or 2-AP-4.1 allows Gama-Metrics be used as an alternate indication, also one channel of Gama-Metrics

C) CORRECT

"Immediately suspend core off-load and any positive reactivity additions"

As per T.S 3.9.3 and 2-AP-4.1

D) INCORRECT

"Immediately suspend any positive reactivity additions and core off-load my continue"
Core off load mets the T.S. definition of Core Alterations and should be stopped immediately

K/A:

G2.1.36

Knowledge of procedures and limitations involved in core alterations.

Technical References:

2-AP-4.1, Malfunction of Source Range Nuclear instrumentation

T.S. 3. 9.3, Nuclear Instrumentation

T.S. 3.9.3, Bases

2-OP-4.1 Controlling procedure for refueling

T.S. 1.1 Definitions

References provided to applicants: None

Learning Objective:

16310

Explain the following concepts associated with the nuclear instrumentation - mode 6 technical specification and bases (TS-3.9.3).

Limiting condition for operation

Applicability

Required actions

Question Source: Modified

Given the following conditions:

Unit 1 is in Mode 6.

Core off-load is in progress.

A loss of Vital Bus 1-I occurs.

Which ONE of the following lists required actions per Technical Specifications, and 1-AP-4.1, Malfunction of Source Range Nuclear Instrumentation?

A. Immediately suspend core alterations and any evolution that would dilute RCS boron concentration to below TS-3.9.1 requirements;

Verify audible Source-Range indication available in containment.

B. Core alterations and any evolution that would dilute RCS boron concentration to below TS-3.9.1 requirements may continue provided the redundant Source-Range NI is operable; Immediately initiate action to restore N-31 to operable.

C. Immediately suspend core alterations and any evolution that would dilute RCS boron concentration to below TS-3.9.1 requirements;

Place N-31 Level Trip switch in BYPASS.

D. Core alterations and any evolution that would dilute RCS boron concentration to below TS-3.9.1 requirements may continue provided the redundant Source-Range NI is operable; Within one hour, initiate action to restore N-31 to operable.

Question History: None

Question Cognitive Level:

10 CFR Part 55 Content: 41.10, 43.6

Comments:

In accordance with MA-AA-103, Conduct of Troubleshooting, how are these troubleshooting activities defined?

- (1) Clamp on ammeter readings
- (2) Lifting leads for voltmeter readings
- (3) Vibration diagnostic equipment readings
- (4) Temporary pressure gage connected to plant system

- A. (1) Intrusive (2) Intrusive (3) Nonintrusive (4) Intrusive
- B✓ (1) Nonintrusive (2) Intrusive (3) Nonintrusive (4) Intrusive
- C. (1) Nonintrusive (2) Intrusive (3) Intrusive (4) Nonintrusive
- D. (1) Nonintrusive (2) Nonintrusive (3) Nonintrusive (4) Intrusive

A Incorrect but is plausible as connecting temporary test gages is intrusive and clamp on ammeters could be considered intrusive.

B Correct. Per MA-AA-103 lifting leads and connecting temporary test gages are intrusive activities.

C Incorrect but is plausible as lifting leads is intrusive and connecting temporary test gages could be non intrusive as they are connected to existing test valves.

D Incorrect but is plausible as connecting gages is intrusive. And lifting leads for voltage readings could be non intrusive. A recent change to the trouble shooting procedure changed connecting voltmeters to a non intrusive activity but lifting leads for voltmeter readings is still

K/A:

G2.2.20

Knowledge of the process for managing troubleshooting activities.

Technical References:

MA-AA-103, Conduct of Troubleshooting

References provided to applicants: None

Learning Objective:

Question Source: Bank

Question History: Seabrook 2013

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.10, 43.5

Comments:

Given the following conditions:

- Unit 2 is at 50% power
- The 2H EDG has been declared inoperable due to mechanical failure

According to technical specifications, with one emergency diesel inoperable, 0-PT-80 , AC Sources operability verification must be performed ____ (1) ____ the operability declaration, and at least once per ____ (2) ____ hours thereafter.

A✓ (1) within one hour of
(2) 8

B. (1) immediately upon
(2) 8

C. (1) within one hour of
(2) 12

D. (1) immediately upon
(2) 12

Distractor Analysis

T.S. 3.8.1 AC Sources-Operating is required in Modes 1,2,3, and 4

(b) Two emergency diesel generators (EDGs) capable of supplying the onsite Class IE power distribution system,

To ensure a highly reliable power source remains with an inoperable EDG, it is necessary to verify the availability of the offsite circuits on a more frequent basis.

0-PT-80 "AC SOURCES OPERABILITY VERIFICATION" purpose is to provide instructions for verifying two qualified circuits between the offsite transmission network and the onsite Class IE AC electrical distribution system as required by SR 3.8.1.1

This requires the examinee to know how and when applicable actions associated with technical specifications should be applied.

A)Correct

Within one hour of; 8.

Condition B is entered for a inoperable EDG, to ensure a highly reliable power source remains with an ioperable EDG, it is necessary to verify the availability of the offsite circuits on a more frequent basis.

B) INCORRECT

immediately upon; 8

The requirement of T.S. 3.8.1 is to perform SR 8.8.1.1 for the required offsite circuits **within 1 hour and once per 8 hours thereafter**

C) INCORRECT

within one hour of; 12

The requirement of T.S. 3.8.1 is to perform SR 8.8.1.1 for the required offsite circuits within 1 hour and **once per 8 hours thereafter**

D) INCORRECT

immedately upon; 12

The requirement of T.S. 3.8.1 is to perform SR 8.8.1.1 for the required offsite circuits **within 1 hour and once per 8 hours thereafter**

K/A:

G2.2.40

Ability to apply Technical Specifications for a system.

Technical References:

T.S. 3.8.1

0-PT-80, AC Sources operability verification (Test Frequency)

TRM 3.8.1 Bases

11715-FE-1BB

References provided to applicants: None

Learning Objective:

16298

Explain the following concepts associated with the AC sources - operating technical specification and bases (TS-3.8.1).

- Accident/transient for which protection is afforded
- Limiting condition for operation
- Applicability
- Required actions
- Surveillance requirements

Question Source: Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.10, 43.2, 43.5

Comments:

In accordance with 1-OP-22.2, Operation of Low Level Waste Drain Tanks, which ONE of the choices below completes the following statements?

When the Low Level Liquid Waste Tanks (LLLWT) are aligned for Continuous Discharge (Sampling Not Required) the contents are sampled ___(1)___.

When the LLLWTs are aligned for Normal Fill and Discharge (Sampling Required) and the radioactivity in the LLLWT is too high to release, then the contents are transferred to the ___(2)___.

- A✓ (1) Weekly
(2) High Level Liquid Waste Tanks
- B. (1) Daily
(2) High Level Liquid Waste Tanks
- C. (1) Weekly
(2) Clarifier Hold up tanks
- D. (1) Daily
(2) Clarifier Hold up tanks

Distractor Analysis:

A. Correct.

A. Incorrect. First part incorrect but is plausible since daily samples would be logical for releasing liquid waste. Second part is correct.

C. Incorrect. First part is correct. Second part is incorrect but plausible since the LLLWTs are normally pumped to the clarifier when radiation levels are low enough. Requires candidate to know the normal method of discharging a LLLWT with high activity.

D. Incorrect. First part incorrect but is plausible since daily samples would be logical for releasing liquid waste. Second part also incorrect but plausible since the LLLWTs are normally pumped to the clarifier when radiation levels are low enough. Requires candidate to know the normal method of discharging a LLLWT with high activity.

K/A:

G2.3.11

Ability to control radiation releases.

Technical References: 1-AP-13, Loss of one or more circulating water pumps

References provided to applicants: None

Learning Objective:

Objective 11410

Explain the purpose of the following high-level action steps associated with 1-AP-13

Question Source: BANK

Question History:North Anna 2010 Exam

Question Cognitive Level: Memory

10 CFR Part 55 Content:

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

34. 71 - G2.3.12 001/RO/T3//3.2/3.7/BANK//

An operator has received a skin dose of 15 Rem this year.

Which ONE of the following identifies the maximum additional exposure to the skin that could be received this year without exceeding 10 CFR 20 dose limits?

- A. 60 Rem
- B. 0 Rem
- C. Worker has already exceeded the limit.
- D. 35 Rem

Distractor Analysis:

- A. Incorrect. Plausible because the total dose would be 75 rem which is the limit for non-lifesaving emergency dose.
- B. Incorrect. Plausible because 15 rem is the limit for lens of the eye.
- C. Incorrect. Plausible because the limit for TEDE has been exceeded.
- D. Correct. The limit for annual skin dose is 50 rem.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

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.

Technical References:

10CFR20

VPAP-2101 - Radiation Protection Program

References provided to applicants: None

Learning Objective:

13583

List the following information associated with the radiation protection program (VPAP-2102)

- 10CFR20 dose limits

Question Source: Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.12

Comments:

An operator is entering the Auxiliary building to verify a tag out on a CC pump. The proper dosimetry has been obtained prior to entering the Radiological Controlled Area (RCA).

Which ONE of the following lists the types of radiation that is detected by an electronic Digital Alarming Dosimeter (DAD)?

- A✓ Gamma only
- B. Beta and Gamma only
- C. Gamma and Neutron only
- D. Beta, Gamma and Neutron

Distractor Analysis:

A. Correct. DADs detect only gamma radiation.

B. Incorrect. Plausible since the candidate must remember that there is no Beta window on a DAD.

C. Incorrect. Plausible since the candidate must remember that there is no neutron detector on a DAD.

D. Incorrect. Plausible since a TLD detects Beta, Gamma and Neutron radiation.

K/A:

G2.3.15

Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

Technical References:

Nuclear Employee Training

References provided to applicants: None

Learning Objective:

Question Source: New

Question History:

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.12/43.4

Comments:

Which ONE of the choices below completes the following statements in accordance with OP-AP-104, Emergency and Abnormal Operating Procedures?

A Continuous Action Step is marked with ____ (1) ____

AND

Unless stated otherwise, ____ (2) ____.

- A. (1) Brackets ([])
(2) NOTES and CAUTIONS at the beginning of a procedure apply throughout the procedure.
- B. (1) an Asterisk (*)
(2) NOTES and CAUTIONS at the beginning of a procedure apply throughout the procedure.
- C. (1) Brackets ([])
(2) NOTES apply to all subsequent steps, whereas CAUTIONS apply only to the step they precede.
- D. (1) an Asterisk (*)
(2) NOTES apply to all subsequent steps, whereas CAUTIONS apply only to the step they precede.

Distractor Analysis:

- A. Incorrect. Plausible because Brackets denote immediate operator action step.
- B. Correct.
- C. Incorrect. Plausible because Brackets denote immediate operator action steps and candidate must know when Notes and Cautions are applicable.
- D. Incorrect. Plausible because candidate must know when Notes and Cautions are applicable.

K/A:

G2.4.14

Knowledge of general guidelines for EOP usage.

Technical References:

OP-AP-104, Emergency and Abnormal Operating Procedures

References provided to applicants: None

Learning Objective:

12115

List the following information concerning the emergency response guideline procedures.

- Type of information provided on procedure cover sheet
- Type of information conveyed by a note
- Type of information conveyed by a caution
- How the immediate operator actions are identified
- How the immediate operator actions are intended to be performed

12447

Explain the following concepts concerning emergency response guideline procedure usage.

- How continuous action steps are identified

Question Source: Bank

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content:41.10

Comments:

Which ONE of the choices below completes the following statements In accordance with TR 7.3, Fire Brigade.

A Fire Brigade of at least ___(1)___ members shall be maintained onsite

AND

The Fire Brigade Scene Leader and at least ___(2)___ brigade members shall have sufficient knowledge of safety-related systems to understand the effects of the fire and fire suppressants on safe shutdown capability.

- A. (1) 4
(2) 1
- B. (1) 4
(2) 2
- C. (1) 5
(2) 1
- D. (1) 5
(2) 2

Distractor analysis:

TR 7.3 A Fire Brigade of at least 5 members shall be maintained onsite.

NOTES

1. The Fire Brigade Scene Leader and at least two brigade members shall have sufficient training in or knowledge of safety-related systems to understand the effects of fire and fire suppressants on safe shutdown capability.
2. The Fire Brigade shall not include the minimum shift crew required by Technical Specification Section 5.2.2 or any personnel required for other essential functions during a fire emergency.

A. Incorrect. First part is incorrect but plausible because the fire brigade is comprised of 1 scene leader and 4 brigade team members. Second part is incorrect but plausible.

B. Incorrect. First part is incorrect but plausible because the fire brigade is comprised of 1 scene leader and 4 brigade team members. Second part is correct.

C. Incorrect. First part is correct. Second part is incorrect but plausible.

D. Correct.

K/A:

G2.4.26

Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage.

Technical References:

T.R. 7.3, Fire Brigade

References provided to applicants: None

Learning Objective:

17538

Explain the following concepts associated with the Fire Brigade technical requirement and bases (TR-7.3)

Question Source: New

Question History: None

Question Cognitive Level: Memory

10 CFR Part 55 Content: 41.10, 43.5

Comments:

QUESTIONS REPORT
for RO Exam Jan Submittal

35. 75 - G2.4.39 001/RO/T3//3.9/3.8/NEW//

Given the following:

- A large break LOCA occurred.
- A Site Area Emergency was declared.
- The 15 minute average wind direction displayed on PCS is 480°.
- You are assigned the duties of State and Local Communicator

In accordance with EPIP-2.01, Notification of State and Local Governments, which ONE of the choices below completes the following statements?

The wind direction is the direction that the wind is ____ (1) ____

AND

The wind direction that will be reported is ____ (2) ____.

- A. (1) coming from
(2) 480°
- B✓ (1) coming from
(2) 120°
- C. (1) going to
(2) 480°
- D. (1) going to
(2) 120°

Distractor analysis:

A. Incorrect. First part is correct. Second part is incorrect but is plausible the range on the MET tower wind direction is 0° - 540° to prevent the direction from jumping back and forth on the chart when the direction is oscillating from the north. The candidate must know to subtract 360 from any reading over 360°.

B. Correct.

C. Incorrect. First part is incorrect but plausible because the protected sectors given for a PAR are in the direction that the wind is going to. Second part is incorrect but is plausible the range on the MET tower wind direction is 0° - 540° to prevent the direction from jumping back and forth on the chart when the direction is oscillating from the north. The candidate must know to subtract 360 from any reading over 360°.

D. Incorrect. First part is incorrect but plausible because the protected sectors given for a PAR are in the direction that the wind is going to. Second part is correct.

QUESTIONS REPORT
for RO Exam Jan Submittal

K/A:

G2.4.39

Knowledge of RO responsibilities in emergency plan implementation.

Technical References:

EPIP-2.01, Notification of State and Local Governments

References provided to applicants: None

Learning Objective:

Question Source: New

Question History: None

Question Cognitive Level: Comprehension/Analysis

10 CFR Part 55 Content:41.10

Comments: