

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

1

ID: 2037559

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- Large Break LOCA at 1000
- RCS pressure lowers to 57 PSIA at 1005
- Operator actions to prepare for RAS are completed at 1035
- RAS is verified at 1040

Which ONE of the following are:

1. The Safety Injection (SI) pumps providing the majority of flow to maintain RCS inventory at 1005 and;
2. The SI pumps providing the majority of flow to maintain RCS inventory at 1045?
 - A. 1. 11 and 12 LPSI Pumps at 1005;
2. 11 and 13 HPSI Pumps at 1045.
 - B. 1. 11 and 12 LPSI Pumps at 1005;
2. 11 and 12 LPSI Pumps at 1045.
 - C. 1. 11, 12, and 13 HPSI Pumps at 1005;
2. 11 and 12 LPSI Pumps at 1045.
 - D. 1. 11, 12, and 13 HPSI Pumps at 1005;
2. 11 and 13 HPSI Pumps at 1045.

Answer: A

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EXAM KEY

Answer Explanation

A. Correct-Per EOP-5 Technical Basis, for Large Break LOCA, inventory control is initially regained through the injection of water by the Safety Injection Tanks and the LPSI pumps. With an RCS pressure of 57 PSIA, LPSI flow will be ~6000 GPM while HPSI flow will be ~1400 GPM. Once RAS is approaching, Operator actions are taken to secure the LPSI pumps. If not completed and RAS occurs, the LPSI pumps will automatically trip. RCS inventory will then rely on 11 and 13 HPSI Pumps, taking suction from the Containment Sump, with flow throttled to maintain the required flowrates of EOP-5.

B. Incorrect-Per EOP-5 Technical Basis, for Large Break LOCA, inventory control is initially regained through the injection of water by the Safety Injection Tanks and the LPSI pumps. 11/12 LPSI Pumps as the main source of RCS makeup after the RAS is plausible if the Operator only concentrates on the actions associated with the HPSI pumps, which is to lower flow to prevent cavitation when taking suction from the Containment Sump. However, when RAS occurs, the LPSI pumps are secured. The only procedures that allow LPSI Pumps to take suction from the Containment Sump are AOP-3B and ERPIP procedures.

C. Incorrect-11/12/13 HPSI Pumps as the main source of initial RCS makeup is plausible if three Safety Injection Pump flow from the HPSI is considered higher than the flow from just two LPSI pumps. However, the only time 3 HPSI pumps are started is in EOP-3 in preparation for OTCC, not in EOP-5. In EOP-5, only two HPSI pumps are verified in operation. 11/12 LPSI Pumps as the main source of RCS makeup after the RAS is plausible if the Operator only concentrates on the actions associated with the HPSI pumps, which is to lower flow to prevent cavitation when taking suction from the Containment Sump. However, when RAS occurs, the LPSI pumps are secured. The only procedures that allow LPSI Pumps to take suction from the Containment Sump are AOP-3B and ERPIP procedures.

D. Incorrect-11/12/13 HPSI Pumps as the main source of initial RCS makeup is plausible if three Safety Injection Pump flow from the HPSI is considered higher than the flow from just two LPSI pumps. However, the only time 3 HPSI pumps are started is in EOP-3 in preparation for OTCC, not in EOP-5. In EOP-5, only two HPSI pumps are verified in operation. Once RAS is approaching, Operator actions are taken to secure the LPSI pumps. If not completed and RAS occurs, the LPSI pumps will automatically trip. RCS inventory will then rely on 11 and 13 HPSI Pumps, taking suction from the Containment Sump, with flow throttled to maintain the required flowrates of EOP-5.

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EXAM KEY

Tier/Group

1/1

K/A Info

011EK2.02

011 Large Break LOCA

EK2 Knowledge of the interrelations between the Large Break LOCA and the following:

EK2.02 Pumps

RO Importance

2.6

Technical References

EOP-5 Technical Basis (Rev 31)

EOP-5 (Rev 29)

References Provided to Applicants

None

Learning Objective

Given RCS parameters identify appropriate Safety Injection system response.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

2

ID: 2038784

Points: 1.00

Both Units are operating at 100% when the following transient occurs:

- All Unit-1 Annunciator lights go dark with exception of Status Panels
- All Unit-2 Annunciator lights remain energized
- Only the Control Board indications and the PPC are available to monitor Unit-1 from the Control Room

Which ONE of the following is the cause of the transient?

- A. 11 DC Bus is lost.
- B. 12 DC Bus is lost.
- C. 21 DC Bus is lost.
- D. 22 DC Bus is lost.

Answer: C

Answer Explanation

A. Incorrect-11 DC Bus is plausible since this will result in Unit-2 Annunciation loss. However, per AOP-7J, loss of 21 DC bus will cause loss of Unit-1 annunciators.

B. Incorrect-12 DC Bus is plausible if loads from 21 and 12 DC bus are swapped. However, per AOP-7J, loss of 21 DC bus will cause loss of Unit-1 annunciators.

C. Correct-Per AOP-7J, loss of 21 DC bus will cause loss of Unit-1 annunciator lights.

D. Incorrect-22 DC Bus is plausible if loads from 22 and 21 DC bus are swapped. However, per AOP-7J, loss of 21 DC bus will cause loss of Unit-1 annunciators.

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EXAM KEY

Tier/Group

1/1

K/A Info

058AA2.03

058 Loss of DC Power

AA2. Ability to determine and interpret the following as they apply to the Loss of DC Power:

AA2.03 DC loads lost; impact on ability to operate and monitor plant systems

RO Importance

3.5

Technical References

AOP-7J-1 (Rev 24)

References Provided to Applicants

None

Learning Objective

Given a loss of 125 volt DC bus 11 or 21, determine the effect on unit 1 and unit 2 and recall the immediate operator actions

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

3

ID: 2039230

Points: 1.00

Which ONE of the following are the power supplies to 12 CCW Pump and the normal electrical alignment of 13 CCW Pump?

- A. 12 CCW Pump-14A 480V Bus;
13 CCW Pump normally electrically aligned to "A" Train.
- B. 12 CCW Pump-24A 480V Bus;
13 CCW Pump normally electrically aligned to "A" Train.
- C. 12 CCW Pump-14A 480V Bus;
13 CCW Pump normally electrically aligned to "B" Train.
- D. 12 CCW Pump-24A 480V Bus;
13 CCW Pump normally electrically aligned to "B" Train.

Answer: C

Answer Explanation

A. Incorrect-13 CCW pump normally aligned to "A" train is plausible since this is normal swing pump alignment for Charging Pumps.

B. Incorrect-12 CCW pump powered from 24A 480V bus is plausible since this is power supply for other 480V pump on 1C13, the 12 SFP Cooling Pump. 13 CCW pump normally aligned to "A" train is plausible since this is normal swing pump alignment for Charging Pumps.

C. Correct-Per OI-27D-2, 12 CCW Pump is powered from 14A 480V Load Center. Per OI-16 and OI-27D, the preferred lineup for 13 CCW pump is the 14B 480 Bus, or "B" train.

D. Incorrect-12 CCW pump powered from 24A 480V bus is plausible since this is power supply for other 480V pump on 1C13, the 12 SFP Cooling Pump.

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EXAM KEY

Tier/Group

2/1

K/A Info

003K2.02

003 Reactor Coolant Pump System (RCPS)

K2 Knowledge of bus power supplies to the following:

K2.02 CCW pumps

RO Importance

2.5

Technical References

OI-16, Component Cooling System (Rev 35)

OI-27D-2, Station Power 480 Volt System Breaker Lineup (Rev 19)

References Provided to Applicants

None

Learning Objective

Identify the power supplies for the CCW pumps

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

4

ID: 2039726

Points: 1.00

Unit-1 is operating at 100% power.

Which ONE of the following conditions, considered separately, will result in a loss of power to one or more Containment Air Coolers?

Condition 1-Loss of MCC-114

Condition 2-Loss of 11A 480V Bus

Condition 3-Loss of 12B 480V Bus

Condition 4-Loss of 14 4KV Bus

- A. Conditions 1, 2, 3, AND, 4.
- B. Conditions 2 and 3 ONLY.
- C. Conditions 2 and 4 ONLY.
- D. Condition 4 ONLY.

Answer: C

Answer Explanation

A. Incorrect-Condition 1 is plausible since MCC-114 supplies multiple ventilation components. However, the CAC fans are powered from 480V load centers. Condition 3 is plausible since this is a 480V load center powering a CEDM ventilation unit. However, CAC fans are powered from SR 480V load centers.

B. Incorrect-Condition 3 is plausible since this is a 480V load center powering a CEDM ventilation unit. However, CAC fans are powered from SR 480V load centers.

C. Correct-11 CAC is powered from 11A 480V bus, 12 from 11B, 13 from 14A, and 14 from 14B. 11 CAC would lose power due to Condition 2 and both 13/14 would lose power when 14 4KV bus is lost.

D. Incorrect-Not including Condition 2 is plausible if both 11/12 CACs are believed to be powered from the 11B 480V bus.

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EXAM KEY

Tier/Group

2/1

K/A Info

022K2.01

022 Containment Cooling System (CCS)

K2 Knowledge of power supplies to the following:

K2.01 Containment cooling fans

RO Importance

3.0

Technical References

OI-27D-2, Station Power 480 Volt System Breaker Lineup (Rev 19)

References Provided to Applicants

None

Learning Objective

Recall the power supplies for the Containment Spray Pps and Containment Air Coolers (CACs)

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

5

ID: 2058629

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- Reactor trip
- Turbine Stop MSV 2 fails to shut
- Turbine Control Valve CV 4 fails to shut

Which ONE of the following ESFAS actuations, if any, could occur if the MSIVs are not shut?

- A. SGIS ONLY.
- B. No ESFAS actuations.
- C. SGIS AND 11 STM LINE RUPTURE.
- D. SGIS AND 12 STM LINE RUPTURE.

Answer: A

Answer Explanation

A. Correct-Based on simulator, with MSV 2 and CV 4 open, there is a steaming path through the Main Turbine which will cause an excessive steam demand once the reactor trips. If the MSIVs are not shut, SG pressure will lower and result in a SGIS.

B. Incorrect-No actuations is plausible if MSV 2 and CV 4 are believed to be in different flowpaths, where steam would not flow through the turbine. However, all piping downstream of the SVs is cross connected and any CV failing open would result in an uncontrolled cooldown.

C. Incorrect-Including 11 STM LINE RUPTURE is plausible if MSVs 1-2 are believed to be piped from 11 SG and MSVs 3-4 from 12 SG. However, both SGs provide a steam source to MSV 2.

D. Incorrect-Including 12 STM LINE RUPTURE is plausible if CV 1-2 are believed to be piped from 11 SG and CVs 3-4 from 12 SG. However, both SGs provide a steam source to CV4.

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EXAM KEY

Tier/Group

2/2

K/A Info

045K3.01

045 Main Turbine Generator (MT/G) System

K3 Knowledge of the effect that a loss or malfunction of the MT/G system will have on the following:

K3.01 Remainder of the plant

RO Importance

2.9

Technical References

EOP-0 Technical Bases (Rev 21)

References Provided to Applicants

None

Learning Objective

Recall how a Unit 1 and Unit 2 Turbine trip are verified

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

6

ID: 2039311

Points: 1.00

Unit-1 is operating in Mode 3 with the following initial condition:

- RCS pressure is 2000 PSIA and steady

The following transient occurs:

- Quench Tank (QT) pressure rises above normal
- QT level rises above normal
- Leakage source into QT is isolated

Which ONE of the following actions are preferred to restore QT parameters to normal per OI-1B, Quench Tank Operations?

- A. Drain the QT to the Reactor Coolant Drain Tank and;
Vent the QT to the Containment.
- B. Drain the QT to the Reactor Coolant Drain Tank and;
Vent the QT to the Waste Gas System.
- C. Drain the QT to the Containment sump and;
Vent the QT to the Containment.
- D. Drain the QT to the Containment sump and;
Vent the QT to the Waste Gas System.

Answer: B

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EXAM KEY

Answer Explanation

A. Incorrect-Venting QT to containment plausible since this can be done at lower RCS pressure < 50 PSIA. However, QT is normally vented to WG system. Operator may view venting to containment as preferred since Rgas would remain in containment and not raise WG discharge volumes, but preferred method is to vent QT to the WG system.

B. Correct-Per OI-1B, QT is drained to the RCDT and filled with DI for level control. Normal level in the QT is ~28". Per OI-1B, normal pressure is 3 PSIG. Pressure would be lowered by venting the QT to the WG system.

C. Incorrect-Draining the QT to the sump is plausible since this is a method to drain the RCDT, which the QT is pumped to. However, the QT does not have a direct pathway to the containment sump. Venting QT to containment plausible since this can be done at lower RCS pressure < 50 PSIA. However, QT is normally vented to WG system. Operator may view venting to containment as preferred since Rgas would remain in containment and not raise WG discharge volumes, but preferred method is to vent QT to the WG system.

D. Incorrect-Draining the QT to the sump is plausible since this is a method to drain the RCDT, which the QT is pumped to. However, the QT does not have a direct pathway to the containment sump.

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EXAM KEY

Tier/Group

2/1

K/A Info

007G2.1.20

007 Pressurizer Relief Tank/Quench Tank System (PRTS)

G2.1.20 Ability to interpret and execute procedure steps.

RO Importance

4.6

Technical References

1C06-ALM, RCS Control Alarm Manual (Rev 51)

OI-1B, Quench Tank Operations (Rev 17)

References Provided to Applicants

None

Learning Objective

Determine RCS PORV/SV leakage or position

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

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EXAM KEY

7

ID: 2038679

Points: 1.00

Unit-2 is operating in Mode 5 with the following initial condition:

- Shutdown Cooling in service
- 21 LPSI running with a flow of 3000 GPM
- RCS temperature is 105°F

The following transient occurs:

- S/D COOLING TEMP CONTR valve, 2-SI-657-CV, fails shut
- RCS temperatures start to rise

Which of the following temperature indications should also show a rise?

Indication 1 - Core Exit Thermocouples

Indication 2 - Shutdown Cooling Temperature Recorder (TR-351)

Indication 3 - Component Cooling HX Outlet Temperatures (TIA-3824/3826)

- A. Indication 1 **ONLY**.
- B. Indications 1, 2, **AND** 3.
- C. Indications 1 and 2 **ONLY**.
- D. Indications 2 and 3 **ONLY**.

Answer: C

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EXAM KEY

Answer Explanation

A. Incorrect- Indication 1 (CETs) only is plausible if Operator determines SDC flow is lost rather than just loss of SDC cooling. OP-7 directs that CETs be used as RCS temperature indication on natural circ.

B. Incorrect-Including Indication 3 (CCW HX Outlet TI) is plausible if Operator believes RCS heating up will heat up the SDC HX, which are cooled by CCW, and ultimately result in CCHX temperatures rising. However, when 657-CV shuts, SDC HX are no longer removing any heat and the heat sink of the SDC HX, CCW, will no longer be absorbing heat from the SDC HX. Therefore, CCHX temperatures will either stay the same due to the CCHX temperature control or start to lower due to loss of heat input.

C. Correct-When SI-657-CV shuts, SDC flow is isolated through the SDC HXs. The RCS will continue to circulate through the vessel and through the SDC system at 3000 GPM, but there will be no flow through a heat sink. This will cause the RCS to start heating up. Any temperature indication that has flow passing by it will start to rise as the RCS begins to heat up. CETs and TR-351 will all show a rising trend. 22 SDC HX outlet temperature will not show a rising trend as the flow will have been isolated through the SDC HX by SI-657 closing.

D. Incorrect-Excluding Indication 1 (CETs) is plausible if the Operator confuses the indication used to track heatup and cooldown rates with indications that will also trend with RCS conditions. With SDC in service, OP-7 directs that TR-351 be used. However, the CETs will trend with TR-351 as the RCS heats ups. Including Indication 3 (CCW HX Outlet TI) is plausible if Operator believes RCS heating up will heat up the SDC HX, which are cooled by CCW, and ultimately result in CCHX temperatures rising. However, when 657-CV shuts, SDC HX are no longer removing any heat and the heat sink of the SDC HX, CCW, will no longer be absorbing heat from the SDC HX. Therefore, CCHX temperatures will either stay the same due to the CCHX temperature control or start to lower due to loss of heat input.

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EXAM KEY

Tier/Group

1/1

K/A Info

025AA1.12

025 Loss of Residual Heat Removal System (RHRS)

AA1. Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System:

AA1.12 RCS temperature indicators

RO Importance

3.6

Technical References

Drawing 84311 (Rev 15)

References Provided to Applicants

None

Learning Objective

Given plant conditions resulting in a loss of shutdown cooling, determine the required actions to maintain plant parameters within desired limits IAW with AOP-3B.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

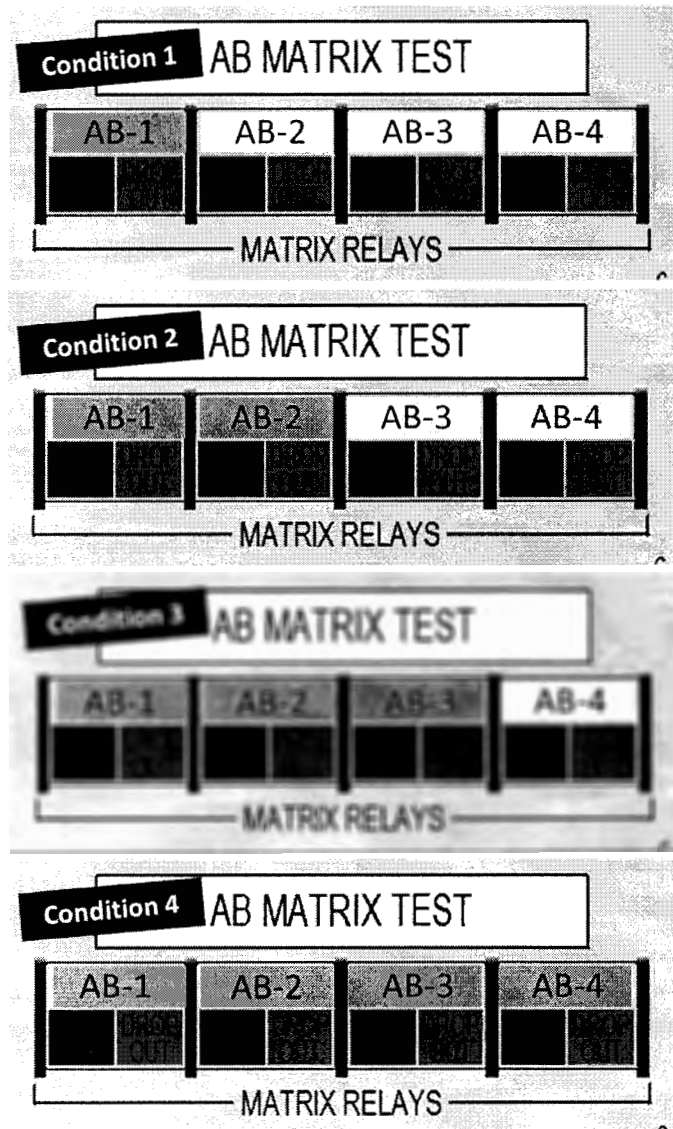
8

ID: 2037471

Points: 1.00

Unit-1 is operating at 100%.

Which ONE of the following RPS Channel "A" Matrix Relay conditions will result in a reactor trip?



- A. Conditions 2, 3, and 4 **ONLY**.
- B. Conditions 1, 2, 3, **AND** 4.
- C. Conditions 3 and 4 **ONLY**.

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EXAM KEY

D. Condition 4 **ONLY**.

Answer: C

Answer Explanation

A. Incorrect-Condition 2 is plausible since this will result in the opening of 4 TCBs and Operator believes opening of any 4 TCBs will result in a reactor trip. However, with only AB-3/AB-4 deenergized, Trip Paths relays K1 and K2 will remain energized and allow the MG sets to supply power for the CEDMs.

B. Incorrect-All conditions is plausible if the Operator believes one matrix relay being deenergized means all the A-B logic matrices is deenergized, which would open all of the TCBs.

C. Correct-The reactor will trip when at least 4 TCBs in parallel open to secure power to the CEDM Coils. There are four matrix relay lights for each of the six logic matrices. Any one matrix relay light out on the left two lights (AB-1/AB-2) along with any one matrix light out on the right two lights (AB-3/AB-4) will result in 4 TCBs opening to cause a reactor trip.

D. Incorrect-Condition 4 only is plausible if Operator believes all 8 TCBs must open to yield a reactor trip. However, Condition 3 would also result in a trip condition as well.

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EXAM KEY

Tier/Group
1/1

K/A Info

007EK2.02

007 Reactor Trip

EK2 Knowledge of the interrelations between a reactor trip and the following:

EK2.02 Breakers, relays and disconnects

RO Importance

2.6

Technical References

USFAR Chapter 7 (Rev 49)

References Provided to Applicants

None

Learning Objective

Recall the RPS response to a Trip Signal, including:

- Trip Units
- Logic Matrices
- Trip Paths
- TCBs

Question Source

Bank

Question History

Not used on a NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

9

ID: 2037515

Points: 1.00

Unit-2 is operating in Mode 3 with the following initial conditions:

- RCS pressure is 620 PSIA
- PZR level is 160"
- Quench Tank pressure is 5 PSIG

The following transient occurs:

- PORV-402 partially opens

Which ONE of the following is:

1. The initial **MAXIMUM** downstream temperature of the PORV and;
2. Why is the PORV downstream temperature so much lower than the Pressurizer temperature?
 - A.
 1. ~225°F
 2. Leakage past the PORV flashes to steam resulting in a higher velocity and a higher heat transfer coefficient
 - B.
 1. ~320°F
 2. Leakage past the PORV flashes to steam resulting in a higher velocity and a higher heat transfer coefficient
 - C.
 1. ~225°F
 2. Leakage past the PORV acts thermodynamically like a throttle valve
 - D.
 1. ~320°F
 2. Leakage past the PORV acts thermodynamically like a throttle valve

Answer: D

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EXAM KEY

Answer Explanation

A. Incorrect-A maximum downstream temperature of 225F is plausible if saturated conditions are assumed to exist on the discharge of the PORV like exist on the inlet of the PORV. Water flashing to steam and resulting in a higher velocity is plausible since this would be condition for an RCS leak in these conditions. However, the PORVs at the top of the PZR are exposed to a steam environment until the PZR reaches solid conditions.

B. Incorrect-Water flashing to steam and resulting in a higher velocity is plausible since this would be condition for an RCS leak in these conditions. However, the PORVs at the top of the PZR are exposed to a steam environment until the PZR reaches solid conditions.

C. Incorrect-A maximum downstream temperature of 225F is plausible if saturated conditions are assumed to exist on the discharge of the PORV like exist on the inlet of the PORV.

D. Correct-Leakage past a PORV is thermodynamically similar to flow through a throttle valve. The throttling process is isenthalpic (enthalpy is constant.) For a RCS pressure of 620 PSIA, the PZR steam space enthalpy would be 1203 BTU/lb. With a PORV discharge pressure of 20 PSIA (QT of 5 PSIG), the discharge conditions with an enthalpy of 1203 BUT/lb at 20 PSIA would be superheated at a temperature of ~320F.

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EXAM KEY

Tier/Group

1/1

K/A Info

008AK3.02

008 Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

AK3. Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident:

AK3.02 Why PORV or code safety exit temperature is below RCS or PZR temperature

RO Importance

3.6

Technical References

Steam Tables

References Provided to Applicants

Steam Tables (with Mollier Diagram)

Learning Objective

Determine exit conditions for a throttling process.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

10

ID: 2037558

Points: 1.00

A Small Break Loss of Coolant Accident has occurred.

Which ONE of the following are:

1. The operational implications if natural circulation is established instead of maintaining forced circulation and;
 2. What are the consequences if reflux boiling is established as the heat removal method?
-
- A.
 1. Main PZR spray will not be available;
 2. SGs can no longer remove any heat.
 - B.
 1. Main PZR spray will not be available;
 2. RCS inventory will be below the top of the hot leg.
 - C.
 1. Allowable cooldown rate is lower, increasing time until SDC can be established;
 2. SGs can no longer remove any heat.
 - D.
 1. Allowable cooldown rate is lower, increasing time until SDC can be established;
 2. RCS inventory will be below the top of the hot leg.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Per EOP-5, Loss of Coolant Accident, with no RCPs in operation, Main PZR spray is not available. SGs not available as a heat sink is plausible to the Operator if they believe boiling in the core is the only heat transfer mechanism occurring during reflux boiling. During reflux boiling, RCS level will be below the top of the hot leg to allow the reflux process to occur. Steam leaving the core is condensed in the SG U-Tubes and that condensate then travels back to the core via the hot leg to repeat the heat removal process.

B. Correct-Per EOP-5, with no RCPs in operation, Main PZR spray is not available. During reflux boiling, RCS level will be below the top of the hot leg to allow the reflux process to occur. Steam leaving the core is condensed in the SG U-Tubes and that condensate then travels back to the core via the hot leg to repeat the heat removal process.

C. Incorrect-A lower cooldown rate is plausible to the Operator since EOP-6, Steam Generator Tube Rupture, cooldown rate limits are lower when on natural circulation (35°F/hr when on natural circulation.) During a natural circulation cooldown in EOP-5, the allowable cooldown rate is the same for both natural and forced circulation (<100°F/hr.) SGs not available as a heat sink is plausible to the Operator if they believe boiling in the core is the only heat transfer mechanism occurring during reflux boiling. During reflux boiling, RCS level will be below the top of the hot leg to allow the reflux process to occur. Steam leaving the core is condensed in the SG U-Tubes and that condensate then travels back to the core via the hot leg to repeat the heat removal process.

D. Incorrect-A lower cooldown rate is plausible to the Operator since EOP-6 cooldown rate limits are lower when on natural circulation (35°F/hr when on natural circulation.) During a natural circulation cooldown in EOP-5, the allowable cooldown rate is the same for both natural and forced circulation (<100°F/hr.) During reflux boiling, RCS level will be below the top of the hot leg to allow the reflux process to occur. Steam leaving the core is condensed in the SG U-Tubes and that condensate then travels back to the core via the hot leg to repeat the heat removal process.

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EXAM KEY

Tier/Group

1/1

K/A Info

009EK1.01

EPE 009 Small Break LOCA

EK1 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA

EK1.01 Natural circulation and cooling, including reflux boiling

RO Importance

4.2

Technical References

EOP-5, Loss of Coolant Accident (Rev 29)

EOP-6, Steam Generator Tube Rupture (Rev 19)

EOP-5 Technical Basis Document (Rev 31)

References Provided to Applicants

None

Learning Objective

Identify the core heat removal mechanisms for a large or small break LOCA

Question Source

Bank

Question History

Last used on 2016 NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(2)

Comments

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CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

11

ID: 2037567

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- Reactor trip due to a Main Generator malfunction at 1300
- RCS temperature is being maintained at 532°F at 1305
- PZR level returns to 160" at 1312
- RCS pressure returns to NOP at 1315

At 1315, the RCPs are manually tripped due to a Component Cooling Water malfunction.

Which ONE of the following are the operational implications as natural circulation conditions are established?

- A. RCS pressure will rise and could approach the PORV lift setpoint if no Operator actions are taken.
- B. 1C06 RCS Loop Thot and Tcold temperatures cannot be used to verify natural circulation.
- C. All ADVs and all TBVs will full open as Tavg rises, causing temperature to rapidly lower.
- D. PZR level will rise rapidly because of voids forming in the Reactor Vessel Head.

Answer: A

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EXAM KEY

Answer Explanation

A. Correct-When natural circulation is being established, a thermal driving head will be established with T_{hot} rising and T_{cold} staying approximately the same. T_{hot} will rise 20-25F higher than T_{cold} . This will result in PZR level rising and PZR pressure rising. Simulator runs indicate that pressure could rise up to 150 PSIA. With the RCS at NOP (pressure of 2250 PSIA), a pressure reaching 2400 (2250 + 150 PSIA) would cause the PORVs to open at 2385 PSIA.

B. Incorrect-1C06 temperature indications not capable of being used to verify natural circulation is plausible since the temperature of record (for determining cooldown and heatup limits) is shifted to the CETs during natural circulation. However, the T_{hot} and T_{cold} loop indications are still utilized to evaluate natural circulation effectiveness by verifying the DT is $< 50^{\circ}\text{F}$ and T_{hot} is trending with the CETs.

C. Incorrect-All ADVs and TBVs opening as T_{avg} rises is plausible since Quick Open occurs when T_{avg} is $> 557^{\circ}\text{F}$. Though T_{hot} may approach 557°F as Natural Circ is established at NOT, T_{ave} will be lower and the ADVs and the one TBV would begin to modulate open well before the Quick Open temperature was reached, preventing an uncontrolled cooldown.

D. Incorrect-Voids forming in the head are plausible since head voids are more likely to form in the top of the head when both natural circulation and RCS depressurization are occurring. With pressure at NOP, a void will not form in the RVH even with the reduced flowrates associated with natural circulation. The PZR level rise is due to T_{hot} rising as the thermal driving head is established, not due to the void expanding.

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EXAM KEY

Tier/Group

1/1

K/A Info

015AK1.01

015/017 Reactor Coolant Pump (RCP) Malfunctions

AK1. Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow):

AK1.01 Natural circulation in a nuclear reactor power plant

RO Importance

4.4

Technical References

UFSAR Chapter 14 (Rev 47)

References Provided to Applicants

None

Learning Objective

For a Loss of Forced Circulation (LOFC), from memory, recall core and plant parameters responses and how initial operating conditions affect the severity of a LOFC event

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

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EXAM KEY

12

ID: 2037578

Points: 1.00

Unit-1 is operating at 100% power with the following initial condition:

- 11 Charging Pump running

The following transient occurs:

- Loss of Offsite Power
- EOP-0 is implemented
- Natural circulation has been established and RCS temperatures are constant
- PZR level initially stabilizes at 105" following the trip and the establishment of Natural Circulation
- No Operator actions have been taken for the Pressure and Inventory Control (PIC) Safety Function

Which ONE of the following are the **MINIMUM** actions required, if any, to satisfy the PIC Safety Function?

- A. No action is needed.
- B. ONLY ONE Charging Pump must be started.
- C. ONLY TWO Charging Pumps must be started.
- D. ALL THREE Charging Pumps must be started.

Answer: B

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EXAM KEY

Answer Explanation

A. Incorrect-No action needed is plausible since PIC requires PZR level to be between 80-180". However, PZR level also needs to be trending towards 160" and with no Charging Pumps manually started following the LOOP, PZR level would start to lower due to CBO.

B. Correct-On a LOOP, the 11 and 14 4KV busses will be temporarily deenergized until the 1A and 1B DGs repower the busses. When the busses are repowered, the Charging Pumps will not start since the Charging Pumps do not start on the Shutdown Sequencer. Therefore, initially, no Charging Pumps will be running. The LOOP will also isolate letdown due to the loss of 1Y10. With no makeup and no letdown, the RCS level will continue to lower as Controlled Bleedoff (at 6 GPM) is still discharging to the VCT. With the PZR at ~NOP, a 6 GPM will equate to PZR level lowering at ~1"/3 minutes (18.9 Gallons per inch in the PZR). To meet PIC, PZR level must be 80-180" and trending to 160". To meet this condition, at least one Charging Pump must be started, which will result in PZR level rising at ~2"/min.

C. Starting a second Charging Pump is plausible if Operator believes PZR level initially at 105" would remain at 105" as a result of 11 Charging Pump continuing to run (since it was the lead pump) after the 11 4KV bus is reenergized by the 1A DG and letdown was believed to remain in service, balancing the single Charging flow to maintain a constant PZR level. However, no Charging Pumps will automatically start and letdown will be isolated on the LOOP, and PZR level will start to lower due to CBO.

D. Incorrect-Starting all 3 Charging Pumps is plausible since this is required action if alternate actions for boration were required in EOP-0. However, PIC only requires that PZR level be trending towards 160".

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EXAM KEY

Tier/Group

1/1

K/A Info

022G2.4.21

022 Loss of Reactor Coolant Makeup

2.4 Emergency Procedures / Plan

G2.4.21 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.

RO Importance

4.0

Technical References

EOP-0-1 (Rev 13)

AOP-7I-1 (Rev 32)

References Provided to Applicants

None

Learning Objective

Determine status of all safety functions.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

13

ID: 2038698

Points: 1.00

Unit-1 is operating at 100% when the following transient occurs:

- Component Cooling Water (CCW) Head Tank is 46" and rising
- CCW RMS, RI-3819, is reading 800 CPM and rising

Which ONE of the following components is the source of the CCW leak?

- A. CEDM Cooler.
- B. 11B RCP Seal Cooler.
- C. RCS Sample Penetration Cooler.
- D. Reactor Coolant Drain Tank Heat Exchanger.

Answer: B

Answer Explanation

A. Incorrect-CEDM cooler is plausible if leak in CEDM cooler is believed to be RCS leak into the CEDM cooler since RCS is on the pressure boundary side of the CEDM motor housing. However, a leak in the CEDM cooler would cause CC Head Tank levels to lower and would not affect the RMS reading.

B. Correct-Per the 1C13 alarm manual for CC Heat Tank level, a high level can be caused by leakage in the CCW system from the RCP seal cooler. Per the 1C22 alarm manual, CC RMS will rise due to a leak from the RCP seal coolers. Both results are validated by the simulator response.

C. Incorrect-RCS Sample Penetration Cooler is plausible if leak on cooler is believed to be RCS leak from RCS sample line into the cooler. However, the cooler only cools the concrete around the penetration, not the RCS sample line. A leak in the cooler would cause a leak from the CCW system, causing the head tank to lower.

D. Incorrect-RCDT HX is plausible if leak in RC Drain Tank allowed contents to contaminate the CCW system and cause RMS readings to rise. However, CCW pressure is > RCDT pressure and a leak in the HX will cause CC Head Tank to lower, not rise.

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EXAM KEY

Tier/Group

1/1

K/A Info

026AA1.05

026 Loss of Component Cooling Water (CCW)

AA1. Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water:

AA1.05 The CCWS surge tank, including level control and level alarms, and radiation alarm

RO Importance

3.1

Technical References

1C13-ALM, SRW and MISC Station Services Alarm Manual (Rev 55)

AOP-7C (Rev 5)

References Provided to Applicants

None

Learning Objective

Given plant conditions, recognize the entry conditions for AOP-7C

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

14

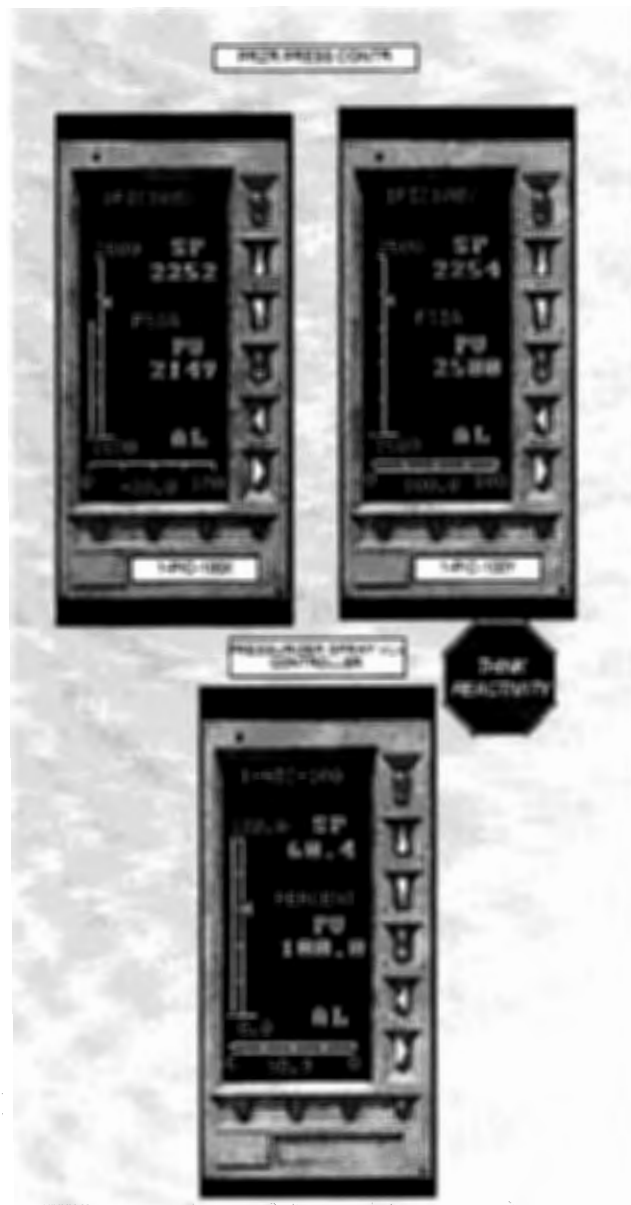
ID: 2038705

Points: 1.00

Unit-1 is operating in Mode 3 at NOP and NOT when the following transient occurs:

- Pressurizer Spray Valves, 1-RC-100E and 100F, both go full open
- RCS pressure is 2149 PSIA and lowering

The Pressurizer Pressure Controllers on 1C06 indicate as follows:



Which ONE of the following actions is required and why?

- A. Trip 11A and 11B RCPs to reduce Main PZR spray flow.

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EXAM KEY

- B. Place PZR PRESS CH SEL switch, 1-HS-100, to "X" since 1-PT-100Y failed high.
- C. Shut the PORV BLOCK valves, 1-RC-403-MOV and 1-RC-405-MOV since both PORVs are open.
- D. Place Pressurizer Spray Valve Controller, 1-HIC-100 in MANUAL and raise output to 100% since HIC has failed low.

Answer: B

Answer Explanation

A. Incorrect-Securing RCPs is plausible since these are actions taken for stuck open spray CVs, but only if actions to attempt to restore pressure control have failed.

B. Correct-Based on given conditions, PIC-100Y instrumentation has failed high, causing PIC-100Y to respond to a high pressure condition. PIC-100Y is in service as the spray CVs are responding to the control signal for a high pressure condition. Per 1C06 ARM, the required action is to shift pressure control channels. Since PIC-100X is properly responding to the lowering pressure, Ch X would be selected.

C. Incorrect-Shutting the Block MOVs is plausible if Operator believes PORVs opened since PIC-100Y signal was > 2385 PSIA. However, PORV pressure signal does not come from PIC-100X or 100Y.

D. Incorrect-Placing HIC in manual is plausible since this would be action if shifting control channels was not successful. However, HIC has not failed as HIC is properly responding to PIC-100Y output. Placing controllers in manual (HIC-100) is less desirable than shifting to a functioning controller in Auto (PIC-100X.) Placing HIC at 100% is plausible if spray valves are believed to be reverse acting. However, HIC output would be lowered to 0% to shut the spray CVs.

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EXAM KEY

Tier/Group

1/1

K/A Info

027AK3.03

027 Pressurizer Pressure Control System (PZR PCS) Malfunction

AK3. Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions:

AK3.03 Actions contained in EOP for PZR PCS malfunction

RO Importance

3.7

Technical References

1C06 Alarm Manual (Rev 52)

References Provided to Applicants

None

Learning Objective

Given a failure of any RCS pressure, temperature or level instrument predict the response of the system (heaters, spray, charging and letdown) to that failure

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

15

ID: 2038725

Points: 1.00

Which ONE of the following Nuclear Instrument (NI) indications, considered separately, would indicate an ATWS condition exists?

- A. WRNI power is $9 \times 10^{-2} \%$ and SUR is 2 DPM.
- B. VOPT was reset at 60% and NI power is 70%.
- C. RRS NI power is 106%.
- D. NI power is 103%.

Answer: B

Answer Explanation

A. Incorrect-2 DPM is plausible to the Operator since the POWER LVL RATE HI CH PRE-TRIP alarm comes in a 1.34 DPM. However, the SUR trip setpoint is 2.43 (2.27-2.59) DPM.

B. Correct-When VOPT is reset by the operator, the trip setpoint will rise 8.4% above current power. When reset at 60%, VOPT will reset to 68.4%. Any power over 68.4% will trip the reactor if not reset by the operator beforehand.

C. Incorrect-106% is plausible to the Operator since this value is high enough to actuate RPS (power above trip value of 105.4 %.) However, RRS NI output is not fed into RPS.

D. Incorrect-The HI POWER TRIP RESET DEMAND setpoint is 2.6% less than the Reactor trip setpoint. A power of 103% is plausible to the Operator if they add the 2.6% to 100% and determine that 103% has exceeded this calculated value (102.6%.) This power is not high enough to actuate RPS (since needs power above trip value of 105.4%.)

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EXAM KEY

Tier/Group

1/1

K/A Info

029EA2.01

029 Anticipated Transient Without Scram (ATWS)

EA2 Ability to determine or interpret the following as they apply to a ATWS:

EA2.01 Reactor nuclear instrumentation

RO Importance

4.4

Technical References

T.S. 3.3.1, Reactor Protective System (RPS) Instrumentation-Operating

1C05-ARM, Reactivity Control Alarm Response Manual (Rev 41)

References Provided to Applicants

None

Learning Objective

Recognize the conditions which would constitute an Anticipated Transient Without Scram (ATWS)

Question Source

Bank

Question History

Last used on 2016 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(6)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

16

ID: 2038726

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Loss of Offsite Power
- SGTR in 21 SG
- Natural Circ is established
- EOP-6, Steam Generator Tube Rupture, is implemented
- T_{cold} is 530°F
- T_{hot} is 555°F

Both ADVs are taken to 100% to initiate the rapid cooldown.

Which ONE of the following are the operational implications of Natural Circ conditions in EOP-6?

- A. The 21 ADV will remain open longer until the 21 SG can be isolated.
- B. 22 Loop T_{COLD} will read higher than T_{HOT} during the entire cooldown.
- C. RCS flow in the 21 Loop will be stagnant until 21 SG is isolated.
- D. After 21 SG is isolated, a MSSV will lift on the 21 SG.

Answer: A

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EXAM KEY

Answer Explanation

A. Correct-When natural circulation conditions are established with two SGs, T_{hot} will be ~20-25F above T_{cold} in both RCS loops. With RCS temperature in a band of 525-535 in EOP-0 and then entering EOP-6, this would result in T_{hot} being at least 545F ($525 + 20F$.) When forced circulation is in effect, T_{hot} and T_{cold} are essentially the same value. Therefore, when performing the rapid cooldown to 515F to allow the isolating of 21 SG, T_{hot} will have to lower an additional 20F. This hotter temperature and slower loop transit times when on natural circulation will result in the ADVs remaining open on the affected SG for a longer time compared to same SGTR with RCPs in service.

B. Incorrect-Loop temperatures inverted are plausible since a SG that is isolated will act as a heat source to the RCS. However, 21 SG will be isolated, not 22 loop, and the temperatures in 21 LOOP will stay inverted until the 21 SG is cooled down.

C. Incorrect-Stagnant flow is plausible since the RCS flow in the affected loop could become thermodynamically uncoupled if cooldown is excessive. However, this applies only after 21 SG is isolated. Before the SG is isolated, both SGs are being steamed and natural circ conditions will exist in both loops. Once T_{hot} reaches 515F, the cooldown rate is lowered, with a suggested rate of ~35F/hr to maintain RCS flow in both loops.

D. Incorrect-The MSSV lifting is plausible if a SG is isolated before T_{hot} is lowered to 515F.

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EXAM KEY

Tier/Group

1/1

K/A Info

038EK1.03

038 Steam Generator Tube Rupture (SGTR)

EK1 Knowledge of the operational implications of the following concepts as they apply to the SGTR:

EK1.03 Natural circulation

RO Importance

3.9

Technical References

EOP-6 Technical Basis (Rev 21)

EOP-2 Technical Bases (Rev 18)

References Provided to Applicants

None

Learning Objective

Given plant conditions associated with a Steam Generator Tube Rupture (SGTR), the license operator candidate will be able to correctly recall and/or identify the required EOP-6 actions and their bases to successfully mitigate the event

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(8)

Comments

None

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EXAM KEY

17

ID: 2038729

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- Steam leak from 12 SG into Containment
- Manual reactor trip
- EOP-4 is implemented

The following conditions exist:

- Containment pressure is 6 PSIG and rising
- 12 SG level is (-)350" and lowering
- RCS subcooling is 145°F and rising
- 11 SG is available for heat removal

Which ONE of the following is when HPSI flow can be throttled?

- A. Only after Containment pressure lowers to < 2.8 PSIG.
- B. Only after subcooling is lowered to < 140°F.
- C. Only after 12 SG blowdown is complete.
- D. Only after PZR level rises above 141".

Answer: D

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EXAM KEY

Tier/Group

1/1

K/A Info

040AA2.05

040 Steam Line Rupture

AA2. Ability to determine and interpret the following as they apply to the Steam Line Rupture:

AA2.05 When ESFAS systems may be secured

RO Importance

4.1

Technical References

EOP-4 (Rev 19)

References Provided to Applicants

None

Learning Objective

Given an Excess Steam Demand Event, evaluate the need for HPSI/LPSI throttling/termination

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

18

ID: 2038735

Points: 1.00

Unit-1 is operating with the following conditions:

- Station Blackout has occurred
- 11, 12, 21, and 22 DC Bus voltages are 126 VDC and lowering

Which ONE of the following is:

1. The DC bus voltage limit that, when reached, is no longer sufficient to support instrumentation and controls and;
2. What system change indicates DC bus voltage is approaching zero?
 - A.
 1. ≤ 105 VDC;
 2. Secondary CEA display goes dark at 1C05.
 - B.
 1. ≤ 123 VDC;
 2. Secondary CEA display goes dark at 1C05.
 - C.
 1. ≤ 105 VDC;
 2. AFW Flow Control Valves start to fail open at 1C04.
 - D.
 1. ≤ 123 VDC;
 2. AFW Flow Control Valves start to fail open at 1C04.

Answer: C

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EXAM KEY

Answer Explanation

A. Incorrect-CEA indications is plausible since all CEA indications on 1C05 and inputs to the PPC are lost during a SBO. However, the CEA indications are lost due to a loss of vital 4KV busses, not vital DC.

B. Incorrect-123 VDC is plausible since this is below normal battery voltage of 132 VDC and is setpoint for Low Battery Voltage alarms on 1C33. However, controls and indications will continue to function until voltage reaches 105 VDC. CEA indications is plausible since all CEA indications on 1C05 and inputs to the PPC are lost during a SBO

C. Correct-Per EOP-7, when DC bus voltage lowers below 105 VDC, actions are taken to address loss of DC busses by implementing AOP-7J. FSG-4 Technical basis lists 105 VDC as battery voltage limit that, once reached, no longer is sufficient for supporting instrumentation and controls. One of those controls lost will be the AFW Flow Control Valves, which will begin to fail open, regardless of air accumulator status.

D. Incorrect-123 VDC is plausible since this is below normal battery voltage of 132 VDC and is setpoint for Low Battery Voltage alarms on 1C33. However, controls and indications will continue to function until voltage reaches 105 VDC.

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EXAM KEY

Tier/Group

1/1

K/A Info

055EA1.05

055 Loss of Offsite and Onsite Power (Station Blackout)

EA1 Ability to operate and monitor the following as they apply to a Station Blackout:

EA1.05 Battery, when approaching fully discharged

RO Importance

3.3

Technical References

EOP-7-1 (Rev 20)

FSG-4 (Rev 1)

References Provided to Applicants

None

Learning Objective

RECALL from memory the operation of the following components during station blackout conditions per EOP-7:

- Atmospheric Dump Valves (ADVs)
- AFW Steam Supply Valves
- AFW Flow Control Valves

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

19

ID: 2038765

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Loss of Offsite Power
- 23 AFW pump is started since both Steam Driven AFW Pumps are unavailable
- AFW Flow is raised to establish positive SG level trends
- 2-FIC-4525A, 21 SG FLOW CONTR, indicates 270 GPM
- 2-FIC-4535A, 22 SG FLOW CONTR, indicates 280 GPM

Which ONE of the following is the required action and basis for that action?

- A. Maintain flow values; No operational limits have been exceeded.
- B. Reduce AFW flow to prevent AFW Pump cavitation.
- C. Reduce AFW flow to protect the DG from overloading.
- D. Reduce AFW flow to prevent runout of the AFW Pump.

Answer: C

Answer Explanation

A. Incorrect-No action is plausible if Operator confuses U-2 Motor Driven AFW Pump limits with U-1. 23 AFW Pump flow is limited to 300 GPM total flow when powered by the DG while 13 AFW Pump is limited to 575 GPM.

B. Incorrect-Reducing flow because of cavitation is plausible since excess flow alarms would be received at 240 GPM. However, flow can remain above 240 GPM until SG levels are recovering.

C. Correct-23 AFW Pump is being powered from the 2B DG. Per EOP-0, the flow limit with 23 AFW running and powered from a DG is 300 GPM. This caution also exists in EOP-2. Per EOP-2 Technical Bases, the 300 GPM limit is to prevent overloading of the 2B DG.

D. Incorrect-Reducing flow due to prevent runout is plausible since motor pump limits are normally associated with horsepower limits of the motor. However, the Motor Driven AFW pumps are limited to 575 GPM to prevent reaching motor limits/runout and in this case, the lower limit of 300 GPM is to prevent DG overloading.

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EXAM KEY

Tier/Group

1/1

K/A Info

056AG2.4.31

056 Loss of Offsite Power

AG2.4.31 Knowledge of annunciator alarms, indications, or response procedures

RO Importance

4.2

Technical References

EOP-0-2 (Rev 14)

EOP-2 Technical Bases (Rev 18)

References Provided to Applicants

None

Learning Objective

Given plant conditions, determine if 13(23) AFW flow limits are met

Question Source

Bank

Question History

Last used on 2010 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

20

ID: 2038864

Points: 1.00

Unit-1 is operating at 100% with the following initial condition:

- 13 SRW Pump OOS

The following transient occurs:

- 11 SRW Pump trips on Motor Overload
- Reactor is manually tripped
- A 250 GPM SGTR begins in 11 SG
- RCS pressure is 1705 PSIA and lowering
- EOP-6, Steam Generator Tube Rupture, is implemented
- 11 SGFP trips
- Multiple 1C04 Status Panel high temperature alarms on both SGFPs

Which ONE of the following is a required action and what is the bases for that action?

- A. Trip 1A DG locally because the 1A DG has lost SRW cooling.
- B. Place 12 SRW Pump in Pull To Lock since SRW is below minimum flow.
- C. Secure 11 and 12 CAC Fans to prevent formation of voids in the 11 SRW Header.
- D. Start 13 AFW Pump because SRW cooling to the Turbine Building has been isolated.

Answer: D

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EXAM KEY

Answer Explanation

A. Incorrect-Tripping the 1A DG is plausible If Operator confuses SRW cooling lineup to the DGs. The A-Train of SRW on U-2 cools a Fairbanks DG, but on U-1, the A Train of SRW does not. The 1A DG is cooled by its own system and does not rely on the SRW system.

B. Incorrect-Placing 12 SRW in PTL is plausible since SRW flow through Turbine Building will be isolated. However, SRW flow through the 1B DG and 13/14 CACs will be adequate to maintain minimum flow on the 12 SRW header.

C. Incorrect-Securing the CAC fans is plausible if Operator is confusing actions of EOP-5 for voids potentially forming in the SRW header. However, the voids would potentially form only if the Containment environment parameters had exceeded CSAS conditions.

D. Correct-A SIAS has occurred due to low RCS pressure. SIAS shuts the 4 SRW CVs providing cooling to the Turbine Building. This will eventually lead to high lube oil temperatures on the SGFPs or a trip of the SGFPs caused by a loss of condenser vacuum. Regardless of the SGFP status, AFW is initiated in EOP-6 if a SIAS exists to ensure MFW can be restored at a later time when SRW is restored.

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EXAM KEY

Tier/Group

1/1

K/A Info

062AG2.4.18

062 Loss of Nuclear Service Water

AG2.4.18 Knowledge of the specific bases for EOPs

RO Importance

3.3

Technical References

EOP-6-1 (Rev 19)

EOP-6 Technical Bases (Rev 21)

References Provided to Applicants

None

Learning Objective

Recall the strategy and the basis for the major actions performed in EOP-6, Steam Generator Tube Rupture, and what actions are required if safety functions are in jeopardy of being lost

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

21

ID: 2038867

Points: 1.00

Unit-2 is operating at 100% with the following initial condition:

- 2B DG paralleled to 24 4KV Bus

The following transient occurs:

- Major Grid Disturbance
- AOP-7M, Major Grid Disturbances, is implemented
- 500 KV voltage lowers substantially for 20 seconds
- U/V Actuation occurs on 11, 14, and 21 4KV Bus after 8 seconds
- U/V Actuation fails to actuate on 24 4KV Bus

Which ONE of the following is a required action on Unit-2 and what is the bases for that action?

- A. Shift Main Generator Voltage Regulators to Manual to maintain MVARs and frequency.
- B. Place the 2A DG output breaker in Pull To Lock to protect the DG from overload conditions.
- C. Shift applicable 13KV Voltage Regulator to Manual and raise 24 KV Bus voltage to prevent motor overheating.
- D. Place the 2B DG Output breaker and the 24 4KV Bus Normal Feeder breaker in Open to ensure proper load shedding.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Shifting AVR to Manual is plausible since this is action taken when MVARs are cycling excessively with a stable grid. However, AOP-7M and OI-43A prefer AUTO operation of the AVR to prevent low grid voltage conditions when there is a grid disturbance.

B. Incorrect-Placing 2A output breaker in PTL is plausible since this would be action during a grid disturbance, but only if 2A was paralleled to grid and a UV actuation failure occurred. Given conditions would result in 2A powering 21 4KV bus, isolated from the grid.

C. Incorrect-Shifting 13 KV Voltage Regulators to manual is plausible since these are actions for low 4 KV Bus Voltage, but only if the grid is stable. Auto operation is desired per OI-27B.

D. Correct-Per AOP-7M, when UV actuation fails to occur and a DG is paralleled to a bus, there is concern for DG loading. Given conditions are U/V actuation due to TUR relays. Loads expected to be tripped by the U/V signal, particularly the bus feeder breakers, could result in DG exceeding design loading. The DG output breaker and the 4KV Bus feeder breakers are verified open to force a proper U/V actuation and proper load shed of the bus by actuating the LOV relays.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/1

K/A Info

077AK3.02

077 Generator Voltage and Electric Grid Disturbances

AK3. Knowledge of the reasons for the following responses as they apply to Generator Voltage and Electric Grid Disturbances:

AK3.02 Actions contained in abnormal operating procedure for voltage and grid disturbances

RO Importance

3.6

Technical References

AOP-7M (Rev 2)

AOP-7M Technical Bases (Rev 2)

References Provided to Applicants

None

Learning Objective

Given an action in AOP-7M, identify the basis for the action

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

22

ID: 2038881

Points: 1.00

Unit-1 is operating at 100% when the following transient occurs:

- 11 SGFP trips
- Manual Reactor trip at 0955
- 12 4KV Bus is lost at 1000
- 12 SGFP trips
- All AFW is lost

Which ONE of the following, if any, is when CBP Injection Flow will be injecting into a SG?

- A. Once a SG pressure is lowered to ≤ 500 PSIA.
- B. Once time reaches 1100 and a CBP is started.
- C. Once the SG with the lowest level is isolated.
- D. CBP Injection is NOT available.

Answer: A

Answer Explanation

A. Correct-Per EOP-3, CBP Injection will start once the RCS has been cooled down to lower a SG pressure to ~ 500 PSIA.

B. Incorrect-No earlier than 1100 is plausible if loads on 12 4KV Bus are incorrectly identified to include all 3 CBPs and starting duties of OI-11A are considered. However, 12 Bus will only result in loss of 11/12 CP and 13 CBP allowing 13 CP/11 or 12 CBP to supply injection flow.

C. Incorrect-Isolating a SG first is plausible since these are actions when restoring feedflow to SGs while OTCC is in progress.

D. Incorrect-CBP Injection not available is plausible if loss of 12 4KV Bus is determined to not meet requirements to run a CBP since OI-11A normal requirements $< 30\%$ are 2 CPs and 1 CBP. EOP-3 only requires 1 CP to run 1 CBP.

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EXAM KEY

Tier/Group

1/1

K/A Info

CE06EK2.1

E06 Loss of Feedwater

EK2. Knowledge of the interrelations between the (Loss of Feedwater) and the following:

EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

RO Importance

3.3

Technical References

EOP-3 (Rev 22)

References Provided to Applicants

None

Learning Objective

Given plant conditions, determine appropriate mitigating actions are correct in accordance with EOP-3

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

23

ID: 2038893

Points: 1.00

Unit-1 is operating with the following initial conditions:

- Reactor Startup in progress at EOC
- Reactor is critical with power at 1E-4% and steady
- TBV Controller in AUTO with a Setpoint of 900 PSIA

The following transient occurs:

- A CEDS malfunction causes Reg Group 5 CEAs to withdraw uncontrolled for 10"
- CEDS Control System is turned OFF and CEA motion stops

Which ONE of the following, assuming no further Operator actions, is the Reactor response?

- A. SUR will be positive and then become more positive once the Point of Adding Heat is reached.
- B. SUR will be positive and then will immediately return to zero since CEA motion has stopped.
- C. Reactor power will rise and then stabilize above the Point of Adding Heat.
- D. Reactor power will remain constant as RCS temperature rises.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation
A. Incorrect-Positive SUR further increasing once POAH is reached is plausible if MTC effects at EOC are confused with those at BOC.
B. Incorrect-SUR returning to zero is plausible since this is response to CEA withdrawals when below criticality.
C. Correct-Once CEAs are withdrawn and reactor is critical, power will begin to rise and will not stop until countered by negative reactivity. RCS temperature will not change until the POAH is reached and fuel temperature feedback will not begin until fuel temperature increases significantly above RCS temperature. With an EOC condition, a negative MTC condition exists. Once RCS temperature begins to rise, the negative MTC will insert negative reactivity and power will stabilize at some value above POAH.
D. Incorrect-Power remaining constant is plausible if Operator only evaluates reactivity effects after POAH is reached. For temperature to rise, power must first rise however.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

001AK1.06

001 Continuous Rod Withdrawal

AK1. Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal:

AK1.06 Relationship of reactivity and reactor power to rod movement

RO Importance

4.0

Technical References

Simulator validation runs

References Provided to Applicants

None

Learning Objective

Given a set of plant conditions, respond to a CEA malfunction in accordance with AOP-1B

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(1)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

24

ID: 2038906

Points: 1.00

Unit-1 is operating at 100% when the following transient occurs:

- A single Regulating CEA near the middle of the core fully drops at 1000
- AOP-1B, CEA Malfunctions, is implemented
- Turbine load is being lowered at 1001
- T_{COLD} is restored to within 0.5°F of program at 1004
- Reg Group CEAs will not be used to maintain power
- The CEA is being withdrawn at 1030
- RCS pressure is being maintained at 2250 PSIA

Regarding ONLY the Fuel Assembly with the dropped CEA, which ONE of the following:

1. At 1000, is adding **POSITIVE** Reactivity in the Fuel Assembly with the dropped CEA and;
2. At 1031, besides RCS temperature rising, what is adding **NEGATIVE** Reactivity in the Fuel Assembly with the dropped CEA?
 - A. 1. **BOTH** lowering fuel temperatures and lowering RCS temperatures are initially adding positive reactivity;
2. **BOTH** boron addition and rising fuel temperatures are adding negative reactivity as the CEA is realigned.
 - B. 1. **BOTH** lowering fuel temperatures and lowering RCS temperatures are initially adding positive reactivity;
2. **ONLY** boron addition is adding negative reactivity as the CEA is realigned.
 - C. 1. **ONLY** lowering RCS temperature is initially adding positive reactivity;
2. **BOTH** boron addition and rising fuel temperatures are adding negative reactivity as the CEA is realigned.
 - D. 1. **ONLY** lowering RCS temperature is initially adding positive reactivity;
2. **ONLY** boron addition is adding negative reactivity as the CEA is realigned.

Answer: A

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EXAM KEY

Answer Explanation

A. Correct-Per the UFSAR, Power Defect is the reactivity changes associated with fuel temperature, RCS temperature, and RCS pressure. The larger of these 2 conditions is the change in fuel and RCS temperatures. When the CEA first drops, power in the assembly with the dropped CEA will drop, lowering the fuel temperature in the fuel assembly. RCS temperature will also drop as the initial Turbine load will result in a Secondary demand higher than Primary power. Both of these conditions will result in the addition of positive reactivity. As the CEA is being withdrawn, AOP-1B directs that power be maintained constant. This can be done with CEAs or boration. The question stem stated that CEAs would not be used to control power during the realignment, which is the normal practice. While pulling the CEA, any negative reactivity source will limit power. As the CEA is withdrawn, the power will rise in the fuel assembly. This will cause fuel temperatures to rise and will limit the power rise. Boration will also be used to maintain steady power.

B. Incorrect-Per the UFSAR, Power Defect is the reactivity changes associated with fuel temperature, RCS temperature, and RCS pressure. The larger of these 2 conditions is the change in fuel and RCS temperatures. When the CEA first drops, power in the assembly with the dropped CEA will drop, lowering the fuel temperature in the fuel assembly. RCS temperature will also drop as the initial Turbine load will result in a Secondary demand higher than Primary power. Both of these conditions will result in the addition of positive reactivity. Boron as the only negative reactivity source is plausible if Operator evaluates only negative reactivity sources under their control (i.e. boration, CEAs, steam demand, etc.)

C. Incorrect-Only RCS temperature adding positive reactivity is plausible if Operator believes Power Defect is associated with negative reactivity only. As the CEA is being withdrawn, AOP-1B directs that power be maintained constant. This can be done with CEAs or boration. The question stem stated that CEAs would not be used to control power during the realignment, which is the normal practice. While pulling the CEA, any negative reactivity source will limit power. As the CEA is withdrawn, the power will rise in the fuel assembly. This will cause fuel temperatures to rise and will limit the power rise. Boration will also be used to maintain steady power.

D. Incorrect-Only RCS temperature adding positive reactivity is plausible if Operator believes Power Defect is associated with negative reactivity only. Boron as the only negative reactivity source is plausible if Operator evaluates only negative reactivity sources under their control (i.e. boration, CEAs, steam demand, etc.)

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

003AK1.15

003 Dropped Control Rod

AK1. Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod:

AK1.15 Definition and application of power defect

RO Importance

2.8

Technical References

UFSAR (Rev 49)

AOP-1B, CEA Malfunctions (Rev 30)

AOP-1B Technical Bases (Rev 10)

References Provided to Applicants

None

Learning Objective

Given a set of plant conditions, respond to a CEA malfunction in accordance with AOP-1B

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(1)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

25

ID: 2038997

Points: 1.00

Unit-1 is operating at 5% when the following transient occurs:

- Loss of 1Y01 occurs

Which ONE of the following are:

1. The effects, if any, on Unit-1 WRNI indications and;
2. What actions, if any, are required for the SUR Trip Units on Unit-1?
 - A.
 1. No impact on any Unit-1 WRNI Channel;
 2. SUR Trip Unit on Unit-1 RPS 'A' must be bypassed within an hour.
 - B.
 1. ONLY WRNI 'A' is lost on Unit-1;
 2. SUR Trip Unit on Unit-1 RPS 'A' must be bypassed within an hour.
 - C.
 1. No impact on any Unit-1 WRNI Channel;
 2. All SUR Trip Units on Unit-1 RPS would remain operable.
 - D.
 1. ONLY WRNI 'A' is lost on Unit-1;
 2. All SUR Trip Units on Unit-1 RPS would remain operable.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-No impact on U-1 WRNI indications is plausible if power supplies between units is swapped. U-1 has two channels of WRNI fed from U-2 120VAC busses (WRNI B is powered by 2Y02 and WRNI D from 2Y04.). On loss of WRNI, SUR is inoperable since WRNI provides signal for SUR trip. Per TS 3.3.1 and OP-CA-103-102-0200, SUR must be either bypassed or placed in trip condition within an hour.

B. Correct-Loss of 1Y01 will result in all Channel A NI, including both Linear and Wide Range NI. On loss of WRNI, SUR is inoperable since WRNI provides signal for SUR trip. Per TS 3.3.1 and OP-CA-103-102-0200, SUR must be either bypassed or placed in trip condition within an hour.

C. Incorrect-No impact on U-1 WRNI indications is plausible if power supplies between units is swapped. U-1 has two channels of WRNI fed from U-2 120VAC busses (WRNI B is powered by 2Y02 and WRNI D from 2Y04.). SUR trip unit remaining in service is plausible if Operator incorrectly applies power range that SUR trip is disabled by RPS. SUR trip is enabled between 10-5% and 13% power. Regardless, the SUR trip would need to be bypassed due to loss of WRNI signal.

D. Incorrect-Loss of 1Y01 will result in all Channel A NI, including both Linear and Wide Range NI. SUR trip unit remaining in service is plausible if Operator incorrectly applies power range that SUR trip is disabled by RPS. SUR trip is enabled between 10-5% and 13% power. Regardless, the SUR trip would need to be bypassed due to loss of WRNI signal.

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EXAM KEY

Tier/Group

1/2

K/A Info

032AK2.01

032 Loss of Source Range Nuclear Instrumentation

AK2. Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following:

AK2.01 Power supplies, including proper switch positions

RO Importance

2.7

Technical References

AOP-7J-1 (Rev 24)

OP-CA-103-102-0200 (Rev 1)

TS 3.3.1

References Provided to Applicants

None

Learning Objective

Recall the power supplies for the safety channels of nuclear instrumentation

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

26

ID: 2039020

Points: 1.00

Unit-1 is operating at 11% with the following initial conditions:

- Annunciator "LOSS OF LOAD CH TRIP BYP" is in alarm
- The Main Turbine has just been paralleled to the grid

The following transient occurs:

- Condenser vacuum begins to rapidly lower
- AOP-7G, Loss of Condenser Vacuum, is implemented
- Condenser vacuum is 21 inches Hg and rapidly lowering

Which ONE of the following is the expected Main Turbine and RPS system response and/or required actions?

- A. Main Turbine will NOT automatically trip and must be manually tripped;
Reactor will NOT automatically trip and manual trip is NOT required.
- B. Main Turbine will NOT automatically trip and must be manually tripped;
Reactor will NOT automatically trip and must be manually tripped.
- C. Main Turbine will automatically trip;
Reactor will NOT automatically trip and must be manually tripped.
- D. Main Turbine will automatically trip;
Reactor will automatically trip.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Turbine not automatically tripping is plausible if SGFP trip setpoint on lowering vacuum (20") is confused with Main Turbine low vacuum trip setpoint. The Reactor not requiring a manual trip is plausible since the Turbine can trip and the Reactor stay on line when Loss of Load is bypassed (<14%). However, AOP-7G directs that the Reactor be tripped when vacuum is <23.5" and power is > 5%.

B. Incorrect-Turbine not automatically tripping is plausible if SGFP trip setpoint on lowering vacuum (20") is confused with Main Turbine setpoint. Per AOP-7G, the Reactor is tripped when vacuum is <23.5" and power is > 5%.

C. Correct-Per AOP-7G, the Main Turbine will automatically trip at ~ 22.5 inches Hg. With Loss of Load alarm in and power < 14%, the Reactor will not automatically trip on Loss of Load (i.e. Turbine Trip). AOP-7G directs that the Reactor be manually tripped when vacuum is < 23.5 inches Hg and power is > 5%.

D Incorrect-Per AOP-7G, the Main Turbine will automatically trip at ~ 22.5 inches Hg. Reactor automatically tripping is plausible since the Reactor would trip normally whenever the Turbine has tripped. However, because of Loss of Load bypass being active at 11% power, the Reactor would not automatically trip.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

051AG2.1.27

051 Loss of Condenser Vacuum

AG2.1.27 Knowledge of system purpose and/or function

RO Importance

3.9

Technical References

AOP-7G-1, Loss of Condenser Vacuum (Rev 4)

References Provided to Applicants

None

Learning Objective

Question Source

Modified

Question History

Modified question last used on 2010 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

Modified from 1449769

Considered K/A match as function of systems impacted by lowering vacuum are evaluated

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

27

ID: 2039034

Points: 1.00

Unit-2 is operating at 100% power with the following initial conditions:

- Positive pressure vent of the Containment in progress per OI-41B

A Large Break LOCA occurs and the following RMS indications are noted:

- CNTMT RAD LVL HI alarm is received on 2C10
- RI-5317A reads 22 R/Hr
- RI-5317B reads 23 R/Hr

Which ONE of the following automatic actions are initiated by the Containment High Range Radiation Monitors (RI-5317A and RI-5317B)?

- A. 21, 22, and 23 Iodine Removal Units START.
- B. 21 and 22 Penetration Room Exhaust Fans START.
- C. Containment Purge CVs, 2-CPA-1410 and 2-CPA-1412, SHUT.
- D. Hydrogen Purge INBD and OUTBD ISOL MOVs, 2-HP-6900 and 2-HP-6901, SHUT.

Answer: D

Answer Explanation

A. Incorrect-Plausible since degrading containment conditions start the IRUs. The IRUs only start because of a SIAS.

B. Incorrect-Plausible since degrading containment conditions start the Pen Room fans. The Pen Room fans only start because of a CIS.

C. Incorrect-Plausible if RMS 5316A-D and CRS, which will shut the purge CVs, are confused with Containment Hi-Range RMS 5317A/B. The Containment purge CVs are normally shut at 100% power. They are not the method of performing a containment vent at power, but rather only in lower modes.

D. Correct-A positive pressure vent of the Containment will open HP-6900/6901. Per 2C10 ARM J-04, receiving the CNTMT RAD LVL HI alarm will shut HP-6900/6901. SIAS also closes the HP MOVs.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

061AA1.01

APE 061 Area Radiation Monitoring (ARM) System Alarms

AA1 Ability to operate and / or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms:

AA1.01 Automatic actuation

RO Importance

3.6

Technical References

2C10-ARM, ESFAS 23 Alarm Response Manual (Rev 44)

OI-41B, Hydrogen Purge System Operation (Rev 13)

References Provided to Applicants

None

Learning Objective

Recall the purpose of the following systems:

- Radiation Monitoring Systems (Area & Process)
- Containment Hi-Range Radiation Monitor
- Main Steam Line Radiation Monitor (MSLRM)
- Wide Range Noble Gas Monitor (WRNGM)

Question Source

Bank

Question History

Last used on 2016 NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(11)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

28

ID: 2039065

Points: 1.00

A Large Break LOCA has occurred on Unit-2.

Which ONE of the following are indications of inadequate Core Cooling?

- A. 21 SG is (-)360" and lowering;
22 SG is (-)145" and slowly rising.
- B. PZR level is 110" and rapidly rising;
One RVLMS light is RED.
- C. PZR level is 0";
21 and 23 HPSI Pumps are injecting;
All Charging Pumps are operating.
- D. Subcooling on PAMS is (-)30°F and trending to (-)35°F.

Answer: D

Answer Explanation

A. Incorrect-Low SG level in one SG is plausible since level is significantly below (-)170", which Operator could interpret as a loss of a secondary heat sink. However, only one SG is required as a heat sink.

B. Incorrect-PZR rising with an RVLMS is plausible if Operator believes first RVLMS light at bottom of core, versus the top of the core. Indications given are of a void forming in the top of the RV Head, not of the core uncovering.

C. Incorrect-PZR level of 0" is plausible since a PZR level of > 30" is required to meet PIC Safety Function. However, core can still remain covered with PZR level of 0" as long as SI and Charging are injecting.

D. Correct-CETs reaching superheat conditions is the best available indication that core is no longer covered and heat removal is no longer effective. Superheat is indicated with negative SCM.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

074EA2.07

074 Inadequate Core Cooling

EA2 Ability to determine or interpret the following as they apply to Inadequate Core Cooling:

EA2.07 The difference between a LOCA and inadequate core cooling, from trends and indicators

RO Importance

4.1

Technical References

EOP-5 Technical Bases (Rev 31)

References Provided to Applicants

None

Learning Objective

Given RCS parameters, identify the appropriate response for Loss of Coolant Accident (LOCA) per EOP-5

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

29

ID: 2039068

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Loss of all CCW
- Manual Reactor trip
- EOP-0, Post-Trip Immediate Actions, is implemented
- All RCPs are tripped following Reactivity

When initially assessing Core and RCS Heat Removal, the following conditions exist:

- 21 SG pressure is 650 PSIA and rapidly lowering
- 21 SG level is (-)220" and rapidly lowering
- 22 SG is 900 PSIA and slowly lowering
- 22 SG level is (-)160" and slowly rising

No Operator actions have been taken yet.

Which ONE of the following is the initial expected status of feedwater?

- A. Main Feedwater is **NOT** available;
AFW is supplying **ONLY** 22 SG.
- B. Main Feedwater is **NOT** available;
AFW is supplying **BOTH** 21 and 22 SGs.
- C. Main Feedwater is supplying **BOTH** 21 and 22 SGs;
AFW is supplying **ONLY** 22 SG.
- D. Main Feedwater is supplying **BOTH** 21 and 22 SGs;
AFW is supplying **BOTH** 21 and 22 SGs.

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-SGIS will actuate when SG pressure reaches 703 PSIA. This will trip both SGFPs and all 3 CBPs, resulting in loss of MFW. AFAS will initiate at -170" in a SG, and with 21 level lowering due to a ESDE, both steam driven and the motor driven AFW pumps will start. AFW flow will only be initiated to 22 SG however, as AFAS Block (21 STM LINE RUPTURE) will shut the four blocking valves to the 21 SG when its pressure is >115 PSID lower than 22 SG. This will result in the steam and motor driven AFW trains feeding only the 22 SG.

B. Incorrect-AFW feeding both SGs is plausible if only the SG levels are evaluated and not the pressure differences.

C. Incorrect-MFW supplying both SGs is plausible if only the conditions affecting AFW/AFAS are considered and SGIS actuation is not recognized.

D. Incorrect-MFW supplying both SGs is plausible if only the conditions affecting AFW/AFAS are considered and SGIS actuation is not recognized. AFW feeding both SGs is plausible if only the SG levels are evaluated and not the pressure differences.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

CA11AK2.1

A11 RCS Overcooling

AK2. Knowledge of the interrelations between the (RCS Overcooling) and the following:

AK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features

RO Importance

3.2

Technical References

2C03 Alarm Manual (Rev 61)

2C04 Alarm Manual (Rev 41)

2C08 Alarm Manual (Rev 36)

EOP-ATT-2 (Rev 18)

References Provided to Applicants

None

Learning Objective

STATE the AFW system automatic control signals including set points and initiating devices

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

30

ID: 2039080

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- Loss of Offsite Power
- Temperatures are stabilized in EOP-0, Post-Trip Immediate Actions
- CETs are reading 542°F and steady
- EOP-2, Loss of Offsite Power, is implemented

At time 1000, a cooldown to 350°F is required.

Which ONE of the following is:

1. The preferred source of AFW in EOP-2 and the reason;
2. The earliest that 350°F can be reached?
 - A.
 1. 11 or 12 AFW Pump is preferred source to limit DG loading;
 2. 1058.
 - B.
 1. 11 or 12 AFW Pump is preferred source to limit DG loading;
 2. 1156.
 - C.
 1. 13 AFW Pump is preferred source due to higher flow capability;
 2. 1058.
 - D.
 1. 13 AFW Pump is preferred source due to higher flow capability;
 2. 1156.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Time of 1058 is plausible if PZR cooldown rate limit of 200F/hr is used instead of RCS TS limit of 100F/hr.

B. Correct-Per EOP-2 Technical Bases, the steam driven AFW pumps are preferred to the motor driven train to limit DG loading. Per EOP-2 and the Tech Specs, the RCS cooldown rate limit is 100F/hr. To reach 350F at 100F/hr would take 1.92 hours $((542 - 350)/100)$ or 1 hr and 55.2 mins.

C. Incorrect-13 AFW as the preferred source is plausible if Operator confuses flow capacity with higher flow limit of 13 AFW while being powered from the 1A DG versus 23 AFW pump on the 2B DG on Unit-2. Time of 1058 is plausible if PZR cooldown rate limit of 200F/hr is used instead of RCS TS limit of 100F/hr.

D. Incorrect-13 AFW as the preferred source is plausible if Operator confuses flow capacity with higher flow limit of 13 AFW while being powered from the 1A DG versus 23 AFW pump on the 2B DG on Unit-2.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

1/2

K/A Info

A13AK3.4

A13 Natural Circulation Operations

AK3. Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations)

AK3.4 RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.

RO Importance

3.1

Technical References

EOP-2 Technical Bases (Rev 18)

EOP-2-1 (Rev 16)

References Provided to Applicants

None

Learning Objective

Identify the basis for using the steam driven AFW pumps as the preferred method of restoring SG level

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

31

ID: 2039103

Points: 1.00

Using Provided References

Unit-1 is operating at 100% power when the following transient occurs:

- Loss of Offsite Power
- 1A, 1B, and 0C DGs all fail to start and are unavailable
- SGTR in 11 SG

During EOP-0, Post-Trip Immediate Actions, the following reports are made:

- VA is not met due to no power to any 4KV busses
- RLEC is not met due to Loss of Power Effects

EOP-8, Functional Recovery Procedure, is implemented with the following conditions:

- Hi-Line 5051, 5052, and 5072 are all deenergized
- SMECO is not available
- 11 MSLRMS RMS is reading 100x normal and rising
- 12 MSLRMS RMS is reading 40x normal and rising

Which ONE of the following Success Path reports, after evaluating the Resource Assessment Table, are made and why?

- A. VA-3 Not Met, because none of the VA Success Paths meet their resource conditions or acceptance criteria and;
RLEC-2 Not Met, since 11 SG is not initially isolated.
- B. VA-3 Not Met, because none of the VA Success Paths meet their resource conditions or acceptance criteria and;
RLEC-1 Not Met, since a Station Blackout exists.
- C. VA-1 Not Met because DC and 120V AC Vital Buses are all energized and;
RLEC-2 Not Met, since 11 SG is not initially isolated.
- D. VA-1 Not Met because DC and 120V AC Vital Buses are all energized and;
RLEC-1 Not Met, since a Station Blackout exists.

Answer: A

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EXAM KEY

Answer Explanation

A. Correct-VA-3 Not Met is reported and implemented because none of the VA Success Paths meet any of their acceptance criteria. For these conditions, EOP-8 directs that the highest numbered Success Path be implemented. RLEC-2 Not Met is reported and implemented because the MSLRMs are above normal, and radiation is detected outside of containment. EOP-8 directs that Success Path not meeting their acceptance criteria are addressed first. RLEC-2 is not met since the 11 SG would not yet be isolated until RLEC and HR were performed.

B. Incorrect-VA-3 Not Met is reported and implemented because none of the VA Success Paths meet any of their acceptance criteria. For these conditions, EOP-8 directs that the highest numbered Success Path be implemented. RLEC-1 Not Met is plausible since a SBO is listed as one of the resource conditions. However, to implement RLEC-1 also means that normal radiation levels outside of containment need to exist. With MSLRM rising, normal conditions do not exist.

C. Incorrect-VA-1 Not Met is plausible since several of the acceptance criteria are correct. However, the resource condition of offsite power is not available, so VA-1 is not implemented regardless of the acceptance criteria status. RLEC-2 Not Met is reported and implemented because the MSLRM are above normal, and radiation is detected outside of containment. EOP-8 directs that Success Path not meeting their acceptance criteria are addressed first. RLEC-2 is not met since the 11 SG would not yet be isolated until RLEC and HR were performed.

D. VA-1 Not Met is plausible if Operator chooses highest preferred Success Path, rather than highest numbered Success Path, when none of the acceptance criteria are met. RLEC-1 Not Met is plausible since a SBO is listed as one of the resource conditions. However, to implement RLEC-1 also means that normal radiation levels outside of containment need to exist. With MSLRM rising, normal conditions do not exist.

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EXAM KEY

Tier/Group

1/2

K/A Info

E09EK3.4

E09 Functional Recovery

EK3. Knowledge of the reasons for the following responses as they apply to the (Functional Recovery)

EK3.4 RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated

RO Importance

3.3

Technical References

EOP-8-1 (Rev 40)

References Provided to Applicants

EOP-8-1, Functional Recovery Procedure

Learning Objective

Given a set of plant conditions, identify the success paths for all safety functions, including the order of priority, in accordance with EOP-8

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

32

ID: 2039122

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Loss of CCW
- AOP-7C, Loss of Component Cooling Water, is implemented

Which ONE of the following conditions would require the RCPs to be tripped?

Condition 1-Motor Winding temperature >250°F

Condition 2-Upper Thrust Bearing temperature >195°F

Condition 3-Controlled Bleed-Off temperature >200°F

- A. Conditions 2 and 3 **ONLY**.
- B. Conditions 1, 2, **AND** 3.
- C. Condition 2 **ONLY**.
- D. Condition 3 **ONLY**.

Answer: A

Answer Explanation

A. Correct-Per AOP-7C, RCP trip criteria are RCP motor thrust bearings exceeding 195F and CBO exceeding 250F.

B. Incorrect-Including Condition 1 is plausible since 250F is temperature associated with rebuilding a seal if CBO reaches that high. Motor windings going high will result in a PPC alarm but are not trip criteria in the AOP.

C. Incorrect-Condition 2 only is plausible since thrust bearing > 195F is trip criteria and the Operator does not remember all of the RCP trip criteria.

D. Incorrect-Condition 3 only is plausible since CBO > 200F is trip criteria and the Operator does not remember all of the RCP trip criteria.

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EXAM KEY

Tier/Group

2/1

K/A Info

003A4.02

003 Reactor Coolant Pump System (RCPS)

A4 Ability to manually operate and/or monitor in the control room:

A4.02 RCP motor parameters

RO Importance

2.9

Technical References

AOP-7C-2 (Rev 5)

References Provided to Applicants

None

Learning Objective

Given a loss of CCW scenario, recall the Reactor Trip Criteria

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

33

ID: 2039231

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- A suction header ruptures on the Charging Pumps
- AOP-2B, Loss of All Charging, is implemented
- All Charging Pumps are placed in Pull-To-Lock
- Letdown is isolated
- VCT outlet valve, 2-CVC-501-MOV, is shut

Which ONE of the following is the expected VCT level trend and the impact on RCP Controlled Bleed-Off (CBO)?

- A. VCT level will remain constant and;
CBO flow is immediately redirected to the Reactor Coolant Drain Tank.
- B. VCT level will start to rise and;
CBO flow is immediately redirected to the Reactor Coolant Drain Tank.
- C. VCT level will remain constant and;
CBO flow remains aligned to the VCT.
- D. VCT level will start to rise and;
CBO flow remains aligned to the VCT.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-VCT remaining constant is plausible if Operator believes VCT will initially reach level at which diversion occurs, maintaining level constant at a higher level. However, VCT level will initially lower due to the leak and the lowering letdown. Once the VCT is isolated from the CVCS (with letdown isolated and 501-MOV shut), CBO will remain aligned to the VCT and VCT level will rise. CBO directed to the RCDT is plausible since this is an alternate action taken if VCT level cannot be controlled from going too high. However, VCT level would first be controlled by operating the VCT drain valve.

B Incorrect-CBO directed to the RCDT is plausible since this is an alternate action taken if VCT level cannot be controlled from going too high. However, VCT level would first be controlled by operating the VCT drain valve.

C. Incorrect-VCT remaining constant is plausible if Operator believes VCT will initially reach level at which diversion occurs, maintaining level constant at a higher level. However, VCT level will initially lower due to the leak and the lowering letdown. Once the VCT is isolated from the CVCS (with letdown isolated and 501-MOV shut), CBO will remain aligned to the VCT and VCT level will rise.

D. Correct- VCT level will initially lower due to the leak and the lowering letdown. Once the VCT is isolated from the CVCS (with letdown isolated and 501-MOV shut), CBO will remain aligned to the VCT and VCT level will rise. Since CBO is normally aligned to the VCT, loss of charging will not automatically isolate the CBO CVs (505/506.)

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EXAM KEY

Tier/Group

2/1

K/A Info

004K3.04

004 Chemical and Volume Control System (CVCS)

K3 Knowledge of the effect that a loss or malfunction of the CVCS will have on the following:

K3.04 RCPS

RO Importance

3.7

Technical References

AOP-2B, Loss of All Charging, Technical Bases (Rev 0)

References Provided to Applicants

None

Learning Objective

Given a loss of Charging, describe the long term impact and strategies for managing that impact per AOP-2B

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

34

ID: 2039265

Points: 1.00

Unit-1 is operating in Mode 5 with the following conditions:

- Electrical system in a normal lineup
- SDC in service
- 11 LPSI running with motor amps reading 50A and steady
- RCS level is 63' and steady
- SDC FLOW CONTR, 1-FIC-306, is in Auto
- SDC flow on 1-FIC-306 is 3000 GPM and steady

12 LPSI Pump is started and running normally.

Which ONE of the following is:

1. The expected response of 11 LPSI Pump motor amps with 12 LPSI Pump now running and;
2. Which alarm condition would immediately cause 12 LPSI Pump motor amps to go to zero?
 - A.
 1. 11 LPSI motor amps would lower to < 50A;
 2. MOV 651 OPEN/RCS PRESS HI alarm on 1C07.
 - B.
 1. 11 LPSI motor amps would lower to < 50A;
 2. 13KV U/V/21 SERV BUS/22 SERV BUS alarm on 1C20.
 - C.
 1. 11 LPSI motor amps would remain 50A;
 2. MOV 651 OPEN/RCS PRESS HI alarm on 1C07.
 - D.
 1. 11 LPSI motor amps would remain 50A;
 2. 13KV U/V/21 SERV BUS/22 SERV BUS alarm on 1C20.

Answer: B

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EXAM KEY

Answer Explanation

A. Incorrect-11 LPSI amps will lower with 12 LPSI also running on the system. MOV 651 OPEN/Hi PRESS alarm is plausible since manual actions are required if SDC system pressure is high, including shutting the SDC Suction MOVs and securing the running LPSI pumps. However, there are no automatic trips of the LPSI pumps based on high RCS pressure.

B. Correct-When 12 LPSI pump is running, SDC flow will be provided by 11 and 12 LPSI pumps. FIC-306 will control flow at 3000 GPM. With two identical centrifugal pumps running at the same flow rate, each pump will have a lower flow rate than the total of 3000 GPM, requiring less work from each pump, and resulting in 11 LPSI motor amps lowering after 12 pump is started. Receiving the 13KV U/V/21 SERV BUS/22 SERV BUS alarm on 1C20 will result in the loss of 14 4KV bus on U-1, which powers 12 LPSI Pump.

C. Incorrect-11 LPSI motor amps remaining the same is plausible if SDC flow controller is believed to control flow rate through each pump, like the SGFPs. However, FIC-306 controls overall SDC flow. MOV 651 OPEN/Hi PRESS alarm is plausible since manual actions are required if SDC system pressure is high, including shutting the SDC Suction MOVs and securing the running LPSI pumps. However, there are no automatic trips of the LPSI pumps based on high RCS pressure.

D. Incorrect-11 LPSI motor amps remaining the same is plausible if SDC flow controller is believed to control flow rate through each pump, like the SGFPs. However, FIC-306 controls overall SDC flow. Receiving the 13KV U/V/21 SERV BUS/22 SERV BUS alarm on 1C20 will result in the loss of 14 4KV bus on U-1, which powers 12 LPSI Pump.

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EXAM KEY

Tier/Group

2/1

K/A Info

005A4.01

005 Residual Heat Removal System (RHRS)

A4 Ability to manually operate and/or monitor in the control room:

A4.01 Controls and indication for RHR pumps

RO Importance

3.6

Technical References

AOP-7I-1, Loss Of 4KV, 480 VOLT OR 208/120 Volt Instrument

Bus Power (Rev 32)

1C20-ALM, 13KV & 4KV Essential Feeder Bkrs Control Board

Alarm Manual (Rev 35)

References Provided to Applicants

None

Learning Objective

Given control board indications of an electrical malfunction

identify the immediate actions and evaluate what bus(es) is/are deenergized

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

35

ID: 2039282

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Large steam leak from 22 SG into Containment
- Reactor is manually tripped
- Reactor Coolant Pumps are secured
- EOP-4, Excess Steam Demand Event is implemented
- Harsh conditions in Containment do not exist

The following conditions currently exist in EOP-4:

- 22 SG level is (-)340" and lowering rapidly
- CET temperatures are 480°F and rapidly lowering
- 21 SG pressure is 740 PSIA with a saturation temperature of 510°F, both slowly lowering
- HPSI throttling criteria are met

Which ONE of the following, for the current conditions, are:

1. The required actions for 21 SG and;
2. The HIGHEST PZR level allowed while throttling HPSI with 22 SG blowdown still occurring?
 - A. 1. Cooldown 21 SG to $\leq 505^{\circ}\text{F}$ and;
2. 120".
 - B. 1. Cooldown 21 SG to $\leq 505^{\circ}\text{F}$ and;
2. 190".
 - C. 1. Stabilize 21 SG pressure at 740 PSIA and;
2. 120".
 - D. 1. Stabilize 21 SG pressure at 740 PSIA and;
2. 190".

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-Per EOP-4, during blowdown, the unaffected SG (21) is to be maintained within 25F of CETs. With CETs at 480F, a SG temperature of > 505F requires the SG to be cooled down. Since the blowdown is still in progress, based on SG level of (-)350" and temperature still lowering, EOP-4 directs that PZR level be maintained 101-120" to limit Pressurized Thermal Shock concerns when blowdown is complete.

B. Incorrect-Per EOP-4, during blowdown, the unaffected SG (21) is to be maintained within 25F of CETs. With CETs at 480F, a SG temperature of > 505F requires the SG to be cooled down. A maximum PZR level of 190" is plausible since this is level to control PZR once blowdown is complete if harsh containment conditions existed.

C. Incorrect-Stabilizing 21 pressure at 740 PSIA is plausible if Operator believes (-)350", which is same level that OTCC is initiated in EOP-3, means the blowdown is over. However, there is another 50" of SG inventory available before the SG is empty and the cooldown secured.

D. Incorrect-Stabilizing 21 pressure at 740 PSIA is plausible if Operator believes (-)350", which is same level that OTCC is initiated in EOP-3, means the blowdown is over. However, there is another 50" of SG inventory available before the SG is empty and the cooldown secured. A maximum PZR level of 190" is plausible since this is level to control PZR once blowdown is complete if harsh containment conditions existed.

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EXAM KEY

Tier/Group

2/1

K/A Info

006A1.01

006 Emergency Core Cooling System (ECCS)

A1 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including:

A1.01 Avoidance of thermal and pressure stresses due to pump startup

RO Importance

3.1

Technical References

EOP-4-2, Excess Steam Demand Event (Rev 18)

References Provided to Applicants

None

Learning Objective

Given and Excess Steam Demand Event, evaluate the need for HPSI/LPSI throttling/termination

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

36

ID: 2039404

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- A PZR Vent SV begins to leak
- Quench Tank (QT) temperature rises and the QUENCH TK/TEMP/LVL/PRESS alarms on 1C06
- The PZR Vent SV leakage is stopped

Which ONE of the following actions is the preferred method to restore QT temperature?

- A. Throttle Open CCW flow to the QT.
- B. Start an additional Containment Air Cooler.
- C. Add Nitrogen to the QT and then vent the QT.
- D. Lower the level and then refill the QT with DI Water.

Answer: D

Answer Explanation

A. Incorrect-Raising CCW flow is plausible if Operator believes QT has an internal HX like the RCDT (where the QT is pumped). The RCDT HX is cooled by CCW. However, the QT has no internal cooling mechanism.

B. Incorrect-Starting an additional CAC is plausible since this will cool containment and QT exterior, which will eventually cool the QT fluid. However, this is a long-term action and OI-1B directs that a bleed and feed be performed to lower temperature.

C. Incorrect-Adding N2 is plausible as N2 gas will be a lower temperature than the QT and would provide some small amount of cooling. However, per OI-1B, to lower the QT temperature, a bleed and feed is performed.

D. Correct-Per OI-1B, to lower the QT temperature, a bleed and feed is performed. Level is lowered as needed by pumping to the RCDT and then DI is used to restore level, lowering the QT temperature.

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EXAM KEY

Tier/Group

2/1

K/A Info

007K4.01

007 Pressurizer Relief Tank/Quench Tank System (PRTS)

K4 Knowledge of PRTS design feature(s) and/or interlock(s)

which provide for the following:

K4.01 Quench tank cooling

RO Importance

2.6

Technical References

OI-1B, Quench Tank Operations (Rev 17)

References Provided to Applicants

None

Learning Objective

Determine RCS PORV/SV leakage or position

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

37

ID: 2039431

Points: 1.00

Unit-2 Component Cooling Water (CCW) system is in a normal lineup.

Which of the following are the currently aligned emergency power sources for the Unit-2 CCW Pumps?

- A. 21 CCW Pump-2A DG;
22 CCW Pump-2B DG;
23 CCW Pump-2A DG.
- B. 21 CCW Pump-2A DG;
22 CCW Pump-2B DG;
23 CCW Pump-2B DG.
- C. 21 CCW Pump-2B DG;
22 CCW Pump-2A DG;
23 CCW Pump-2B DG.
- D. 21 CCW Pump-2B DG;
22 CCW Pump-2A DG;
23 CCW Pump-2A DG.

Answer: B

Answer Explanation

A. Incorrect-23 CCW Pump from the 2B DG is plausible since this electrical lineup is possible, but is not the normal operating lineups specified in OI-16.

B. Correct-Per OI-16 and OI-27D, the preferred lineup for 23 CCW pump is the 24B 480 Bus. Per OI-27D-2, 21 CCW pump is powered from 21A 480V Load Center and 22 from 24A 480V Load Center. This is the normal operating lineup as specified in OI-16. The 2A DG will power the 21A Load Center. The 2B DG will power the 24A and 24B Load Centers.

C. Incorrect-21 CCW from 2B and 22 CCW from the 2A DGs are possible since the DGs will power a CCW pump.

D. Incorrect-21 CCW from 2B and 22 CCW from the 2A DGs are possible since the DGs will power a CCW pump. 23 CCW Pump from the 2B DG is plausible since this electrical lineup is possible, but is not the normal operating lineups specified in OI-16.

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EXAM KEY

Tier/Group

2/1

K/A Info

008K2.02

008 Component Cooling Water System (CCWS)

K2 Knowledge of bus power supplies to the following:

K2.02 CCW pump, including emergency backup

RO Importance

3.0

Technical References

OI-16-2, Component Cooling System (Rev 32)

OI-27D-2, Station Power 480 Volt System Breaker Lineup (Rev 19)

References Provided to Applicants

None

Learning Objective

Identify the power supplies for the CCW pumps

Question Source

Bank

Question History

Last used on 2008 NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

38

ID: 2039583

Points: 1.00

Unit-1 is operating in Mode 3 with the following conditions:

- Cooldown in progress
- RCS temperature is 400°F and slowly lowering
- RCS pressure is 800 PSIA and slowly lowering

The following transient occurs:

- PT-103 fails to 1600 PSIA

Which ONE of the following is the expected PORV response?

- A. BOTH PORV's remain closed.
- B. ONLY PORV-402 opens.
- C. ONLY PORV-404 opens.
- D. BOTH PORVs open.

Answer: A

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EXAM KEY

Answer Explanation

A. Correct-PORVs will be in Normal until establishing MPT. MPT is not enabled until RCS reaches 369F. With PORVs in Normal, the PORVs will open when RCS pressure reaches 2385 PSIA, and not the lower pressure associated with MPT.

B. Incorrect-PORV 402 opening is plausible since P103 provides input into PORV 402 MPT circuit. However, with temperature of 400F, only a dedicated overpressure watch is required and MPT is not enabled until RCS reaches 369F.

C. Incorrect-PORV 404 opening is plausible if Operator believes P103 provides input into PORV 404 MPT circuit. However, P103-1 provides PORV 404 MPT signal.

D. Incorrect-Both PORVs opening is plausible since both PORVs open when RCS pressure reaches 2385 PSIA. However, at low temperature conditions, each PORV has its own MPT circuit. PORV 402 opening is plausible since P103 provides input into PORV 402 MPT circuit. However, with temperature of 400F, only a dedicated overpressure watch is required and MPT is not enabled until RCS reaches 369F. PORV 404 opening is plausible if Operator believes P103 provides input into PORV 404 MPT circuit. However, P103-1 provides PORV 404 MPT signal.

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EXAM KEY

Tier/Group

2/1

K/A Info

0010K6.01

010 Pressurizer Pressure Control System (PZR PCS)

K6 Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS:

K6.01 Pressure detection systems

RO Importance

2.7

Technical References

1C06-ALM, RCS Control Alarm Manual (Rev 51)

OP-5-1, Plant Shutdown From Hot Standby to Cold Shutdown (Rev 63)

References Provided to Applicants

None

Learning Objective

Given PORV HS positions, RCS temperature and RCS pressure determine whether PORVs are enabled or disabled for MPT

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

K/A considered met has Examinee must differentiate between PT failure at 400°F and failure below 369°F, where PORVs would open.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

39

ID: 2039596

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Channel "C" Upper NI begins to act erratically and then fails to 200% power

Which ONE of the following is:

1. The expected RPS Channel "C" Trip Units that will trip and;
2. What RPS Channel "C" Trip Units need to be bypassed with an hour?
 - A.
 1. ONLY HI POWER Trip Unit will trip;
 2. ONLY HI POWER (1) and AXIAL PWR (10) Trip Units need bypassed.
 - B.
 1. BOTH HI POWER and AXIAL PWR Trip Units will trip;
 2. ONLY HI POWER (1) and AXIAL PWR (10) Trip Units need bypassed.
 - C.
 1. ONLY HI POWER Trip Unit will trip;
 2. HI POWER (1), HI RATE (2), TM/LO PRESS (7), LOSS LOAD (8), and AXIAL PWR (10) Trip Units ALL need bypassed.
 - D.
 1. BOTH HI POWER and AXIAL PWR Trip Units will trip;
 2. HI POWER (1), HI RATE (2), TM/LO PRESS (7), LOSS LOAD (8), and AXIAL PWR (10) Trip Units ALL need bypassed.

Answer: D

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EXAM KEY

Answer Explanation

A. Incorrect-Only HI POWER trip is plausible if Operator believes AXIAL PWR trip is driven off of Delta-T power. TUs 1 and 10 only is plausible since these are Trip Units driven by NI power. However, TUs 2 and 8 also need bypassed as well since they are impacted by 13% bypass signal driven by NI power. TU 7 needs bypassed because NI power is an input to the TMLP calculator.

B. Incorrect-NI failing high is similar to actuation of the Power Trip Test Interlock, where TUs 1, 7, and 10 trip. Response was verified using the simulator. TUs 1 and 10 only is plausible since these are Trip Units driven by NI power. However, TUs 2 and 8 also need bypassed as well since they are impacted by 13% bypass signal driven by NI power. TU 7 needs bypassed because NI power is an input to the TMLP calculator.

C. Incorrect-Only HI POWER trip is plausible if Operator believes AXIAL PWR trip is driven off of Delta-T power. Per OP-CA-103-102-0200, TUs 1, 2, 7, 8, and 10 are all bypassed for an inoperable LRNI channel.

D. Correct-NI failing high is similar to actuation of the Power Trip Test Interlock, where TUs 1 (HI POWER), 7 (TM/LO PRESS), and 10 (AXIAL PWR) trip. Response was verified using the simulator. Per OP-CA-103-102-0200, TUs 1, 2, 7, 8, and 10 are all bypassed for an inoperable LRNI channel. TUs 1 and 10 are driven by NI power. TUs 2 and 8 are impacted by 13% bypass signal driven by NI power. TU 7 is impacted as NI power is an input to the TMLP calculator.

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EXAM KEY

Tier/Group

2/1

K/A Info

012A2.05

012 Reactor Protection System (RPS)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based

on those predictions, use procedures to correct, control, or

mitigate the consequences of those malfunctions or operations:

A2.05 Faulty or erratic operation of detectors and function generators

RO Importance

3.1

Technical References

Reactor Protective System Description-058 (Rev 6)

OP-CA-103-102-0200, Watchstanding Practices (Rev 1)

References Provided to Applicants

None

Learning Objective

Recall the RPS response to a Trip Signal, including:

- Trip Units
- Logic Matrices
- Trip Paths
- TCBs

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

40

ID: 2039622

Points: 1.00

Unit 1 is operating at 100% power with the following initial conditions:

- AFAS channel "ZE" is bypassed

The following transient occurs:

- Loss of 120 Vital AC bus 1Y01

Which ONE of the following is the response of AFAS?

- A. AFAS "B" actuation ONLY occurs
- B. AFAS "A" AND "B" actuations occur
- C. Sensor logic is reduced to 1 out of 2 to generate an AFAS
- D. Sensor logic is reduced to 2 out of 2 to generate an AFAS

Answer: C

Answer Explanation

A. Incorrect-AFAS B only actuation is plausible if Operator believes bypass condition left AFAS in a 1 out of 3 condition initially and the loss of ZD met the 1 of 3 condition.

B. Incorrect-AFAS actuation is plausible if Operator believes bypass condition left AFAS in a 1 out of 3 condition initially, and only the impact of the ZD sensor cabinet is considered.

C. Correct-With ZE in bypass, sensor logic is reduced to 2 out of 3 (ZD, ZF, ZG) as the bypass mode removes ZE sensor inputs as long as ZE maintains power. When power is lost to 1Y01, AFAS ZA Logic and AFAS sensor ZD channels are lost. ZA will not actuate as there is no power. ZB logic will then be operating off of ZD, ZF, ZG, and ZD is tripped due to the loss of power. Therefore, ZB Logic is operating in a 1 of 2 logic.

D. Incorrect-2 of 2 logic is plausible if loss of power to sensor cabinet is considered same as loss of power to a logic cabinet, where no actuations will occur.

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EXAM KEY

Tier/Group

2/1

K/A Info

013K5.02

013 Engineered Safety Features Actuation System (ESFAS)

K5 Knowledge of the operational implications of the following concepts as they apply to the ESFAS:

K5.02 Safety system logic and reliability

RO Importance

2.9

Technical References

AOP-7I-1, Loss Of 4KV, 480 VOLT OR 208/120 Volt Instrument Bus Power (Rev 32)

Auxiliary Feedwater System Description-036A/B (Rev 7)

References Provided to Applicants

None

Learning Objective

Explain the effect on AFAS operation when a sensor channel and/or an actuation logic channel is deenergized.

Question Source

Bank

Question History

Last used on 2006 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55 41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

41

ID: 2039710

Points: 1.00

Unit-2 is operating at 100% power with the following initial conditions:

- 21/22/23 Containment Air Cooler (CAC) fans running in FAST
- 24 CAC fan in Off
- SIAS-A Logic is OOS

The following transient occurs:

- 250 GPM LOCA
- Reactor is manually tripped
- EOP-0, Post-Trip Immediate Actions, is implemented
- RCS pressure lowers to 1720 PSIA
- Containment pressure rises to 1.8 PSIG
- No Operator actions have been taken

Which ONE of the following is the initial expected status of the CACs when performing Containment Environment in EOP-0?

- A. 21/22/23/24 CAC fans ALL running in Slow.
- B. ONLY 21/22/23 CAC fans ALL running in Fast;
ONLY 24 CAC fan Off.
- C. ONLY 21/22 CAC fans running in Fast;
ONLY 23/24 CAC fans running in Slow.
- D. ONLY 21/22 CAC fans running in Slow;
ONLY 23 CAC fan running in FAST;
ONLY 24 CAC fan in Off.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-21/22 CAC running in slow is plausible since RCS pressure is low enough to cause a SIAS. However, SIAS-A will not actuate, which is 21/22 CACs.

B. Incorrect-CACs running in their original lineup is plausible if only Containment pressure is evaluated as below the SIAS setpoint of 2.8 PSIG. However, SIAS actuated on low RCS pressure and caused 23/24 CACs to start/shift to slow speed.

C. Correct-Per the 1C08 Alarm Manual, RCS reaching 1720 PSIA will cause a SIAS. Given conditions indicate that SIAS-A Logic is OOS, so only SIAS-B will actuate automatically. SIAS-B includes 23 and 24 CACs, which will shift/start in slow speed. 21 and 22 CACs will initially remain in original fast speed conditions since SIAS-A failed to actuate.

D. Incorrect-23/24 CACs in their original lineup is plausible since one logic channel of SIAS is OOS. However, SIAS B is functional and would start 23/24 CACs in slow.

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EXAM KEY

Tier/Group
2/1

K/A Info
022A3.01
022 Containment Cooling System (CCS)
A3 Ability to monitor automatic operation of the CCS, including:
A3.01 Initiation of safeguards mode of operation

RO Importance
4.1

Technical References
2C08-ALM, ESFAS 21 Alarm Manual (Rev 36)
STP O-7A-2, "A" Train Engineered Safety Features Logic Test
(Rev 61)
STP O-7B-2, "A" Train Engineered Safety Features Logic Test
(Rev 63)

References Provided to Applicants
None

Learning Objective
Given any ESFAS alarm condition assess the impact on plant
operation.

Question Source
New

Question History
N/A for new question

Cognitive Level
Comprehension or Analysis

10 CFR Part 55 Content
55.41(b)(7)

Comments
None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

42

ID: 2039739

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- Large Break LOCA
- EOP-5, Loss of Coolant Accident, is implemented
- All required ECCS equipment is operating

At time 1000, the following conditions exist:

- ACTUATION SYS RAS TRIP alarm is received
- Containment sump level as read on CNTMT WR WATER LVL is 53" and slowly rising
- RAS is verified and the RWT Outlet MOVs, SI-4142-MOV and SI-4143-MOV, are shut
- HPSI and Containment Spray pump amps, pressure, and flow are oscillating
- HPSI flow is throttled to the minimum allowed per EOP Attachment (10), High Pressure Safety Injection Flow
- Flow oscillations stop

At time 1010, the following conditions exist:

- HPSI and Containment Spray pump amps, pressure, and flow are oscillating

Which ONE of the following:

1. Describes why the oscillating conditions exist at 1010 and;
2. Which pumps should be tripped first?
 - A.
 1. The Containment Emergency Sump has blockage;
 2. HPSI Pumps.
 - B.
 1. The Containment Emergency Sump has blockage;
 2. Containment Spray Pumps.
 - C.
 1. The Containment water level is < minimum required;
 2. HPSI Pumps.
 - D.
 1. The Containment water level is < minimum required;
 2. Containment Spray Pumps.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Tripping the HPSI first is plausible since the HPSI are tripped if cavitation continues, but EOP-5 directs the CS pumps to be tripped first.

B. Correct-Per EOP-5, adequate level in the Containment exists for RAS as long as WR sump level is 28" or higher. Per EOP-5, if HPSI and cavitation continue after HPSI flow is throttled to the minimum allowed per Attachment 10, then the CS pumps are first secured and HPSI pump performance verified. HPSI are only secured if cavitation conditions continue after the CS pumps are off.

C. Incorrect-Inadequate level is plausible since this would result in inadequate NPSH for the pumps and could result in potential oscillations. However, per EOP-5, sump water level of 28" is sufficient to support HPSI and CS flow during a RAS provided there is no blockage. Additionally, if level was not sufficient, then flow oscillations would not have stopped initially at 1000. Tripping the HPSI first is plausible since the HPSI are tripped if cavitation continues, but EOP-5 directs the CS pumps to be tripped first.

D. Incorrect-Inadequate level is plausible since this would result in inadequate NPSH for the pumps and could result in potential oscillations. However, per EOP-5, sump water level of 28" is sufficient to support HPSI and CS flow during a RAS provided there is no blockage. Additionally, if level was not sufficient, then flow oscillations would not have stopped initially at 1000. EOP-5 directs the CS pumps to be tripped first for cavitation.

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EXAM KEY

Tier/Group

2/1

K/A Info

026A2.07

026 Containment Spray System (CSS)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

A2.07 Loss of containment spray pump suction when in recirculation mode, possibly caused by clogged sump screen, pump inlet high temperature exceeded cavitation, voiding), or sump level below cutoff (interlock) limit

RO Importance

3.6

Technical References

EOP-5-1, Loss of Coolant Accident (Rev 30)

EOP-5 Technical Bases (Rev 32)

References Provided to Applicants

None

Learning Objective

Given RCS parameters identify appropriate Safety Injection system response

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

43

ID: 2040882

Points: 1.00

Unit-1 is operating at 100% with the following conditions:

- Both 11 and 12 Component Cooling HXs are in service with Saltwater (SW) flow
- 11, 12, and 13 Containment Air Coolers are in service

The following transient occurs:

- Large break LOCA
- SIAS, CIS, and CSAS actuate
- 11 Containment Spray (CS) Pump trips
- EOP-5, Loss of Coolant Accident, is implemented
- SW flow through 12 CC HX is blocked by debris and goes to zero GPM
- RAS actuates and is verified
- RWT Outlet MOVs, 1-SI-4142-MOV and 1-SI-4143-MOV are shut

Which ONE of the following is:

1. The current status of Design Containment Cooling and;
2. The current status of 12 CS flow?
 - A. 1. Design Containment Cooling is ADEQUATE;
2. 12 CS Pump is providing COOLED spray flow.
 - B. 1. Design Containment Cooling is ADEQUATE;
2. 12 CS Pump is NOT providing cooled spray flow.
 - C. 1. Design Containment Cooling is NOT adequate;
2. 12 CS Pump is providing COOLED spray flow.
 - D. 1. Design Containment Cooling is NOT adequate;
2. 12 CS Pump is NOT providing cooled spray flow.

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-Per TS Bases 3.6.6, design containment cooling is met by either 2 CS pumps or 3 CACs. All 4 CACs should be operating, which meets design cooling and 1 CS with 2 CACs should be operating, which also meets design cooling. 12 CS Pump will start on the SIAS and spray flow will be initiated on the CSAS. When RAS occurs, 12 CS Pump suction will be the emergency sump and the 12 SDC HX will be cooled by the 11 CCHX as CCW is cross connected downstream of the CCHX's.

B. Incorrect-Design cooling is adequate due to all CACs operating. 12 CS spray flow not being cooled is plausible since there is no SW cooling to the 12 CCHX and Operator believes that only 12 CCHX will cool the 12 SDC HX. However, CCW is cross-connected downstream of the CCHX's and either CCHX will be able to cool both SDC HX's.

C. Incorrect-Inadequate design cooling is plausible if only the CS input to containment cooling is considered. However, all 4 CACs will be in operation. 12 CS Pump will be providing cooled spray flow.

D. Incorrect-Inadequate design cooling is plausible if only the CS input to containment cooling is considered. However, all 4 CACs will be in operation. 12 CS spray flow not being cooled is plausible since there is no SW cooling to the 12 CCHX and Operator believes that only 12 CCHX will cool the 12 SDC HX. However, CCW is cross-connected downstream of the CCHX's and either CCHX will be able to cool both SDC HX's.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

026K3.02

026 Containment Spray System (CSS)

K3 Knowledge of the effect that a loss or malfunction of the CSS will have on the following:

K3.02 Recirculation spray system

RO Importance

4.2

Technical References

Tech Spec 3.6.6 Bases

SD-015, Component Cooling Water System Description

SD-052, Safety Injection and Containment Spray System Description

USFAR (Rev 49)

EOP-5-1, Loss of Coolant Accident (Rev 30)

References Provided to Applicants

None

Learning Objective

State the minimum operating combinations of Containment Spray (CS) Pumps and/or Containment Air Coolers (CACs) that ensures the design pressure and temperature of containment is not exceeded for the design basis accident LOCA.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

44

ID: 2040918

Points: 1.00

Unit-2 is operating at 100% when the following transient occurs:

- 22 ADV fails full open

Which ONE of the following is:

1. The impact on the Main Steam system and:
2. What actions in AOP-7K, Overcooling Event in Mode 1 or 2, should be taken first?
 - A.
 1. Main Steam header flow rises 2.5% and;
 2. Trip the Reactor.
 - B.
 1. Main Steam header flow rises 10% and;
 2. Borate to restore power to 100%.
 - C.
 1. Main Steam header flow rises 2.5% and;
 2. Insert CEAs to restore power to 100%.
 - D.
 1. Main Steam header flow rises 10% and;
 2. Shift 22 ADV control to 2C43 and shut the ADV.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation
A. Incorrect-Tripping the reactor is plausible since this is AOP-7K action if power cannot be controlled and a reactor trip is imminent. The RO will be able to control power < the trip setpoint since one ADV will only raise steam flow by 2.5%.
B. Incorrect-10% rise in steam flow is plausible since this is flow increase from a TBV. ADVs combined capacity only equate to 5% total steam flow, with 1 ADV passing a max of 2.5% flow. Boration could be used to lower power.
C. Correct-ADV's combined capacity equates to 5% total steam flow, with 1 ADV passing a max of 2.5% flow. Per AOP-7K, initial steps would be to lower power by inserting CEAs or borating.
D. Incorrect-10% rise in steam flow is plausible since this is flow increase from a TBV. ADVs combined capacity only equate to 5% total steam flow, with 1 ADV passing a max of 2.5% flow. Shifting ADV control in an attempt to shut the ADV is plausible since this is an AOP-7K action to stop the excessive steam flow. However, this would take several minutes and controlling power and lowering turbine load would be the first actions taken in the Control Room.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

039A2.04

039 Main and Reheat Steam System (MRSS)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

A2.04 Malfunctioning steam dump

RO Importance

3.4

Technical References

AOP-7K-2, Overcooling Event in Mode 1 or 2 (Rev 30)

SD-083A, Main Steam System Description

References Provided to Applicants

None

Learning Objective

Given plant conditions, an event in progress, and several alternate actions, determine the most appropriate actions in accordance with AOP-7K

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

45

ID: 2040946

Points: 1.00

Unit-2 is operating at 25% with the following conditions:

- Plant startup in progress
- Feed Regulating Valves (FRVs) in Auto and 15% open
- Feed Bypass Valves (BFRVs) in Auto and 90% open

The following transient occurs:

- Reactor trip

Which ONE of the following is:

1. The expected initial response of the FRV and BFRV to the Reactor trip and;
2. The expected FRV and BFRV response after SG levels return to 0"?
 - A.
 1. FRVs will ramp full shut and BFRVs will ramp shut to 56% initially;
 2. FRV remains shut and BFRV controls level when SG reaches 0".
 - B.
 1. FRVs will remain at 15% and BFRVs will remain at 90% initially;
 2. FRV will ramp shut and BFRV controls level when SG level reaches 0".
 - C.
 1. FRVs will remain at 15% and BFRVs will remain at 90% initially;
 2. FRV will ramp shut to 5% and BFRV controls level when SG level reaches 0".
 - D.
 1. FRVs will ramp full shut and BFRVs will ramp shut to 56% initially;
 2. FRV opens to control level and BFRV ramps full shut when SG reaches 0".

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-On a reactor trip, FRVs will ramp full shut in 20 secs and the BFRV will position to 56% open. The valves will remain in this position until either RTO is reset manually or automatically. Per EOP-1, when RTO is reset, the FRV will remain shut and the BFRV will control in auto to control SG levels.

B. Incorrect-FRV and BFRV remaining in current conditions post trip is plausible if Operator assumes lower power means that feed will not configure to a post-trip configuration. However, if power is $> 14\%$, feed will go to RTO if there is a trip. The FRV ramping shut and the BFRV controlling level would occur in a low power condition.

C. Incorrect-FRV and BFRV remaining in current conditions post trip is plausible if Operator assumes lower power means that feed will not configure to a post-trip configuration. However, if power is $> 14\%$, feed will go to RTO if there is a trip. Both FRV and BFRV controlling level, with FRV at 5% is plausible if both valves were assumed to remain in auto.

D. Incorrect-FRV opening to control SG levels after reaching 0" is plausible since this is normal level control method in high power mode. However, the FRV will remain shut and the BFRV will control in auto to control SG levels during low power mode.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

059G2.1.27

059 Main Feedwater (MFW) System

2.1.27 Knowledge of system purpose and/or function.

RO Importance

3.9

Technical References

SD-0545A, Main Feedwater System Description

EOP-1-2, Reactor Trip (Rev 16)

References Provided to Applicants

None

Learning Objective

Identify the response of the MFV, BFV, and SGFP to a reactor trip/turbine trip from any power level, with or without a vital instrument bus loss

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

Matches K/A as question evaluates function of the MFW system controls to a Reactor trip.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

46

ID: 2040950

Points: 1.00

Unit-1 is operating at 100% with the following conditions:

- Feed Regulating Valves (FRVs) in Auto and 90% open
- Feed Bypass Valves (BFRVs) in Auto and shut

The following transient occurs:

- 11 and 12 SGFP speeds start to oscillate
- 11 SG FRV, 1-1111-CV, is oscillating
- AOP-3G, Malfunction of Main Feedwater is implemented
- Bypass Override is established

Which ONE of the following is the expected FRV/BFRV status immediately after Bypass Override is established?

- A. 11 SG FRV controller is in Manual with the FRV at ~80%,
11 SG BFRV controller is in Auto with BFRV at ~70%.
- B. 11 SG FRV controller is in Manual with the FRV at 90%,
11 SG BFRV controller is in Auto with BFRV at ~70%.
- C. 11 SG FRV is pinned locally with the FRV at 90%,
11 SG BFRV controller is in Auto with BFRV shut.
- D. 11 SG FRV is pinned locally with the FRV at ~80%,
11 SG BFRV controller is in Auto with BFRV shut.

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-Per AOP-3G, to establish bypass override, the FRV is placed in manual and then shut to allow the BFRV to open automatically to control level. When the BFRV is ~70%, override is established.

B. Incorrect-FRV at 90% and manual is plausible since this would stop SGFP oscillations. However, to establish bypass override in AOP-3G, the FRV must be shut to allow the BFV to open and control SG level in a preferred valve response (~70% open.) BFRV at 70% with FRV at initial condition is plausible if Operator assumes SGFP speed could be lowered to allow for BFRV to be open with the FRV at its initial position while still controlling level.

C. Incorrect-FRV pinned at 90% is plausible since this would stop SGFP oscillations. However, to establish bypass override in AOP-3G, the FRV must be shut to allow the BFV to open and control SG level in a preferred valve response (~70% open.) BFRV shut is plausible since BFRV was initially shut and raising SGFP speed would allow the FRV to be partially shut but still maintaining level.

D. Incorrect-FRV pinned at 80% would be success path to stop SGFP oscillations. BFRV shut is plausible since BFRV was initially shut and Operator assumed raising SGFP speed would allow the FRV to be partially shut but still maintaining level.

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EXAM KEY

Tier/Group

2/1

K/A Info

059K1.04

059 Main Feedwater (MFW) System

K1 Knowledge of the physical connections and/or cause effect relationships between the MFW and the following systems:

K1.04 S/GS water level control system

RO Importance

3.4

Technical References

AOP-3G, Malfunction of Main Feedwater System (Rev 13)

References Provided to Applicants

None

Learning Objective

Identify when the Bypass Override Mode should be selected and how SG level is controlled in BPO

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

47

ID: 2040959

Points: 1.00

Unit-2 is operating at 100% power at End of Cycle when the following transient occurs:

- Invalid AFAS-B actuates

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

- A. Calculated Thermal Power rises.
- B. Steam flow to the SGFPs rises.
- C. RCS T_{COLD} lowers.
- D. SG levels lower.

Answer: C

Answer Explanation

A. Incorrect-Calculated thermal power rising is plausible since actual reactor power will rise. However, calculated power, which uses feedflow as an input, will lower as less feedflow is required due to AFW feedflow of 600 GPM now initiated to the SGs.

B. Incorrect-Steam flow to the SGFPs rising is plausible since total SG steam flow will initially increase as steam driven AFW is started on the AFAS. However, the MFW feedrate will lower as SG levels rise, shutting the FRV and lowering the SGFP speed, resulting in less steam flow to the SGFPs.

C. Correct-RCS T_{cold} will lower when AFW is initiated. AFW suction source is from the CST, which is considerably cooler than MFW entering the SGs. This cooler water will cool the SGs and this will result in a larger heat transfer from the RCS to the SGs, lowering RCS T_{cold}.

D. Incorrect-SG level lowering is plausible since colder AFW will cool the SG. However, SG levels will initially rise as AFW is added to steady state MFW flow.

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EXAM KEY

Tier/Group

2/1

K/A Info

061K5.01

061 Auxiliary / Emergency Feedwater (AFW) System

K5 Knowledge of the operational implications of the following concepts as they apply to the AFW:

K5.01 Relationship between AFW flow and RCS heat transfer

RO Importance

3.6

Technical References

None, validated on simulator

References Provided to Applicants

None

Learning Objective

Explain the effects of an inadvertent AFAS on Reactor Power, Tcold, and Steam Generator Level.

Question Source

Modified

Question History

Modified question last used on 2002 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

Modified from 1440878

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

48

ID: 2040970

Points: 1.00

Unit-2 is in a normal electrical lineup when the following occurs:

- 2Y02 is placed on its Inverter Backup Bus (2Y11) per OI-26B, 120 Volt Vital AC and Computer AC

The following transient occurs:

- Loss of the Red Bus

Which ONE of the following is the expected response?

- A. 2Y02 remains energized and;
2A DG automatically starts and reenergizes the 21 4KV Bus
- B. 2Y02 initially deenergizes and;
2B DG automatically starts and reenergizes the 24 4KV Bus
- C. 2Y11 remains energized and;
2A DG does not automatically start but 21 4KV Bus remains energized.
- D. 2Y11 initially deenergizes and;
2B DG must be manually started to reenergize the 24 4KV Bus.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-2Y02 staying energized is plausible if Operator believes 2Y11 is powered from 21 4KV Bus (MCC-214). 2Y11, is powered from MCC-204, which will initially lose power. The 2A DG starting and loading is plausible since this is normal response on a LOOP. However, with loss of Red Bus only, the 21 4KV Bus remains energized.

B. Incorrect-2Y02 will initially deenergize. The 2B DG automatically starting is plausible since this is normal response to loss of 24 4KV bus. However, with 2Y02 deenergized, ESFAS B Logic will not start the 2B DG.

C. Incorrect-2Y11 staying energized is plausible if Operator believes 2Y11 is powered from 21 4KV Bus (MCC-214). 2Y11, is powered from MCC-204, which will initially lose power. The 2A DG will not start as 21 4KV bus will remain energized.

D. Correct-On a loss of the Red Bus, 24 4KV bus will be lost, initially deenergizing MCC-204, 2Y11, and 2Y02. With 2Y02 deenergized, ESFAS B Logic will be deenergized and will not automatically start the 2B DG. The 2B DG will need to be manually started to reenergize the 24 4KV Bus.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

062A1.03

062 AC Electrical Distribution System

A1 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including:

A1.03 Effect on instrumentation and controls of switching power supplies

RO Importance

2.5

Technical References

OI-26B, 120 Volt Vital AC and Computer AC (Rev 30)

SD-017, 120 Volt Instrument and Vital AC

References Provided to Applicants

None

Learning Objective

Describe the design features/interlocks which provide for the following:

- Transfer of inverter power to a backup bus
- Continuous power to 125 VDC system
- Battery short circuit protection

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

49

ID: 2041027

Points: 1.00

Unit-1 is operating at 100% power in a normal electrical lineup when the following occurs:

- Loss of Offsite Power
- 11 4KV Bus faults
- EOP-0, Post-Trip Immediate Actions, is implemented
- Small Break LOCA
- Valid Containment radiation monitor alarms are received

Which ONE of the following is the required actions associated with the Iodine Removal Units (IRUs) when performing Containment Environment?

- A. Place 12 IRU HS in Start ONLY.
- B. Place 12 IRU HS in Start and;
Place 13 IRU HS in Start ONLY.
- C. Place 12 IRU HS in Start and;
Place 13 IRU HS in Pull-To-Lock and;
Direct Equipment Operator to shift 13 IRU disconnects to 14 Bus and;
Place 13 IRU HS in Start.
- D. Place 12 IRU HS in Start and;
Place 13 IRU HS in Pull-To-Lock and;
Open 13 IRU Disconnect to 11 Bus and;
Remove Key from 13 IRU Disconnect to 11 Bus and;
Insert Key into 13 IRU Disconnect to 14 Bus and;
Shut 13 IRU Disconnect to 14 Bus and;
Place 13 IRU HS in Start.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Starting only 12 IRU is plausible since starting an IRU is required when performing CE. However, EOP-0 requires at least 2 IRUs to be running for a valid RMS alarm.

B. Incorrect-Starting 13 IRU is plausible since it would initially have power on a LOOP. However, when 11 4KV bus faults, the power supply must be first swapped to 14 bus.

C. Incorrect-Shifting disconnects locally is plausible since these are actions for other 480V pumps (Charging and CCW.) However, disconnects for IRUs are controlled at 1C10, not in the plant.

D. Correct-Following a LOOP and 11 4KV bus faulting, only 14 4KV bus loads will be left, which includes 12 IRU. EOP-0 directs that all available IRUs be started when a valid containment RMS alarm is received and requires that at least 2 IRUs be running. 11 will lose power when 11 4KV bus is lost as will 13 IRU, since 13 IRU is normally aligned to 11 Bus. To meet CE actions in EOP-0, the bus disconnects at 1C10 will be swapped from 11 to 14 bus first, and then 13 IRU can be started in addition to 12 IRU.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

062K4.03

062 AC Electrical Distribution System

K4 Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following:

K4.03 Interlocks between automatic bus transfer and breakers

RO Importance

2.5

Technical References

EOP-0-1, Post-Trip Immediate Actions (Rev 13)

OI-5B, Containment Iodine Removal Units (Rev 9)

References Provided to Applicants

None

Learning Objective

Identify the radiation monitors available to determine the status of the Containment Environment safety function per EOP-0

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

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EXAM KEY

50

ID: 2041030

Points: 1.00

Both units are in a normal electrical lineup when the following transient occurs:

- Large electrical transient
- All 125V DC Busses remain energized

12 Battery Amps indications on 1C24A now read as following:



Which ONE of the following Battery Chargers, if any, have been lost?

- A. ONLY 12 Battery Charger.
- B. BOTH 12 and 22 Battery Chargers.
- C. BOTH 12 and 24 Battery Chargers.

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EXAM KEY

D. No Battery Chargers have been lost.

Answer: C

Answer Explanation

A. Incorrect-Only 12 Charger is plausible since this is one of the Battery Chargers aligned to 12 DC Bus. However, if only one charger is lost, the other Battery Charger will maintain a charge on the battery.

B. Incorrect-22 Battery Charger is plausible since this supplies a DC Battery. However, 22 Charge would power 22 DC Bus/Battery.

C. Correct-Per SD-002, 125 Volt Electrical Power Distribution System Description, 12 and 24 Battery Chargers are aligned to 12 DC bus and battery. If 12 DC battery amps are discharging, then there are no battery chargers operating on the bus.

D. Incorrect-No Chargers lost is plausible if Operator interprets ammeter as charging versus discharging.

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EXAM KEY

Tier/Group

2/1

K/A Info

063K1.03

062 AC Electrical Distribution System

K1 Knowledge of the physical connections and/or cause effect relationships between the DC electrical system and the following systems:

K1.03 Battery charger and battery

RO Importance

2.9

Technical References

SD-002, 125 Volt Electrical Power Distribution System
Description

References Provided to Applicants

None

Learning Objective

Describe the electrical performance and design attributes of the following 125 VDC, and 120 VAC Vital system components:

- Station 125 VDC batteries
- Battery chargers
- Static Inverters

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

51

ID: 2046291

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- RCS activity starts rising due to a fuel failure
- Tube ruptures in 21 SG

Which ONE of following is the expected Main Steam Line (MSL) and N-16 RMS response?

- A. The MSLRMS for BOTH 21 and 22 SG will start to rise with 21 SG reading higher;
The 21 SG N-16 RMS will provide reliable indications only when power is > 50%.
- B. The MSLRMS for BOTH 21 and 22 SG will start to rise with 21 SG reading higher;
The 21 SG N-16 RMS will provide reliable indications at all times.
- C. The MSLRMS for ONLY 21 SG will start to rise;
The 21 SG N-16 RMS will provide reliable indications only when power is > 50%.
- D. The MSLRMS for ONLY 21 SG will start to rise;
The 21 SG N-16 RMS will provide reliable indications at all times.

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-Due to RMS location in MSIV room, activity in a Main Steam header will cause shine on the unaffected header, resulting in both MSLRMS rising (although the affected header would be greater.) Per OI-35, N-16 RMS are only reliable when power is $> 50\%$.

B. Incorrect- Both MSLRMS will rise. N-16 providing reliable indications at all times is plausible since MSLRMS will function at all power levels. However, N-16 processing once power is $< 50\%$ provides unreliable RMS indications.

C. Incorrect-Only 21 SG MSLRMS rising is plausible since this is the affected header. However, due to RMS location in MSIV room, activity in a Main Steam header will cause shine on the unaffected header, resulting in both MSLRMS rising. N-16 RMS are only reliable when power is $> 50\%$.

D. Incorrect-Only 21 SG MSLRMS rising is plausible since this is the affected header. However, due to RMS location in MSIV room, activity in a Main Steam header will cause shine on the unaffected header, resulting in both MSLRMS rising. Both MSLRMS will rise. N-16 providing reliable indications at all times is plausible since MSLRMS will function at all power levels. However, N-16 processing once power is $< 50\%$ provides unreliable RMS indications.

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EXAM KEY

Tier/Group
3/NA

K/A Info

G2.3.5

2.3.5 Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

RO Importance

3.4

Technical References

OI-35, Radiation Monitoring System (Rev 44)

References Provided to Applicants

None

Learning Objective

Given the status of any radiation monitor, use the Technical Specifications, Operating Instructions, ERPIP and the Alarm Response Manual to determine operability and/or actions required

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(11)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

52

ID: 2041151

Points: 1.00

Unit-2 is operating at 100% power with the following conditions:

- 2B DG is paralleled to 4KV Bus 24 and loaded to 3.0 MW

The following transient occurs:

- FUEL OIL LEVEL LOW IN DAY TANK alarms on the 2B DG Control Panel 2C61
- The Diesel Watch reports the 2B Fuel Oil Transfer Pump is not running

Which ONE of the following is how long the 2B DG will continue to operate in this condition?

- A. ~ 1 hour
- B. ~ 6 hours
- C. ~ 8 hours
- D. ~ 24 hours

Answer: A

Answer Explanation

A. Correct-Per the 1C62/2C62/2C61, 1B/2A/2B Diesel Generator Alarm Manual, approximately one hour of fuel remains in the day tank upon receipt of the alarm.

B. Incorrect-6 hours is plausible since this is compensatory action time for monitoring level if the annunciator is OOS.

C. Incorrect-8 hours is plausible since this is SR repeat time associated with declaring a DG OOS.

D. Incorrect-24 hours (1 day) is plausible due to name of tank, Day Tank.

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EXAM KEY

Tier/Group

2/1

K/A Info

064K6.08

064 Emergency Diesel Generators (ED/G)

K6 Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system:

K6.08 Fuel oil storage tanks

RO Importance

3.2

Technical References

1C62/2C62/2C61, 1B/2A/2B Diesel Generator Alarm Manual
(Rev 10)

Tech Spec 3.8.1 Bases

References Provided to Applicants

None

Learning Objective

Given a support system status, evaluate the effect on continued
DG operability for the following;

- DG Starting Air
- DG Fuel Oil Supply
- DG Cooling Water (SRW and Jacket Cooling)

Question Source

Bank

Question History

Not used on a NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

53

ID: 2041166

Points: 1.00

Unit-1 is operating at 100% power when the following transient occurs:

- RAD MON LVL HI alarms on 1C07
- High RMS reading on RI-202 is valid

Which ONE of the following is the expected automatic response of the Letdown Isolation CVs to the RAD MON LVL HI alarm?

- A. BOTH Letdown Isolation CV's remain open.
- B. ONLY Letdown Isolation CV, 1-CVC-515 (L/D STOP), automatically shuts.
- C. ONLY Letdown Isolation CV, 1-CVC-516 (L/D CNTMT ISOL), automatically shuts.
- D. BOTH Letdown Isolation CVs, 1-CVC-515 (L/D STOP) and 1-CVC-516 (L/D CNTMT ISOL) automatically shut.

Answer: A

Answer Explanation

A. Correct-Per the 1C07 alarm manual for RAD MON LVL HI, there are no automatic CVCS actions associated with high RCS activity.

B. Incorrect-Only CV-515 automatically shutting is plausible since only this CV shuts on high letdown temperature. However, there is no automatic signal for a high radiation conditions.

C. Incorrect-Only CV-516 automatically shutting is plausible since the only one CV shuts on high letdown temperature. However, there is no automatic signal for a high radiation conditions.

D. Incorrect-Both Letdown CVs isolating is plausible since both valves will isolate on a CVCIS. However, the CVCIS is caused by pressure in penetration rooms, not high radiation conditions.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

073K4.02

073 Process Radiation Monitoring (PRM) System

K4 Knowledge of PRM system design feature(s) and/or interlock(s) which provide for the following:

K4.02 Letdown isolation on high-RCS activity

RO Importance

3.3

Technical References

1C07, Chemical and Volume Control Alarm Manual (Rev 37)

References Provided to Applicants

None

Learning Objective

Given an abnormal chemistry conditions in the Primary or Secondary, the trainee will be able to identify the event, take appropriate actions per AOP-6A or AOP-10, to mitigate the event, and understand the basis for those actions

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

54

ID: 2041224

Points: 1.00

Which ONE of the following are the expected positions of Containment Air Cooler Service Water valves:

1. The CNTMT CLR EMER OUT valves at 1C09/10 on a SIAS and;
 2. On a RAS, the CAC SRW INL valves at 1C13?
- A.
 1. CNTMT CLR EMER OUT valves at 1C09/10 OPEN on SIAS;
 2. CAC SRW INL valves at 1C13 THROTTLED after RAS.
 - B.
 1. CNTMT CLR EMER OUT valves at 1C09/10 OPEN on SIAS;
 2. CAC SRW INL valves at 1C13 OPEN after RAS.
 - C.
 1. CNTMT CLR EMER OUT valves at 1C09/10 THROTTLED on SIAS;
 2. CAC SRW INL valves at 1C13 THROTTLED after RAS.
 - D.
 1. CNTMT CLR EMER OUT valves at 1C09/10 THROTTLED on SIAS;
 2. CAC SRW INL valves at 1C13 OPEN after RAS.

Answer: B

Answer Explanation

A. Incorrect-1C09/10 Emergency CVs will open on a SIAS. 1C13 SRW INL valves throttling on a RAS is plausible since they will throttle on a SIAS. However, on a RAS, the valves will go full open.

B. Correct-Per EOP Attachments SIAS Verification Checklist, the 1C09/10 Emergency CVs will open on a SIAS. Per the RAS Verification Checklist, the 1C13 SRW INL valves will go full open.

C. Incorrect-1C09/10 Emergency CVs throttling is plausible since the SRW INL valves on 1C13 will throttle on a SIAS. 1C13 SRW INL valves throttling on a RAS is plausible since they will throttle on a SIAS. However, on a RAS, the valves will go full open.

D. Incorrect-1C09/10 Emergency CVs throttling is plausible since the SRW INL valves on 1C13 will throttle on a SIAS. 1C13 SRW INL will open on a RAS.

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EXAM KEY

Tier/Group

2/1

K/A Info

076G2.1.31

076 Service Water System (SWS)

2.1.31 Ability to locate control room switches, controls, and indications, and to

| determine that they correctly reflect the desired plant lineup.

RO Importance

4.6

Technical References

EOP-ATT-1, EOP Attachments (Rev 19)

References Provided to Applicants

None

Learning Objective

Identify the ESFAS signal that initiates the following:

- Starts Containment Spray Pps/CACs
- Opens Containment Spray header CVs and CAC outlet SRW CVs

Question Source

Modified

Question History

Modified question last used on 2008 NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

55

ID: 2041235

Points: 1.00

U-1 is operating at 100% power when the following transient occurs:

- Instrument Air pressure lowers to 72 PSIG and continues to lower
- Plant Air pressure lowers to 88 PSIG and continues to lower

Which of the following conditions, assuming no Operator actions have been taken, should have occurred?

Condition 1-Both Saltwater Compressors started
Condition 2-PA to IA Cross Connect, 1-PA-2061-CV, opened
Condition 3-Standby Plant Air Compressor started
Condition 4-CNTMT IA SUPPLY, 1-IA-2085-CV, shut

- A. Condition 2 ONLY.
- B. Conditions 2 and 3 ONLY.
- C. Conditions 1, 2, 3, AND 4.
- D. Conditions 2, 3, and 4 ONLY.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Not including Condition 3 is plausible since each unit has its own Plant Air system. However, there is a cross tie between the units on the PA system. Per AOP-7D, standby PAC will start at a PA pressure of 91 PSIG. Not including Condition 4 is plausible if logic to shut supply CV is believed to be same as supply MOV (CIS.) Per AOP-7D, 2085-CV will shut at an IA pressure of 75 PSIG.

B. Incorrect-Not including Condition 4 is plausible if logic to shut supply CV is believed to be same as supply MOV (CIS.) Per AOP-7D, 2085-CV will shut at an IA pressure of 75 PSIG.

C. Incorrect-Including Condition 1 is plausible since starting the SWACs is a manual action to take when IA pressure lowers to 90 PSIG.

D. Correct-Per AOP-7D, Condition 2 will automatically happen as PA-2061-CV will open when IA pressure reaches 88 PSIG. Per AOP-7D, Condition 3 will automatically happen as standby PAC will start at a PA pressure of 91 PSIG. Per AOP-7D, Condition 4 will automatically happen as IA-2085-CV will shut at an IA pressure of 75 PSIG.

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EXAM KEY

Tier/Group

2/1

K/A Info

078A3.01

078 Instrument Air System (IAS)

A3 Ability to monitor automatic operation of the IAS, including:

A3.01 Air pressure

RO Importance

3.1

Technical References

AOP-7D-1, Loss of Instrument Air (Rev 16)

References Provided to Applicants

None

Learning Objective

Identify the design features that provide a backup for the instrument air system during a partial or total loss of the system

Question Source

Modified from 1440676

Question History

Question 1440676 not used on a NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

56

ID: 2041271

Points: 1.00

U-1 is operating at 100% power when the following transient occurs:

- Large Break LOCA
- Containment Pressure rises to 3.8 PSIG

Which ONE of the following Containment Isolation valves, if found OPEN, is challenging the Containment boundary?

- A. CNTMT CLR EMER OUT, 1-SRW-1590-CV
- B. CC CNTMT SUPPLY VLV, 1-CC-3382-CV
- C. 12 SG FW ISOL, 1-FW-4517-MOV
- D. 11 MSIV, 1-MS-4043-CV

Answer: B

Answer Explanation

A. Incorrect-1590-CV is plausible since this valve would SRW control flow through a Containment penetration. However, the SRW to the CACs is designed to operate during an accident, unlike SRW to the Turbine Building which isolates during an accident.

B. Correct-With a Containment pressure of 3.8 PSIG, a SIAS and CIS should have occurred. Per the 1C09 Alarm Manual, when CIS actuates, both CCW supply and return CVs to containment close.

C. Incorrect-4517-MOV is plausible since this valve would control FW flow through a Containment penetration. However, the Main Feedwater to the SGs is isolated during a CSAS, and not during a CIS.

D. Incorrect-4043-CV is plausible since this valve would control MS flow through a Containment penetration. However, Main Steam to the SGs is isolated during a CSAS, and not during a CIS.

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EXAM KEY

Tier/Group

2/1

K/A Info

103A3.01

103 Containment System

A3 Ability to monitor automatic operation of the containment system, including:

A3.01 Containment isolation

RO Importance

3.9

Technical References

1C08-ALM, ESFAS 11 Alarm Manual (Rev 35)

EOP-ATT-1, EOP Attachments (Rev 19)

References Provided to Applicants

None

Learning Objective

Given any ESFAS alarm condition assess the impact on plant operation.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

57

ID: 2041287

Points: 1.00

U-1 is operating at 100% power when the following transient occurs:

- The spring setting on Pressurizer (PZR) Safety Valve 1-RV-200 changes and raises the lift setpoint 300 PSIA

Which ONE of the following is the impact?

- A. LTOP lift setpoint will also rise by 300 PSIA.
- B. Only one PZR Safety Valve would lift before the RCS Pressure Safety Limit is reached.
- C. DSS will now deenergize power to the MG Sets only after PZR Safety Valve 1-RV-201 lifts.
- D. Change in spring force will result in greater propensity for PZR Safety Valve 1-RV-200 seat leakage to start.

Answer: B

Answer Explanation

A. Incorrect-LTOP setpoint rising is plausible since RV-200 is credited in the bases for preventing exceeding the RCS Pressure Safety limit in Modes 1-5. However, LTOP is an electronic setpoint and utilizes the PORVs for pressure protection, not the Code Safety RVs.

B. Correct-Per TS 3.4.10, lift setpoints for RV-200 are 2475-2575 PSIA and RV-201 lifts between 2475-2600 PSIA. If the lift setpoint for RV-200 rises by 300 PSIA, then the lowest pressure that RV-200 would lift would be 2775 PSIA. This is above the RCS Pressure Safety Limit of 2750 PSIA in TS 2.1.2.

C. Incorrect-DSS actuates after first RV is plausible if DSS setpoint is believed to be 2540 PSIA instead of 2450 PSIA.

D. Incorrect-Higher risk of starting seat leakage is plausible since changing spring tension can start a Code Safety to leak, but only if the spring force is less on the valve, resulting in a lower lift setpoint.

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EXAM KEY

Tier/Group

2/2

K/A Info

002K6.12

002 Reactor Coolant System (RCS)

K6 Knowledge of the effect of a loss or malfunction on the following RCS components:

K6.12 Code Safety valves

RO Importance

3.0

Technical References

Tech Spec 2.1.2

Tech Spec 3.4.10

References Provided to Applicants

None

Learning Objective

State the operating characteristics of the PZR code safety valves

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

58

ID: 2041318

Points: 1.00

U-1 is operating at 100% power when the following transient occurs:

- Loss of Offsite Power
- 1B DG fails to start
- PZR level lowers to 85"
- RCS pressure lowers to 1900 PSIA
- No Operator actions have been taken

Which ONE of the following:

1. PZR Heaters, if any, are currently energized/On and;
2. What PZR Heaters currently have power but are NOT energized/On?
 - A.
 1. None;
 2. 11 Proportional Heater.
 - B.
 1. None;
 2. 12 Proportional Heater.
 - C.
 1. 11 Proportional Heater;
 2. 11 Backup Heater.
 - D.
 1. 12 Proportional Heater;
 2. 13 Backup Heater.

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Correct-Since PZR level is $< 101''$, the PZR low level cutout will deenergize all heaters. 11 Proportional Heater is powered from 11A 480V Bus. On a LOOP, the 1A DG will repower the 11 4KV bus and the 11A 480V Bus.

B. Incorrect-Since PZR level is $< 101''$, the PZR low level cutout will deenergize all heaters. 12 Proportional Heater having power is plausible since they are powered from DG backed buses and would have power following a LOOP. However, the 1B DG failed to load, which would be the emergency power supply for the 12 Proportional Heater.

C. Incorrect-11 Proportional Heater energized is plausible since the Proportional Heaters normally remain energized at all times. However, since PZR level is $< 101''$, the PZR low level cutout will deenergize all heaters. 11 Backup Heater will have power from the 11B 480V Bus.

D. Incorrect-12 Proportional Heater energized is plausible since the Proportional Heaters normally remain energized at all times. However, 12 Proportional Heaters are powered from the 14A 480V bus, which will not have power since the 1B DG failed to load. 13 Backup Heater having power is plausible since they are powered from DG backed buses and would have power following a LOOP. However, the 1B DG failed to load, which would be the emergency power supply for the 13 Backup Heater.

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EXAM KEY

Tier/Group

2/2

K/A Info

011K2.02

011 Pressurizer Level Control System (PZR LCS)

K2 Knowledge of bus power supplies to the following:

K2.02 PZR heaters

RO Importance

3.1

Technical References

SD-064A, Reactor Coolant System Description

1C06-ALM, RCS Control Alarm Manual (Rev 51)

References Provided to Applicants

None

Learning Objective

Identify the pressurizer pressure control setpoints for automatic operation of the following components:

- Pressurizer spray valves
- Proportional heaters
- Backup Heaters

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

59

ID: 2041324

Points: 1.00

U-1 is operating at 70% power with Group 5 CEAs at 120" when the following transient occurs:

- Loss of Plant Computer and DAS
- AOP-7H, Loss of Plant Computer in Mode 1 or 2, is implemented.

The following actions are taken with Group 5 CEAs

- Pulse Counters are recorded and each is reading 2230
- CEAs are withdrawn 5 steps
- CEAs are reinserted to 120"

Group 5 CEAs Pulse Counters are recorded again

Which ONE of the following is the expected Pulse Counter readings for Group 5 CEAs when recorded the second time and why?

- A. 2235 because Pulse Counters ONLY count up during outward CEA motion.
- B. 2225 because Pulse Counters ONLY count down during inward CEA motion.
- C. 2240 because Pulse Counters count up during BOTH inward and outward CEA motion.
- D. 2230 because Pulse Counters count up for outward CEA motion AND count down for inward CEA motion.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-2235 is plausible if counter only thought to track cycle time CEAs moving in outward direction for lift coil maintenance frequency determination. However, CEA Pulse Counters cannot distinguish between inward and outward motion, and the counter rises each time a CEA is moved, regardless of direction.

B. Incorrect-2225 is plausible if counter only thought to track cycle time CEAs moving in inward direction for pull down coil maintenance frequency determination. However, CEA Pulse Counters cannot distinguish between inward and outward motion, and the counter rises each time a CEA is moved, regardless of direction.

C. Correct-When the CEAs are moved 5 steps, this will be 5 pulses to the Coil Power Programmers, raising the Pulse Counter readings by 5. When the CEAs are reinserted back to 120", then 5 more steps are added to the Pulse Counter, resulting in an overall increase in 10 ($2230 + 10 = 2240$.) Per AOP-7H Technical Bases, once the CEAs are moved, the Pulse Counting method can no longer be credited as a CEA position indicator channel as the Pulse Counter cannot distinguish between inward and outward motion.

D. Incorrect-Pulse counter reading 2230 is plausible since CEA has returned to its original height of 120". However, CEA Pulse Counters cannot distinguish between inward and outward motion, and the counter rises each time a CEA is moved, regardless of direction.

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EXAM KEY

Tier/Group

2/2

K/A Info

014K5.01

014 Rod Position Indication System (RPIS)

K5 Knowledge of the operational implications of the following concepts as they apply to the RPIS:

K5.01 Reasons for differences between RPIS and step counter

RO Importance

2.7

Technical References

AOP-7H, Loss of Plant Computer in Mode 1 or 2 Technical Bases (Rev 7)

References Provided to Applicants

None

Learning Objective

Given a loss of Plant Computer, identify how CEA positions are verified

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

60

ID: 2041372

Points: 1.00

Which ONE of the following is why the NUCLEAR PWR CALIBRATE potentiometer on the Linear Range Nuclear Instruments (LRNIs) must be adjusted:

1. During a plant startup between 50 to 100% power and;
2. While maintaining 100% power, from the MOC to the EOC?
 - A.
 1. LRNIs will read HIGHER than actual power until calibrated;
 2. LRNI detectors will see a LOWER neutron flux as fuel is depleted.
 - B.
 1. LRNIs will read LOWER than actual power until calibrated;
 2. LRNI detectors will see a HIGHER neutron flux as fuel is depleted.
 - C.
 1. LRNIs will read HIGHER than actual power until calibrated;
 2. LRNI detectors will see a HIGHER neutron flux as fuel is depleted.
 - D.
 1. LRNIs will read LOWER than actual power until calibrated;
 2. LRNI detectors will see a LOWER neutron flux as fuel is depleted.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-LRNI will read higher until calibrated during a startup. Detectors seeing a lower neutron flux as fuel is depleted is plausible if Operator is only evaluating that fuel is being depleted and power is thus going down. However, stem states that power is being maintained constant and a flux level rises as the core ages, resulting in more leakage and more the LRNI seeing a higher neutron flux.

B. Incorrect-LRNI reading lower is plausible if Operator believes rising temperature will result in greater absorption capability in the core. However, as RCS temperature rises, more neutrons leak from the core and are able to reach the LRNI detectors, so LRNI readings will actually rise until calibrated. As fuel is depleted, a higher neutron flux will be required to maintain the same power. A higher flux will result in more neutrons leaking and arriving at the excore detectors.

C. Correct-LRNI will read higher until calibrated during a startup. As power is increased, RCS temperatures will rise. This will result in increased leakage from the core and more neutrons will be seen at the LRNI detectors. This will result in an increase in the LRNI ion chamber reaction, causing the LRNI readings to rise. As fuel is depleted, a higher neutron flux will be required to maintain the same power. A higher flux will result in more neutrons leaking and arriving at the excore detectors.

D. Incorrect-LRNI reading lower is plausible if Operator believes rising temperature will result in greater absorption capability in the core. However, as RCS temperature rises, more neutrons leak from the core and are able to reach the LRNI detectors, so LRNI readings will actually rise until calibrated. Detectors seeing a lower neutron flux as fuel is depleted is plausible if Operator is only evaluating that fuel is being depleted and power is thus going down. However, stem states that power is being maintained constant and flux level rises as the core ages, resulting in more leakage and more the LRNI seeing a higher neutron flux.

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EXAM KEY

Tier/Group

2/2

K/A Info

015A1.06

015 Nuclear Instrumentation System (NIS)

A1 Ability to predict and/or monitor changes in parameters to prevent exceeding design limits) associated with operating the NIS controls including:

A1.06 Fuel burnup

RO Importance

2.5

Technical References

SD-078A, Nuclear Instrumentation System Description

References Provided to Applicants

None

Learning Objective

Given a steady state power condition, calibrate excore/RRS Nuclear Instrument Channels during Steady/Non-Steady State conditions

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

61

ID: 2041373

Points: 1.00

Unit-1 is operating at 100% when a Reactor trip occurs.

Which ONE of the following, assuming no operator actions, is the response of the Main Steam system several minutes after the trip?

- A. TBVs will modulate based on Main Steam Header pressure ONLY.
- B. ADVs will modulate based on T_{COLD} indication ONLY.
- C. TBVs will modulate based on T_{HOT} indication ONLY.
- D. ADVs will modulate based on SG pressures ONLY.

Answer: A

Answer Explanation

A. Correct-Several minutes after the trip, once the quick trip signal has cleared, the TBVs are controlled by PIC-4056. Per SD-083A, PIC-4056 uses Main Steam Header pressure as its process variable.

B. Incorrect-ADV using T_{cold} is plausible since T_{avg} is used to control ADVs. However, T_{cold} only does not provide T_{avg}.

C. Incorrect-TBVs using T_{hot} is plausible since ADV uses T_{avg}, with T_{hot} as part of that process variable. However, the TBVs use only Main Steam Header pressure for their control.

D. Incorrect-ADV using SG pressure is plausible since TBVs use pressure to modulate. However, the ADVs use only T_{avg}.

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EXAM KEY

Tier/Group

2/2

K/A Info

016A3.01

016 Non-Nuclear Instrumentation System (NNIS)

A3 Ability to monitor automatic operation of the NNIS, including:

A3.01 Automatic selection of NNIS inputs to control systems

RO Importance

2.9

Technical References

SD-083A, Main Steam System Description

References Provided to Applicants

None

Learning Objective

Given plant conditions and/or parameters evaluate the operation of the TBVs/ADVs for normal and emergency operating conditions

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

62

ID: 2041588

Points: 1.00

Which of the following equipment is/are positioned by a Containment Radiation Signal?

Equipment 1-Containment Purge Exhaust Valve
Equipment 2-Containment Purge Supply Fan
Equipment 3-Penetration Room Exhaust Fans
Equipment 4-Containment H₂ Purge Isolation MOVs

- A. Equipment 1 ONLY.
- B. Equipment 1, 2, 3, AND 4.
- C. Equipment 1 and 3 ONLY.
- D. Equipment 1, 2, and 4 ONLY.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Not including Equipment 2 is plausible if only release from the Containment is considered. However, Purge supply and exhaust fans and valves are isolated by CRS. Not including Equipment 4 is plausible if only Containment Purge system is considered due to its piping size, and not the H2 Purge. However, per EOP Attachments, CRS shuts the H2 Purge MOVs as well as Containment Purge.

B. Incorrect-Including Equipment 3 is plausible since Penetration Room Exhaust Fans start to maintain Aux Building conditions during an event in the Containment. However, Penetration Room Exhaust Fans are actuated by CIS, not CRS.

C. Incorrect-Not including Equipment 2 is plausible if only release from the Containment is considered. However, Purge supply and exhaust fans and valves are isolated by CRS. Including Equipment 3 is plausible since Penetration Room Exhaust Fans start to maintain Aux Building conditions during an event in the Containment. However, Penetration Room Exhaust Fans are actuated by CIS, not CRS. Not including Equipment 4 is plausible if only Containment Purge system is considered due to its piping size, and not the H2 Purge. However, per EOP Attachments, CRS shuts the H2 Purge MOVs as well as Containment Purge.

D. Correct-Per EOP Attachments, CRS will secure both Containment Purge fans (supply and exhaust), shut both Containment Purge valves (supply and exhaust), and shut both H2 Purge Isolation MOVs.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/2

K/A Info

029K1.03

029 Containment Purge System (CPS)

K1 Knowledge of the physical connections and/or cause-effect relationships between the Containment Purge System and the following systems:

K1.03 Engineered safeguards

RO Importance

3.6

Technical References

EOP-ATT-1, EOP Attachments (Rev 19)

References Provided to Applicants

None

Learning Objective

Evaluate plant conditions and/or parameters and determine the following: ESFAS signal status; conditions required to reset an ESFAS signal; conditions required to block; ESFAS component status; operator action required

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

63

ID: 2041590

Points: 1.00

Spent Fuel Pool (SFP) level very slowly lowers 2" due to evaporation.

Which ONE of the following sources can be used to directly raise level in the SFP?

- A. 11 and 21 RWT ONLY.
- B. Demineralized Water ONLY.
- C. CVCS Blended Makeup to the SFP ONLY.
- D. 11, 21 RWT and Demineralized Water ONLY.

Answer: D

Answer Explanation

A. Incorrect-Not including DI is plausible since DI does not meet boron concentration requirements of the SFP. However, when SFP evaporates, boron does not evaporate, only the water. Therefore, DI can be used and boron concentration should be identical once level has been raised 2".

B. Incorrect-DI only is plausible since taking water from RWT could put respective in low RWT Tech Spec if not controlled. However, per OI-24F, either units RWT can be used to fill the SFP.

C. Incorrect-CVCS makeup is plausible since this is a method to refill the RWT and CVCS system piping can be used for DI fill of the SFP. However, CVCS does not directly discharge into the SFP.

D. Correct-Per OI-24F, options to refill the SFP include DI or taking SFP suction from the 11 or 21 RWT.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/2

K/A Info

033K4.01

033 Spent Fuel Pool Cooling System (SFPCS)

K4 Knowledge of design feature(s) and/or interlock(s) which provide for the following:

K4.01 Maintenance of spent fuel level

RO Importance

2.9

Technical References

OI-24F, Filling Spent Fuel Pool (Rev 4)

References Provided to Applicants

None

Learning Objective

Describe the physical connection and define the relationship that exists between the Spent Fuel Pool Cooling system and the following plant components or systems, in accordance with plant Operating Procedures:

- Spent Fuel Pool
- Refueling Pool
- Refueling Water Tank
- Shutdown Cooling
- Service Water
- Demineralized water

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(7)

Comments-None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

64

ID: 2041616

Points: 1.00

The following transient occurs:

- Transfer Cask is dropped into the SFP
- SFP level starts to lower
- AOP-6F, Spent Fuel Pool Cooling Malfunction, is implemented
- SFP level is now 63' and lowering

Which ONE of the following is:

1. The MINIMUM Tech Spec water level in the SFP required to move irradiated fuel with the Spent Fuel Handling Machine and;
2. What AOP-6F actions are required?
 - A.
 1. 65' 8.5";
 2. Stop both 11 and 12 SFP Pumps
 - B.
 1. 56' 8.4";
 2. Stop both 11 and 12 SFP Pumps
 - C.
 1. 65' 8.5";
 2. Start both 11 and 12 Penetration Room Exhaust Fans
 - D.
 1. 56' 8.4";
 2. Start both 11 and 12 Penetration Room Exhaust Fans

Answer: A

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation
A. Correct-Per OI-25A, the minimum SFP water level that satisfies TS 3.7.13 is 65' 8.5". Per AOP-6F, both SFP pumps are stopped when SFP level is lowering.
B. Incorrect-56' is plausible since this is minimum level for fuel moves in the Reactor Vessel. However, SFP racks are at a higher elevation than the top of the core, and 65' 8.5" is required in the SFP. Both SFP pumps would be secured per AOP-6F.
C. Incorrect-Per OI-25A, the minimum SFP water level that satisfies TS 3.7.13 is 65' 8.5". Starting Pene Room Exhaust Fans is plausible since these are actions in AOP-6D for a fuel handling incident. However, these are actions for an issue in the Containment, not the Aux Building.
D. Incorrect-56' is plausible since this is minimum level for fuel moves in the Reactor Vessel. However, SFP racks are at a higher elevation than the top of the core, and 65' 8.5" is required in the SFP. Starting Pene Room Exhaust Fans is plausible since these are actions in AOP-6D for a fuel handling incident. However, these are actions for an issue in the Containment, not the Aux Building.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/2

K/A Info

034A2.02

034 Fuel Handling Equipment System (FHES)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System; and (b) based on those

predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

A2.02 Dropped cask

RO Importance

3.4

Technical References

AOP-6F, Spent Fuel Pool Cooling Malfunction (Rev 7)

OI-25A, Spent Fuel Handling Machine (Rev 49)

Tech Spec 3.7.13

References Provided to Applicants

None

Learning Objective

Given plant conditions, identify the entry conditions for AOP-6F, and based on the conditions determine the required actions in accordance with AOP-6F

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

65

ID: 2042197

Points: 1.00

Unit-2 is operating at 100% power with the following initial condition:

- Circ Water (CW) temperature is 55°F
- Barometric Pressure is 30.0 in-HG_a
- 21, 22, and 23 Condenser Air Removal Units (CARs) running

The following transient occurs:

- Generator load lowers 10 MWe
- No Operator actions have been taken

Which ONE of the following:

1. Parallel indications, considered separately, require entry into AOP-7G, Loss of Condenser Vacuum, and;
2. Since Turbine load must be reduced if backpressure reaches 4.75 in-HG_a, what is the HIGHEST vacuum when the downpower is required?
 - A. 1. CW Inlet temperature rises to 60°F;
2. 23.50 in-HG_a.
 - B. 1. CW Inlet temperature rises to 60°F;
2. 25.25 in-HG_a.
 - C. 1. STM LINE DRN PANEL 2T22 alarm on 2C03 with 24 CAR running;
2. 23.50 in-HG_a.
 - D. 1. STM LINE DRN PANEL 2T22 alarm on 2C03 with 24 CAR running;
2. 25.25 in-HG_a.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-CW rising to 60F is plausible if only generator load dropping is considered as the entry to AOP-7G. However, as CW inlet temperature rises, generator load will lower as vacuum lowers, but this is not a reason to enter AOP-7G. 23.5" is plausible since this is value in AOP-7G-1 for reducing power, but only if Reactor power is < 5%. For U-2, the downpower start is required at a backpressure of 4.75 in-HGa, which is 25.25 in-HGa (30.0 - 4.75).

B. Incorrect-CW rising to 60F is plausible if only generator load dropping is considered as the entry to AOP-7G. However, as CW inlet temperature rises, generator load will lower as vacuum lowers, but this is not a reason to enter AOP-7G. Per AOP-7G-2, a load reduction is required at a backpressure of 4.75 in-HGa, which is 25.25 in-HGa (30.0 - 4.75).

C. Incorrect-AOP-7G would be entered if 24 CAR automatically started. 23.5" is plausible since this is value in AOP-7G-1 for reducing power, but only if Reactor power is < 5%. For U-2, the downpower start is required at a backpressure of 4.75 in-HGa, which is 25.25 in-HGa (30.0 - 4.75).

D. Correct-24 is the standby CAR. The standby CAR does not automatically start unless vacuum lowers to < 26". If the CAR starts, the 2T22 alarm on 2C03 will alarm as the CONDR VAC PPS SEAL PRESS LO/TEMP HI alarm will annunciate on 2T22 whenever a CAR is manually or automatically starts. With Generator load dropping and a backup CAR starting, vacuum is lowering and AOP-7G should be entered. Per AOP-7G-2, a load reduction is required at a backpressure of 4.75 in-HGa, which is 25.25 in-HGa (30.0 - 4.75).

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/2

K/A Info

055G2.4.4

055 Condenser Air Removal System (CARS)

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

RO Importance

4.5

Technical References

AOP-7G-2, Loss of Condenser Vacuum (Rev 6)

References Provided to Applicants

None

Learning Objective

Given a loss or lowering Condenser vacuum, determine the correct actions to mitigate the event in accordance with plant operating procedures

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

66

ID: 2042199

Points: 1.00

Which ONE of the following is the MINIMUM approval required to deviate from an Operations procedure?

- A. BOTH the Shift Manager and the Unit Supervisor.
- B. The Shift Operations Superintendent ONLY.
- C. The Shift Technical Advisor ONLY.
- D. The Shift Manager ONLY.

Answer: D

Answer Explanation

A. Incorrect-Both SM and the US is plausible because both are allowed to approve the deviation individually. However, both are not required to approve the deviation.

B. Incorrect-SOS is plausible since OP-CA-0201 requires the SOS to be notified before the deviation if possible. However, only the SM is required to approve the deviation as a minimum.

C. Incorrect-STA is plausible since STA approval is required to transition from a procedure when not meeting an Optimal EOP. However, this is not the same as a deviation where the procedure cannot be followed.

D. Correct-Per OP-CA-0201, the SM or the US (when the SM is not available) can approve the use of a deviation from an Ops procedure.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group
3/NA

K/A Info
G2.1.1

2.1.1 Knowledge of conduct of operations requirements

RO Importance
3.8

Technical References
OP-CA-0201, Calvert Cliffs Operating Manual (Rev 1)

References Provided to Applicants
None

Learning Objective
Apply the requirements of NO-1-201, Calvert Cliffs Operating Manual

Question Source
Bank

Question History
Last used on 2012 NRC Exam

Cognitive Level
Memory or Fundamental Knowledge

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

Comments
None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

67

ID: 2042228

Points: 1.00

Which ONE of the following:

1. Areas of the plant must an Operator have their 800 Mhz Radio turned off and;
2. Which of the situations below would require a Plant-Wide announcement over both the Plant Page and the Operation 800 Mhz Radio?

Situation 1-Closing 0-552-43 to energize the 500 KV Black Bus

Situation 2-Receipt of CNTMT NORM SUMP LVL HI five minutes after initiation of Shutdown Cooling

- A.
 1. Unit-1 Cable Spreading Room;
 2. Situation 1 AND 2.
- B.
 1. Unit-2 45' SWGR Room;
 2. Situation 1 AND 2.
- C.
 1. Unit-1 27' SWGR Room;
 2. Situation 1 ONLY.
- D.
 1. 72' Computer Room;
 2. Situation 1 ONLY.

Answer: D

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Radios would be turned off in the U-1 CSR. Including Situation 2 is plausible if Operator confuses normal sump with emergency containment sump alarm. However, normal sump alarm by itself is not immediate indication of any radiological or safety issue and does not warrant a plant wide alarm.

B. Incorrect-Turning off radio in 45' SWGR Room is plausible since there are several do not transmit zones in the room, but radios are not required to be turned off. Including Situation 2 is plausible if Operator confuses normal sump with emergency containment sump alarm. However, normal sump alarm by itself is not immediate indication of any radiological or safety issue and does not warrant a plant wide alarm.

C. Incorrect-Turning off radio in 27' SWGR Room is plausible since there are several do not transmit zones in the room, but radios are not required to be turned off. Situation 1 would require a plant wide and radio announcement per OP-AA-104-101. Closing a 500 KV breaker to energize a 500 KV bus would be considered energizing a major electrical buses.

D. Correct-Per OP-CA-113-1001, radios are required to be turned off in the 45' and 72' Computer Rooms. Situation 1 would require a plant wide and radio announcement per OP-AA-104-101. Closing a 500 KV breaker to energize a 500 KV bus would be considered energizing a major electrical buses.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.1.14

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

RO Importance

3.1

Technical References

OP-AA-104-101, Communications (Rev 3)

OP-CA-113-1001, Control of Radio Transmitters (Rev 0)

References Provided to Applicants

None

Learning Objective

Apply the requirements of NO-1-201, Calvert Cliffs Operating Manual

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

68

ID: 2042245

Points: 1.00

Unit-1 is operating at 50% power when the following transient occurs:

- Loss of Offsite Power

Which ONE of the following actions outside the Control Room must be performed?

- A. Verify SWGR Room Ventilation in service per OI-22H, Switchgear Ventilation and Air Conditioning.
- B. Verify the MSR 2ND STAGE BYPASS CONTROL VALVE panel loaders in manual with a 0% output.
- C. Close 0C DG disconnects 189-1106 and 189-1406.
- D. Operate ADVs in manual.

Answer: A

Answer Explanation

A. Correct-Per EOP-0, SWGR HVAC is verified during or following an electrical perturbation, which LOOP certainly is. There are no SWGR HVAC controls in the Control Room and system operation is verified locally by the Equipment Operator.

B. Incorrect-MSR Panel loader operation is plausible since the MSR Source MOVs will not close on the LOOP. However, since both source MOVs are deenergized, the MSIVs are closed instead of operating the Panel Unloaders.

C. Incorrect-Operating 0C DG disconnects is plausible since the 0C is emergency started if a DG does not load. However, no information states that the 11 or 14 4KV bus are not energized.

D. Incorrect-Operating ADVs in manual is plausible since 1Y09 will be deenergized for ~ 10 seconds during the LOOP. However, once power is restored by the DGs, the ADV controller will continue to function in Auto and no local operation will be required.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.1.8

2.1.8 Ability to coordinate personnel activities outside the control room

RO Importance

3.4

Technical References

EOP-0-1, Post-Trip Immediate Actions (Rev 13)

References Provided to Applicants

None

Learning Objective

Recall the basis for the minimum required electrical buses to satisfy the Vital Auxiliary Safety Function

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

69

ID: 2042270

Points: 1.00

Unit-1 is operating at 100% power with the following condition:

- 14 4KV Bus is on its Alternate Feeder Breaker

Maintenance has requested that the Normal Feeder Breaker be closed and the Alternate Feeder Breaker be opened

Which ONE of the following actions are required, per HU-AA-101, Human Performance Tools and Verification Practices, BEFORE performing the breaker operations?

Action 1-Self Check (STAR)

Action 2-Peer Check

Action 3-Independent Verification

- A. Action 1 and 3 ONLY.
- B. Action 1 and 2 ONLY.
- C. Action 1, 2, AND 3.
- D. Action 2 ONLY.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Not including Action 2 and including Action 3 is plausible since IV is a practice to ensure that components are in their proper position. However, per HU-AA-101, Peer Check (PC) is used to ensure the proper component is identified and will be operated in the correct sequence prior to actually manipulating the component.

B. Correct-Per HU-AA-101, Action 1, Self-Check (STAR), is used for all manipulations to ensure proper position and response. Per HU-AA-101, Action 2, PC, is used to ensure the proper component is identified and will be operated in the correct sequence prior to actually manipulating the component.

C. Incorrect-Including Action 3 is plausible since IV is a practice to ensure that components are in their proper position. However, the IV occurs after the component has been manipulated.

D Incorrect-Not including Self-Check (STAR) is plausible since PC would ensure proper component is positioned to the correct position. However, per HU-AA-101, Action 1 (Self-Check (STAR)), is used for all manipulations to ensure proper position and response.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group
3/NA

K/A Info

G2.2.14

2.2.14 Knowledge of the process for controlling equipment configuration or status

RO Importance

3.9

Technical References

HU-AA-101, Human Performance Tools and Verification Practices (Rev 9)

References Provided to Applicants

None

Learning Objective

Recognize and model proper HU tool usage in accordance with Exelon HU Procedures

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

70

ID: 2042271

Points: 1.00

Using Provided References

Unit-1 is operating at 100% power when the following transient occurs:

- LIA for 11 CST fails low
- 11 CST LVL alarms on 1C03

Which ONE of the following is:

1. Whose permission is required to disable the 11 CST LVL alarm and;
2. What is the MAXIMUM monitoring frequency established to check 11 CST level locally?
 - A. 1. Work Execution Coordinator;
2. Check every hour.
 - B. 1. Unit Supervisor;
2. Check every hour.
 - C. 1. Unit Supervisor;
2. Check every 6 hours.
 - D. 1. Work Execution Coordinator;
2. Check every 6 hours.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-WEC is plausible since Temporary Change Configurations are normally introduced there before the Control Room. However, per OP-AA-103-102, the Unit Supervisors permission is required to disable an alarm function. Every 6 hours is plausible since this is log frequency for CST level. However, per 1C03 Alarm Manual window C-15 compensatory measures, local tank level should be monitored at least hourly.

B. Correct-Per OP-AA-103-102, the Unit Supervisors permission is required to disable an alarm function. Per 1C03 Alarm Manual window C-15, local tank level should be monitored at least hourly as the comp measure if the alarm is OOS.

C. Incorrect-Per OP-AA-103-102, the Unit Supervisors permission is required to disable an alarm function. Every 6 hours is plausible since this is log frequency for CST level. However, per 1C03 Alarm Manual window C-15 compensatory measures, local tank level should be monitored at least hourly.

D. Incorrect-WEC is plausible since Temporary Change Configurations are normally introduced there before the Control Room. However, per OP-AA-103-102, the Unit Supervisors permission is required to disable an alarm function. Every 6 hours is plausible since this is log frequency for CST level. However, per 1C03 Alarm Manual window C-15 compensatory measures, local tank level should be monitored at least hourly.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.2.43

2.2.43 Knowledge of the process used to track inoperable alarms

RO Importance

3.0

Technical References

1C03-ALM, Condensate and Feedwater Alarm Manual (Rev 56)

OP-AA-103-102, Watchstanding Practices (Rev 18)

References Provided to Applicants

1C03-ALM, Condensate and Feedwater Alarm Manual Window C-15 (11 CST Level)

Learning Objective

Apply the requirement of CNG-OP-1.01-2003, Alarm Response and Control

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(10)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

71

ID: 2046121

Points: 1.00

Unit-1 was operating at 100% power when the following transient occurred:

- Loss of Offsite Power
- Steam Generator Tube Rupture in 11 SG
- EOP-6, Steam Generator Tube Rupture is implemented
- T_{HOT} is 546°F and slowly rising

Which ONE of following is the reason T_{HOT} must be lowered to $< 515^{\circ}\text{F}$?

- A. Minimizes the differential pressure across the break thereby reducing the leakrate.
- B. Establishes natural circulation cooling as soon as possible during the event.
- C. Reduces S/G pressure below the lift setpoints of the Main Steam Safety valves.
- D. Prevents dilution of the RCS by maintaining S/G pressure lower than RCS pressure.

Answer: C

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Plausible to the Operator since lowering of temperature is done in EOP-5 to support the depressurization of the RCS. Per the EOP-6 Technical Basis document: The initial cooldown is done prior to isolating the affected S/G. This action reduces the risk of challenging the steam generator safety valves of the affected S/G after it is isolated.

B. Incorrect-Plausible to the Operator since natural circ conditions will exist due to the LOOP. A cooldown to 515°F is not necessary to establish natural circulation conditions

C. Correct-Per the EOP-6 Technical Basis document: The initial cooldown is done prior to isolating the affected S/G. This action reduces the risk of challenging the steam generator safety valves of the affected S/G after it is isolated.

D. Incorrect- Plausible to the Operator since uncontrolled dilution is always a concern when shutdown. EOP-6 accounts for the potential flow from the S/G to the RCS by requiring additional boron/SDM. Backflow from the S/G to the RCS is an available method for controlling affected S/G level.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group
3/NA

K/A Info
G2.3.11
2.3.11 Ability to control radiation releases

RO Importance
3.8

Technical References
EOP-6, Steam Generator Tube Rupture Bases (Rev 21)

References Provided to Applicants
None

Learning Objective
Recall the strategy and the basis for the major actions performed in EOP-6, Steam Generator Tube Rupture, and what actions are required if safety functions are in jeopardy of being lost

Question Source
Bank

Question History
Last used on 2016 NRC Exam

Cognitive Level
Memory or Fundamental Knowledge

10 CFR Part 55 Content
55.41(b)(12)

Comments
Justification for K/A match: If Operator is not aware of why Thot must be lowered to <515F and instead isolates the SG when Tcold or Tavg is < 515F, then uncontrolled airborne release path via the Main Steam Safety Valves is possible due to elevated SG pressures.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

72

ID: 2046128

Points: 1.00

Unit-1 was operating at 100% power when the following transient occurred:

- 5 GPM tube leak in 12 SG
- AOP-2A-1, Excessive Reactor Coolant Leakage, is implemented

Which ONE of the following is the reason the manual valves are shut to isolate the Condensate Dump to 11 CST?

- A. To ensure that the water level in the condenser hotwell remains high enough to meet the NPSH requirement of the Condensate Pumps.
- B. To ensure the water level in the condenser hotwell remains high enough to adequately dilute radioactive water from 12 SG.
- C. To isolate flow to the CST to prevent the spread of contamination.
- D. To isolate flow to the CST to prevent it from overflowing.

Answer: C

Answer Explanation

A. Incorrect-NPSH is plausible since actions would result in maximum NPSH to the CPs. However, per AOP-2A, they are shut to minimize contamination.

B. Incorrect-Dilution is plausible since isolation the dump would maximize hotwell inventory. However, per AOP-2A, they are shut to minimize contamination.

C. Correct-Per AOP-2A Technical Bases, Dump CV from the hotwell to the CST is manually isolated to prevent spread of contamination.

D. Incorrect-Overflow is plausible since hotwell level will rise during a plant shutdown with the TBVs available. However, per AOP-2A, they are shut to minimize contamination.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.3.14

2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

RO Importance

3.4

Technical References

AOP-2A-1, Excessive Reactor Coolant Leakage (Rev 26)

AOP-2A Technical Bases (Rev 23)

References Provided to Applicants

None

Learning Objective

Given an RCS leak, quantify leakage and/or implement the applicable actions per AOP-2A

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.41(b)(12)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

73

ID: 2041101

Points: 1.00

Using Provided References

1B DG is in service with the following conditions:

- 1B East Air Receiver pressure is 230 PSIG and steady
- 1B West Air Receiver pressure is 231 PSIG and steady

The following transient occurs:

- An air leak develops downstream of the 1B West Air Receiver on 1B-DSA-108
- STARTING AIR PRESSURE LOW alarms on 1B DG Control Panel 1C62
- 1B-DSA-101, 1B-DSA-109, 1B-DSA-114, and 1B-DSA-1003 are all isolated to stop the leak
- 1B West Air Receiver pressure is now 20 PSIG and steady

Which ONE of the following:

1. Is the expected East Air Receiver pressure response and;
2. What would be the response of the 1B DG if an automatic start signal is received?
 - A.
 1. East Air Receiver pressure would lower to ~ 20 PSIG;
 2. 1B DG will start in < 10 seconds and is OPERABLE.
 - B.
 1. East Air Receiver pressure should remain ~ 230 PSIG;
 2. 1B DG will start in < 10 seconds and is OPERABLE.
 - C.
 1. East Air Receiver pressure would lower to ~ 20 PSIG;
 2. 1B DG will start in > 10 seconds and is INOPERABLE.
 - D.
 1. East Air Receiver pressure should remain ~ 230 PSIG;
 2. 1B DG will start in > 10 seconds and is INOPERABLE.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Air pressure of 20# in the East Receiver is plausible since the 1B Air Compressor discharges to both East and West Receivers. However, check valves in the system on the downstream side will prevent the loss of both receivers due to a leak on just one. At 20# in both receivers#, the DG would not start. The DG starting in < 10 seconds to remain operable is plausible with the lower receiver pressure if cross-connect lines to other Fairbanks DGs are considered and would still start 1B DG regardless of East Receiver pressure.

B. Correct-Per print OM-69SH0002, check valves on the inlet and outlet of the receivers would prevent the loss of both receivers when a leak occurs on one of the systems. Per SD-024A, Fairbanks Morse Diesel Generators System Description, one receiver is fully capable of starting the DG within its required Tech Spec time. Per TS 3.8.1, that time is < 10 seconds.

C. Incorrect-Air pressure of 20# in the East Receiver is plausible since the 1B Air Compressor discharges to both East and West Receivers. However, check valves in the system on the downstream side will prevent the loss of both receivers due to a leak on just one. The DG starting in a delayed sequence (> 10 seconds) is plausible with a low air pressure.

D. Incorrect-Air pressure should remain ~230 PSIG due to the system check valves. The DG starting in a delayed sequence (> 10 seconds) is plausible if Operator believes both receivers are necessary to start the DG. However, the DG will start within Tech Spec times when one receiver is at normal pressure.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group

2/1

K/A Info

064K6.07

064 Emergency Diesel Generators (ED/G)

K6 Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system:

K6.07 Air receivers

RO Importance

2.7

Technical References

SD-024A, Fairbanks Morse Diesel Generators System

Description

Tech Spec 3.8.1

OM-69SH0002

References Provided to Applicants

Print OM-69/60727SH0001

Print OM-69/60727SH0002

Print OM-69/60727SH0003

Learning Objective

Given a support system status, evaluate the effect on continued DG operability for the following;

- DG Starting Air
- DG Fuel Oil Supply
- DG Cooling Water (SRW and Jacket Cooling)

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.41(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

74

ID: 2046292

Points: 1.00

Unit-2 is operating at 100% power when the following transient occurs:

- Reactor trip

The following conditions exist during EOP-0, Post-Trip Immediate Actions:

- One CEA has remained at 135" withdrawn
- PZR level has lowered to 100" and is rising at 5"/min
- SG levels are (-)100" and very slowly lowering
- AFW flowrate is raised
- SG Blowdown RMS is deenergized

Which ONE of following EOP-0 reports is expected for the current conditions?

- A. Taking Alternate Actions for Stuck CEA.
- B. Monitoring Core and RCS Heat Removal for trends in SG levels.
- C. Pressure and Inventory Control cannot be met due to low Pressurizer Level.
- D. Monitoring Rad Levels External to Containment for trends in Main Steam N-16 Monitors.

Answer: B

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Answer Explanation

A. Incorrect-Alternate Actions (AA) for stuck CEA is plausible since AA are taken for two stuck CEAs, but not for just one.

B. Correct-SG level is required to be between (-)170 to (+)30" with MFW/AFW operating to maintain level. Per OP-CA-103-102-1001, monitoring would be correct call since SG level is meeting level criteria but positive trends have not yet been established.

C. Incorrect-PIC not met is plausible since 160" is normal shutdown value when CVCS has stabilized from trip. However, 100" and rising is trending to 160" and PIC would be met.

D. Incorrect-Monitoring RLEC is plausible since SG BD RMS are OOS and N-16 monitors provide SG activity trends. However, N-16 indications are only valid when above 50%. A more applicable report would be RLEC not met due to loss of power effects.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group
3/NA

K/A Info
G2.4.17

2.4.17 Knowledge of EOP terms and definitions

RO Importance
3.9

Technical References
OP-CA-103-102-1001, Strategies for Successful Transient
Mitigation (Rev 4)
EOP-0-1, Post-Trip Immediate Actions (Rev 13)

References Provided to Applicants
None

Learning Objective
Given plant conditions, apply the communication terms when
assessing safety function status while performing EOP-0 per OP-
CA-103-102-1001

Question Source
New

Question History
N/A for new question

Cognitive Level
Comprehension or Analysis

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

Comments
Justification for K/A match: Operator must be aware of specific
wording/terms used to report status of EOP Safety Functions.
Terms used in EOP-0 reports have specific definitions and are
then used by the SRO to evaluate the Diagnostic Safety Function
Check.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

75

ID: 2046403

Points: 1.00

The following conditions have occurred:

- An Alert was declared
- You have been assigned as the Shift Communicator
- You are directed to perform the State and Local notifications

While performing the notifications, both the OFFSITE CONFERENCE and the B/U OFFSITE CONFERENCE buttons on the Dedicated Offsite Agency phone do not automatically initiate a conference call.

Which ONE of the following is the next preferred communication method?

- A. Simultaneously call agencies using the Radio Communications Console.
- B. Individually call agencies using the Dedicated Offsite Agency phone.
- C. Individually call agencies using any available operating phone.
- D. Simultaneously call agencies using ERONs.

Answer: B

Answer Explanation

A. Incorrect-Simultaneous radio communication is plausible since this is a method to notify offsite agencies. However, this is done only after phone communications are determined not available.

B. Correct-Per EOP-CE-114-100, if no conference calls work using the Dedicated Offsite phone, then the agencies are called individually using the dedicated line.

C. Incorrect-Individual calls using any phone is plausible if Dedicated Offsite phone is believed to only perform conference calls. However, per EOP-CE-114-100, if no conference calls work using the Dedicated Offsite phone, then the agencies are called individually using the dedicated line.

D. Incorrect-ERONs is plausible since this is a notification method usually performed first, but this is for ERO personnel, not offsite agencies.

CALVERT CLIFFS AUGUST 2018 RO

EXAM KEY

Tier/Group
3/NA

K/A Info
G2.4.43

2.4.43 Knowledge of emergency communications systems and techniques

RO Importance
3.2

Technical References
EP-CE-114-100, Emergency Notifications (Rev 6)

References Provided to Applicants
None

Learning Objective
Given an EAL condition, notify offsite agencies of the Emergency Classification

Question Source
New

Question History
N/A for new question

Cognitive Level
Memory or Fundamental Knowledge

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

Comments
None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

1

ID: 2039124

Points: 1.00

****SRO ONLY****

Unit-1 is operating at 100% power when the following transient occurs:

- A PZR Spray CV, RC-100F-CV, fails open
- Manual Operator actions are attempted but the Spray CV cannot be shut and remains full open

Which ONE of the following:

1. Would indicate a PZR Safety Valve is leaking at the same time the PZR Spray Valve is failed open and;
2. What directions would have the MAXIMUM effect in slowing the rate of the depressurization since the PZR Spray Valve can't be shut?
 - A.
 1. Pressurizer RV Acoustic Flow Monitor levels rising and;
 2. Stop one RCP in the 12 Loop associated with the open PZR Spray CV per the 1C06 Alarm Manual.
 - B.
 1. SPRAY LINE TEMP LO alarm on 1C06 and;
 2. Stop one RCP in the 12 Loop associated with the open PZR Spray CV per the 1C06 Alarm Manual.
 - C.
 1. Quench Tank pressure rising and;
 2. Stop one RCP in the 11 Loop associated with the open PZR Spray CV per the 1C06 Alarm Manual.
 - D.
 1. Reactor power rising and;
 2. Stop one RCP in the 11 Loop associated with the open PZR Spray CV per the 1C06 Alarm Manual.

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Stopping one RCP in the 12 loop is plausible since lowering 12 Loop flow will reduce PZR Spray CV flow some amount. However, the Spray CV's are associated with the 11 Loop and stopping either of the 11 Loop RCPs will lower Spray CV flow more compared to 12 Loop, thereby minimizing the depressurization rate.

B. Incorrect-Spray Line Temp alarm is plausible if Operator confuses Surge Line temperature low alarm on 1C06 response with Spray Line temperature low alarm. The Spray Line temperature low alarm would not actuate as temperatures in the spray line would actually rise with more spray flow. Stopping one RCP in the 12 loop is plausible since lowering 12 Loop flow will reduce PZR Spray CV flow some amount. However, the Spray CV's are associated with the 11 Loop and stopping either of the 11 Loop RCPs will lower Spray CV flow more compared to 12 Loop, thereby minimizing the depressurization rate.

C. Correct-A leaking PZR RV would result in the Acoustic Monitor indications on 1C06 starting to rise, QT parameters (pressure, level, temperature) starting to rise, and downstream tail pipe temperatures rising. Stopping one RCP in the 11 Loop is the action directed in the 1C06 Alarm Manual as this will lower spray flow to ~1/3 of its normal value, thereby limiting the rate of depressurization.

D. Incorrect-Reactor power rising is plausible if Operator concentrates on PZR level response with RV leaking (and PZR level believed to start rising) and determines PZR level rise is due to power rise which is caused by Reactivity Void coefficient change. However, pressure will actually lower with a leaking RV, and power would actually lower.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/1

K/A Info

008AA2.19

008 Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

AA2. Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident:

AA2.19 PZR spray valve failure, using plant parameters

SRO Importance

3.6

Technical References

1C06 Alarm Manual (51)

OI-1H, Pressurizer Pressure Control (Rev 10)

References Provided to Applicants

None

Learning Objective

Given any instrument failure:

- Identify the failure
- Determine its impact on plant operations
- Take action IAW the alarm manuals to correct, control, or mitigate the consequences of the failure
- Recognize indications for system operating parameters which are entry conditions for TECH SPECS and apply the action statement

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

2

ID: 2039221

Points: 1.00

****SRO ONLY****

Unit-2 is operating at 100% power with the following initial conditions:

- VCT pressure is 40 PSIG and steady

The following transient occurs on 22B RCP:

- Middle seal pressure rapidly rises to 2000 PSIA and steadies
- Upper seal pressure lowers to 130 PSIA and steadies
- Controlled Bleedoff flow rises to 2.7 GPM and steadies

Which ONE of the following:

1. Describes the impact on plant operation and;
2. What actions should be directed?
 - A.
 1. The Lower and Middle seals have failed, requiring immediate trip of the 22B RCP;
 2. Trip the reactor per the 2C06 Alarm Manual, then perform Reactivity per EOP-0, Post-Trip Immediate Actions, then secure 22B RCP.
 - B.
 1. The Lower and Upper seals have failed, requiring immediate trip of the 22B RCP;
 2. Trip the reactor per the 2C06 Alarm Manual, then perform Reactivity per EOP-0, Post-Trip Immediate Actions, then secure 22B RCP.
 - C.
 1. The Lower and Middle seals have failed, requiring commencement of an expeditious plant shutdown;
 2. Commence expeditious plant shutdown per OP-3, Normal Power Operation, then cooldown the RCS to less than 350°F per OP-5, Plant Shutdown From Hot Standby to Cold Shutdown, then secure 22B RCP.
 - D.
 1. The Lower and Upper seals have failed, requiring commencement of an expeditious plant shutdown;
 2. Commence expeditious plant shutdown per OP-3, Normal Power Operation, then cooldown the RCS to less than 350°F per OP-5, Plant Shutdown From Hot Standby to Cold Shutdown, then secure 22B RCP.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer: D

Answer Explanation

A. Incorrect-Middle Seal failing is plausible if seal pressures are assumed to read downstream of seal instead of upstream. Immediate trip of the RCP is plausible if Operator confuses actions for loss of 3 seals to actions required for just 2 seals lost, which is the power reduction and cooldown.

B. Incorrect-Immediate trip of the RCP is plausible if Operator confuses actions for loss of 3 seals to actions required for just 2 seals lost, which is the power reduction and cooldown.

C. Incorrect-Middle Seal failing is plausible if seal pressures are assumed to read downstream of seal instead of upstream.

D. Correct-Per OI-1A, the middle seal pressure is normally ~1500 PSIA and the upper seal normally ~ 730 PSIA. With middle seal rising to 2000 PSIA, this means the lower seal has failed. The middle seal has not failed since it is breaking down pressure from 2000 to 130 PSIA. A functioning seal will normally break down at least 300 PSID, but the upper seal reading of 130 PSIA indicates that the difference in pressure between the upper seal and the VCT is only 90 PSID, indicating the upper seal has also failed as well. Per the 2C06 alarm manual, an expeditious plant shutdown per OP-3 is conducted, followed by a cooldown to 350F per OP-5, and then the 22B RCP can be secured.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/1

K/A Info

015AA2.01

015/017 Reactor Coolant Pump (RCP) Malfunctions

AA2. Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow):

AA2.01 Cause of RCP failure

SRO Importance

3.5

Technical References

2C06 ALM, RCS Control Alarm Manual (Rev 50)

OI-1A, Reactor Coolant System and Pump Operations (Rev 41)

References Provided to Applicants

None

Learning Objective

Given any RCP seal alarm, determine seal status and required actions for single or multiple RCS seal conditions

Question Source

Modified

Question History

Not used on a NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

Modified from Q1436580

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

3

ID: 2039270

Points: 1.00

****SRO ONLY****

Unit-1 is operating in Mode 3 with the following initial conditions:

- RCS temperature is 400°F

The following transient occurs:

- A steam line rupture rapidly cools the RCS to < 365°F and temperature continues to lower
- EOP-4, Excess Steam Demand Event, is implemented per ERPIP-3.0
- 11 and 13 HPSI pumps are injecting to maintain RCS inventory

Which ONE of the following:

1. Low Temperature actions are required and;
2. What is the Tech Spec bases for these actions?
 - A.
 1. Place BOTH 11 and 13 HPSI Pumps in Pull To Lock;
 2. Prevents RCS overpressurizing by limiting HPSI flow.
 - B.
 1. Verify 12 HPSI Pump in Pull-To-Lock and place 13 HPSI Pump in Pull-To-Lock;
 2. Prevents RCS overpressurizing by limiting HPSI flow.
 - C.
 1. Place BOTH 11 and 13 HPSI Pumps in Pull To Lock;
 2. Limits heat input from the Safety Injection pumps when cooldown is complete.
 - D.
 1. Verify 12 HPSI Pump in Pull-To-Lock and place 13 HPSI Pump in Pull-To-Lock;
 2. Limits heat input from the Safety Injection pumps when cooldown is complete.

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Placing 11/13 HPSI in PTL is plausible since 2 HPSI pumps must be disabled during LTOP conditions and Operator believes 12 HPSI is left in auto and will provide flow to maintain injection flow. However, 12 HPSI is normally maintained in PTL and only one of the HPSI are required to be secured per EOP-4. Per the TS bases, this is done to provide overpressure protection by minimizing coolant inventory input volume.

B. Correct-When LTOP conditions exist ($< 365\text{F}$ on Unit-1), TS 3.4.12 applies, allowing a maximum of one HPSI to inject into the RCS. Per EOP-4, if HPSI flow is required, then 2 HPSI pumps are placed in PTL. Per the TS bases, this is done to provide overpressure protection by minimizing coolant inventory input volume.

C. Incorrect-Placing 11/13 HPSI in PTL is plausible since 2 HPSI pumps must be disabled during LTOP conditions and Operator believes 12 HPSI is left in auto and will provide flow to maintain injection flow. However, 12 HPSI is normally maintained in PTL and only one of the HPSI are required to be secured per EOP-4. Limiting heat input is plausible since LTOP also requires disabling the RCPs at a lower temperature to minimize potential RCS heat input from forced flow (allowing a hot SG to cause the SG to heat up.) However, SI pump heat input is minimal as compared to the RCPs and is heat input from the SI pumps is not the reason in the Tech Spec bases.

D. Incorrect-Per EOP-4, if HPSI flow is required, then 2 HPSI pumps are placed in PTL. Limiting heat input is plausible since LTOP also requires disabling the RCPs at a lower temperature to minimize potential RCS heat input from forced flow (allowing a hot SG to cause the SG to heat up.) However, SI pump heat input is minimal as compared to the RCPs and is heat input from the SI pumps is not the reason in the Tech Spec bases.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/1

K/A Info

040AG2.2.25

APE 040 Steam Line Rupture

AG2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits

SRO Importance

4.2

Technical References

EOP-4, Excess Steam Demand Event (Rev 19)

EOP-4 Technical Bases (Rev 19)

Tech Spec 3.4.12

Tech Spec 3.4.12 Bases

References Provided to Applicants

None

Learning Objective

Apply the bases for the Technical Specifications

Question Source

Modified

Question History

Not used on a NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(2)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

4

ID: 2039363

Points: 1.00

SRO ONLY

Unit-1 is operating at 100% power when following transient occurs:

- 1Y01 is lost

Which ONE of the following remaining indications are BOTH Post-Accident Monitoring Instrumentation AND are specifically referenced on the EAL Chart when evaluating Fission Product Barrier status?

- A. U-1 CNTMT RAD MON, 1-RI-5317B, on 2C24B.
- B. CHG HDR PRESS, 1-PIA-212, on 1C07.
- C. 11 SG LEVEL, 1-LIC-1113A, on 1C03.
- D. 11 RWT LVL, 1-LIA-4143, on 1C09.

Answer: A

Answer Explanation

A. Correct-U-1 Containment Hi Range Radiation Monitor, 1-RI-5317B, is a PAMs instrument as listed in TS 3.3.10 and STP O-63. 1-RI-5317B is also specifically listed on the EAL Chart to evaluate Fission Product Barrier status.

B. Incorrect-Charging Header Pressure is plausible since Charging Header Flow is a PAMs instrument, but the pressure is not. The Pressure could be used to evaluate charging header flow > Leak rate on the EAL Chart.

C. Incorrect-11 SG Level instrument 1-LIC-1113A is plausible since WR SG level instruments (1114A-D) are PAMs instruments. However, the NR Safety Channels are not PAMS. 1-LIC-1113A could be used to evaluate SGTR conditions for an EAL, but the instrument does not provide a direct referenced value on the EAL Chart.

D. Incorrect-11 RWT instrument, 1-LIA-4143 is a PAMs instrument. Its use for evaluating EAL is plausible since a lowering RWT level could indicate a liquid release. However, the RWT level would not be directly used to evaluate Fission Product Barrier status on the EAL Chart.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/1

K/A Info

057AG2.4.3

057 Loss of Vital AC Electrical Instrument Bus

2.4.3 Ability to identify post-accident instrumentation

SRO Importance

3.9

Technical References

EAL-HOT Chart (Rev 4)

Tech Spec 3.3.10

STP O-63, Remote Shutdown and Post Accident Monitoring Instr
Channel Check (Rev 35)

References Provided to Applicants

None

Learning Objective

Given a Mode of operation and a set of equipment conditions,
identify applicable Technical Specifications (TS) Conditions and
Technical Requirement Manual (TRM) Nonconformances

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

5

ID: 2039563

Points: 1.00

****SRO ONLY****

Using Provided References

Both units are operating at 100% power when the following transient occurs:

- A Major Grid disturbance
- 11 SERV BUS VOLTS lowers to 12.3 KV
- 11 GEN FREQUENCY lowers to 59.9 Hz
- Unit-1 declares Offsite power sources INOPERABLE

The Grid disturbance has now cleared with the following conditions:

- SMECO is being credited as one of the Offsite power sources for Unit-1
- STP O-90, AC Sources And On Site Power Distribution Systems, 7-Day Operability Verification has just been completed.

Which ONE of the following is:

1. Why the Offsite power source was initially declared INOPERABLE on Unit-1 and;
2. The MAXIMUM time before STP O-90 must be completed again?
 - A. 1. Due to low system voltage ONLY;
2. 7 days.
 - B. 1. Due to low system voltage ONLY;
2. 8 hours.
 - C. 1. Due to BOTH low system voltage AND low system frequency;
2. 7 days.
 - D. 1. Due to BOTH low system voltage AND low system frequency;
2. 8 hours.

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Per AOP-7M and STP O-90, offsite power sources are inoperable if 13 KV bus voltage is <12.45 KV. 7 days is plausible since this is frequency of SR 3.8.1.2 in Surveillance Control Program. However, Per Condition A, SR 3.8.1.1 applies when SMECO is aligned and STP O-90 would be required every 8 hours.

B. Correct-Per AOP-7M and STP O-90, offsite power sources are inoperable if 13 KV bus voltage is <12.45 KV. SR requirement of TS 3.8.1 is that STP O-90 be completed within an hour and every 8 hours with an offsite source INOPERABLE and SMECO aligned as the offsite source.

C. Incorrect-Low frequency is plausible since frequency is lower than normal and Operator confuses AOP-7M trip criteria with inoperability. 7 days is plausible since this is frequency of SR 3.8.1.2 in Surveillance Control Program. However, Per Condition A, SR 3.8.1.1 applies when SMECO is aligned and STP O-90 would be required every 8 hours.

D. Incorrect-Low frequency is plausible since frequency is lower than normal and Operator confuses AOP-7M trip criteria with inoperability. SR requirement of TS 3.8.1 is that STP O-90 be completed within an hour and every 8 hours with an offsite source INOPERABLE and SMECO aligned as the offsite source.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/1

K/A Info

077G2.4.47

077 Generator Voltage and Electric Grid Disturbances

2.4.47 Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material

SRO Importance

4.2

Technical References

AOP-7M (Rev 2)

References Provided to Applicants

TS 3.8.1

Surveillance Frequency Control Program

Learning Objective

Given an action in AOP-7M, identify the basis for the action

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(2)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

6

ID: 2039689

Points: 1.00

****SRO ONLY****

Unit-1 is operating at 100% power with the following initial condition:

- 11 AFW Pump OOS

The following transient occurs:

- Loss of P-13000-1
- EOP-0-1, Post-Trip Immediate Actions is implemented
- 11 4KV bus faults
- 12 AFW Pump trips and cannot be reset
- Feeder breaker to U-4000-21 trips open and can't be shut
- 24 4KV bus faults

Which ONE of the following heat removal success paths will be available in the Optimal EOP?

- A. Establishing OTCC with 13 HPSI.
- B. Establishing AFW flow with 23 AFW Pump.
- C. Establishing MFW flow with 11 or 12 SGFP.
- D. Establishing Condensate Booster Pump Injection with any CBP.

Answer: A

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Correct-Conditions presented result in a loss of all feedwater condition. Main feed is lost due to the loss of P-13000-1. AFW is lost because 11 is OOS, 12 AFW pump trips, and 13/23 AFW pumps do not have power. EOP-3, Loss of All Feedwater is written to address a Loss of Offsite Power condition coincident with the Loss of All Feedwater. OTCC will be the success path in EOP-3 as CBP Injection will be unavailable due to the loss of power.

B. Incorrect-23 AFW Pump is plausible if Operator only evaluates U-1 power supplies and does not recognize that 23 AFW pump is also not available due to loss of 24 4KV bus.

C. Incorrect-MFW is preferred source of heat removal and is plausible if P-13000-1 loads are confused with P-13000-2 loads. However, P-13000-1 will result in loss of 12 and 13 4KV bus, which will result in loss of all MFW.

D. Incorrect-EOP-3 would be implemented due to the loss of P-13000-1 and loss of all AFW to Unit-1. CBP injection is plausible if P-13000-1 loads are confused with P-13000-2 loads. However, P-13000-1 will result in loss of 12 and 13 4KV bus, which will result in loss of all CBPs. The ability to power the CBPs from Unit-2 is also not available since U-4000-21 is deenergized.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/1

K/A Info

CE06EA2.1

E06 Loss of Feedwater

EA2 Ability to determine and interpret the following as they apply to the (Loss of Feedwater):

EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations

SRO Importance

3.9

Technical References

EOP-0-1, Post-Trip Immediate Actions (Rev 13)

EOP-3-1, Loss of All Feedwater (Rev 23)

References Provided to Applicants

None

Learning Objective

Given plant conditions and the EOP-0 diagnostic flow chart determine the correct procedure to implement

Question Source

Modified from 1451343

Question History

Modified question last used on 2014 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

7

ID: 2039733

Points: 1.00

****SRO ONLY****

Unit-2 is operating at 100% power when the following transient occurs:

- Steam Generator Tube Leak in 22 SG
- Letdown lowers to minimum
- 21 and 22 Charging Pumps are running
- PZR level is 206" and steady
- AOP-2A, Excessive Reactor Coolant Leakage, is implemented

Which ONE of the following is:

1. The appropriate section of AOP-2A to implement and;
2. How will 22 SG be isolated when EOP-6, Steam Generator Tube Rupture, is implemented?
 - A.
 1. Step V, RCS Leakage Within The Capacity of One Charging Pump;
 2. SGIS will actuate to fully isolate the SG.
 - B.
 1. Step VI, RCS Leakage Exceeds One Charging Pump, Modes 1 & 2;
 2. SGIS will actuate to fully isolate the SG.
 - C.
 1. Step V, RCS Leakage Within The Capacity of One Charging Pump;
 2. The SG will have to be manually isolated by the CRO.
 - D.
 1. Step VI, RCS Leakage Exceeds One Charging Pump, Modes 1 & 2;
 2. The SG will have to be manually isolated by the CRO.

Answer: D

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Within the capacity of a charging pump is plausible if only the PZR level trend is evaluated. SGIS isolating the SG is plausible since a rapid cooldown is performed in EOP-6 to isolate the SG. However, the cooldown is slowed once Th is < 515F to prevent lifting MSSVs and will remain above the SGIS would normally not occur.

B. Incorrect-SGIS isolating the SG is plausible since a rapid cooldown is performed in EOP-6 to isolate the SG. However, the cooldown is slowed once Th is < 515F to prevent lifting MSSVs and will remain above the SGIS would normally not occur.

C. Incorrect-Within the capacity of a charging pump is plausible if only the PZR level trend is evaluated.

D. Correct-With 2 Charging Pumps running at 44 GPM each and minimum letdown of 30 GPM, net charging flow into the RCS is 58 GPM $((2 \times 44) - 30)$. A single charging pump would not be able to maintain PZR level as PZR level is being held steady at 58 GPM when a single charging pump would only provide 44 GPM flow. Per EOP-6, the affected SG, 22 in this case, is isolated manually. SGIS, if it actuated, would isolate several components, but not the steam and feed paths associated with AFW/ADVs.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/2

K/A Info

037AG2.1.28

037 Steam Generator (S/G) Tube Leak

2.1.28 Knowledge of the purpose and function of major system components and controls

SRO Importance

4.1

Technical References

EOP-6-2, Steam Generator Tube Rupture (Rev 20)

References Provided to Applicants

None

Learning Objective

From memory and given a set of plant conditions, demonstrate an understanding of the strategy and basis of AOP-2A

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(7)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

8

ID: 2039899

Points: 1.00

****SRO ONLY****

Both units are operating at 100% with the following initial conditions:

- Control Room HVAC in a normal lineup
- 11 Control Room HVAC in service

The following transient occurs:

- An uncontrolled gaseous release to the environment is in progress
- AOP-6C, Accidental Gaseous Waste Release, is implemented

Which ONE of the following actions are required and what is the bases for those actions?

- A. Place the Kitchen and Toilet Exhaust Fan in STOP to prevent Operators from exceeding radiation limits for the duration of the accident.
- B. Immediately don SCBAs to prevent Operators from exceeding radiation limits for the duration of the accident.
- C. Start the Control Room Smoke Removal System to create a positive pressure in the Control Room.
- D. Start the 12 Control Room HVAC to create a positive pressure in the Control Room.

Answer: A

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Correct-Per AOP-6C, the CR HVAC is verified in recirculation mode, which includes placing the Kitchen and Toilet Exhaust Fan in STOP. Per TS Bases 3.7.8, the CREVs is designed to maintain a habitable environment in the CR for 30 days of continuous occupancy after a DBA without exceeding a 5 Rem TEDE.

B. Incorrect-Donning SCBAs is plausible since the SCBAs are addressed in ERPIP-3.0 Immediate Actions Attachment 19 (Radiological Event). However, they are not immediately donned until recommended by RadCon.

C. Incorrect-Starting the Smoke Removal System is plausible since a Smoke Removal fan is started to remove air from the CR. However, the fan started is the exhaust fan, not the supply fan. Creating a positive pressure is plausible since this would limit air inleakage into the CR. However, a negative pressure would be created by starting exhaust fan.

D. Incorrect-Starting 12 CR HVAC is plausible since starting the 11 and 12 POST-LOCI fans is an action to consider in ERPIP-3.0 Immediate Actions Attachment 19 (Radiological Event). Creating a positive pressure would limit air inleakage into the CR.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/2

K/A Info

060AG2.2.25

060 Accidental Gaseous Radwaste Release

2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for | operations and safety limits.

SRO Importance

4.2

Technical References

AOP-6C, Accidental Gaseous Waste Release (Rev 12)

References Provided to Applicants

None

Learning Objective

Given AOP-6C, respond to the following:

- Waste Gas system rupture or leakage
- An uncontrolled Waste Gas release
- High Airborne in the Auxiliary Building

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(2)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

9

ID: 2040930

Points: 1.00

****SRO ONLY****

Unit-2 conditions are as follows:

- EOP-5, Loss of Coolant Accident, was implemented due to a 100 GPM leak from RV-200
- RCS pressure lowered to 1900 PSIA and RV-200 reseated
- Containment pressure rose to 0.1 PSIG and is now steady
- RCS temperature is 532°F and steady
- PZR level is 160" and steady
- All final EOP-5 Safety Function Acceptance Criteria are met

A transient results in the following conditions:

- 21 SG level is (-)100" and rapidly lowering
- 22 SG level is (-)10" and slowly lowering
- Both SG pressures are 680 PSIA and lowering
- 13 AFW Pump is manually started
- RCS temperature is 500°F and rapidly lowering
- RCS pressure is 1850 PSIA and lowering
- PZR level is 120" and lowering
- Containment pressure is 0.7 PSIG and rising

Which ONE of the following actions are required?

- A. Transition to EOP-3, Loss of All Feedwater.
- B. Remain in EOP-5, Loss of Coolant Accident.
- C. Transition to EOP-4, Excess Steam Demand Event.
- D. Transition to EOP-6, Steam Generator Tube Rupture.

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-EOP-3 is plausible if only SG levels lowering and fact that SG pressure < 685 initiated a SGIS (tripping all MFW) is only evaluated. However, SG level trend in 22 SG is consistent with RCS cooldown and with 13 AFW Pump running, 22 SG has a feed source.

B. Incorrect-Remaining in EOP-5 is plausible since all acceptance criteria are still met with exception of SG level trends. However, another event has occurred and an RCS cooldown is in progress caused by an excess steam demand, not a larger RCS leak. A larger RCS leak would also have resulted in lowering subcooling.

C. Correct-The change in plant conditions is associated with a leak from 21 SG into containment. The RCS cooldown is caused by an excess steam demand. Per EOP-5, if diagnosis of Loss of Coolant is not correct, then the EOP-0 diagnostic flowchart is reevaluated. Per the flowchart and given conditions, the result would be implementation of EOP-4.

D. Incorrect-EOP-6 is plausible since one SG level is rapidly lowering while one is slowly lowering. This coupled with lowering RCS pressure and PZR level could indicate a SGTR in 22 SG if RCS temperatures are not taken into account.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/2

K/A Info

CA11AA2.1

A11 RCS Overcooling

AA2. Ability to determine and interpret the following as they apply to the (RCS Overcooling)

AA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

SRO Importance

3.3

Technical References

EOP-5-2, Loss of Coolant Accident (Rev 29)

EOP-0-2, Post-Trip Immediate Actions (Rev 14)

References Provided to Applicants

None

Learning Objective

Given plant conditions and the Diagnostic Flowchart, determine the correct procedure to implement following safety function assessment in EOP-0

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

Justification as a SRO Question: Examinee must assess changing plant conditions during an EOP and rediagnose the event. At Calvert Cliffs, only SROs are responsible for rediagnosing changing plant conditions and determining the appropriate EOP to transition to.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

10

ID: 2040956

Points: 1.00

****SRO ONLY****

Which ONE of the following would require the implementation of EOP-8, Functional Recovery Procedure?

- A. 12 DC Bus lowers to 120VDC in EOP-0.
- B. Reactivity Control Safety Function cannot be met in EOP-0 due to loss of 1Y09 and 1Y10.
- C. EOP-6, Steam Generator Tube Rupture, is implemented and a Loss of Offsite Power occurs.
- D. EOP-5, Loss of Coolant Accident, is implemented and Charging and Safety Injection flow cannot be restored.

Answer: D

Answer Explanation

A. Incorrect-Low DC bus voltage is plausible since EOP-8 is entered for loss of any DC bus. However, DC bus is considered lost when voltage is <105 VDC. 120VDC will result in low voltage alarm, but DC bus will continue to function.

B. Incorrect-Reactivity not met is plausible since EOP-8 is entered when Reactivity is not met, but only if there is power indications to the CEAs. 1Y09/10 would result in loss of all indications.

C. Incorrect-Two events, SGTR and LOOP, is plausible since EOP-8 is entered when 2 separate events are in progress. However, all Optimal EOPs are designed to function concurrently with a LOOP, so loss of power is not considered a separate event.

D. Correct-Loss of all injection flow during EOP-5 would result in PIC Intermediate Safety Function Acceptance Criteria not being met. Per EOP-5, if a LOCA is the only event in progress and the Intermediate Safety Function Acceptance Criteria cannot be met, then the Optimal EOP is exited and EOP-8 is entered.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

1/2

K/A Info

E09EA2.2

E09 Functional Recovery

EA2. Ability to determine and interpret the following as they apply to the (Functional Recovery):

EA2.2 Adherence to appropriate procedures and operation within the limitations in the facilities license and amendments

SRO Importance

4.0

Technical References

EOP-5-1, Loss of Coolant Accident (Rev 29)

References Provided to Applicants

None

Learning Objective

Given a set of plant conditions, identify the success paths for all safety functions, including the order of priority, in accordance with EOP-8

Question Source

Bank

Question History

Last used on 2006 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

Justification as a SRO Question: Examinee must assess plant conditions during an emergency and select the Optimal EOP that will be used. At Calvert Cliffs, only SROs are responsible for evaluating plant conditions, performing a diagnostic evaluation using a flowchart, and determining the appropriate procedure to implement following a trip.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

11

ID: 2041025

Points: 1.00

****SRO ONLY****

Unit-2 is operating with the following conditions:

- SGTR in 21 SG
- EOP-6, Steam Generator Tube Rupture, is implemented
- SIAS has actuated
- A plant cooldown is in progress to reach SDC cooling initiation
- All HPSI and LPSI pumps are in Pull-To-Lock since throttling criteria are met
- 21, 22, and 23 Charging pumps are operating and maintaining Pressurizer level steady
- RCS Pressure is being lowered to maintain RCS subcooling low in the band
- 22A and 22B RCPs are operating

The STA reports the present RCS pressure/temperature trend is approaching RCP NPSH limits.

Which ONE of the following is occurring and what is the required direction to maintain the RCPs operating?

- A. The leak size has gotten larger;
Energize all PZR Proportional and Backup heaters.
- B. Cooldown rate is excessive;
Lower the ADV Controller output and shut the ADVs.
- C. Aux Spray is lowering pressure;
Reopen the Loop Charging valves and shut the Aux Spray valve.
- D. Main Spray is lowering pressure;
Lower the Main Spray controller output and shut the Main Spray valves.

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-The leak size getting larger is plausible since this would cause a lowering PZR level and RCS pressure. However, PZR level is being maintained steady, which means the leak size has not increased. Raising pressure by energizing the heaters would be an action to prevent losing the RCPs due to the pump curves.

B. Incorrect-Cooldown rate excessive is plausible since an excessive cooldown could cause a contraction in the RCS, lowering PZR level and RCS pressure. However, PZR level is being maintained steady which means the cooldown is not excessive. Shutting the ADVs is plausible since this would be an action to take if PZR level was lowering excessively. However, raising temperature would result in closer approach to RCP pump curves.

C. Correct-With only 2 RCPs in service, Aux Spray is used to lower pressure and subcooling. Pressure lowering will challenge the NPSH limits and the pressure reduction must be stopped to prevent having to secure the RCPs. Aux Spray is secured by reopening the Charging Header Stop CVs and then shutting the Aux Spray CV.

D. Incorrect-Main spray bypass flow is still lowering pressure is plausible if RCP configuration is believed to result in Main Spray flow. However, per OI-1H, with only 22A/22B RCPs in operation, spray flow is insignificant. Lowering the controller output is plausible since this would be action when full Main spray is in service. However, the controller is placed in manual with a 0% output when Aux spray is placed in service.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

2/1

K/A Info

004A2.17

004 Chemical and Volume Control System

A2 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:

A2.17 Low PZR pressure

SRO Importance

3.7

Technical References

EOP-6-2, Steam Generator Tube Rupture (Rev 20)

References Provided to Applicants

None

Learning Objective

Recall the conditions to and bases for maintaining RCS subcooling as close to 25°F as possible while on natural circulation and as close to the NPSH limits with RCP's running.

Question Source

Bank

Question History

Last used on 2012 NRC Exam

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

Justification as a SRO Question: Examinee must assess plant conditions during an emergency and select appropriate section of an Optimal EOP that will be used. At Calvert Cliffs, only SROs are responsible for assigning directions in EOPs.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

12

ID: 2041084

Points: 1.00

****SRO ONLY****

Unit-1 is operating at 100% power with the following initial condition:

- 11 Component Cooling Water (CCW) Pump in service

The following transient occurs:

- A CCW System pipe downstream of 11 CCW Pump ruptures
- CC PP(S) DISCH PRESS LOW alarms on 1C13
- CC Head Tank level is 39" and rapidly lowering
- AOP-7C, Loss of Component Cooling Water, is implemented
- Tech Spec 3.7.5, Component Cooling System, is entered

Which ONE of the following is

1. An expected alternate indication to validate the rupture and:
2. If all 3 CCW Pumps are placed in Pull To Lock due to the flooding, what other Tech Specs are required to be entered?
 - A.
 1. 11 CCW Pump amps reading LOWER than normal;
 2. Tech Specs 3.0.3 AND 3.6.6, Containment Spray and Cooling Systems.
 - B.
 1. 11 CCW Pump amps reading HIGHER than normal;
 2. Tech Specs 3.0.3 AND 3.6.6, Containment Spray and Cooling Systems.
 - C.
 1. 11 CCW Pump amps reading LOWER than normal;
 2. Tech Spec 3.6.6, Containment Spray and Cooling Systems, ONLY.
 - D.
 1. 11 CCW Pump amps reading HIGHER than normal;
 2. Tech Spec 3.6.6, Containment Spray and Cooling Systems, ONLY.

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Amps reading lower is plausible since discharge pressure will be reading lower than normal. However, with a rupture, pumps amps will rise as pump flow rises. TS 3.0.3 and 3.6.6 would be required.

B. Correct-When a rupture occurs downstream of a centrifugal pump, flow resistance lowers and pump flow increases. Since the motor is doing more work due to the increased flow, pump amps will rise during a rupture. CCW supplies the SDC HXs, and when CCW is taken OOS, the associated SDC HX, which supply cooling to Containment Spray, are also OOS. Therefore, TS 3.6.6 must be entered. TS 3.0.3 must also be entered as there is no condition for 2 CCW subsystems being OOS.

C. Incorrect-Amps reading lower is plausible since discharge pressure will be reading lower than normal. However, with a rupture, pumps amps will rise as pump flow rises. Not including TS 3.0.3 is plausible if separate entries for both CCW subsystems is considered satisfactory in TS 3.7.5. However, 3.7.5 has no allowance for both subsystems being OOS at same time, only one.

D. Incorrect-Amps will rise as pump flow rises. Not including TS 3.0.3 is plausible if separate entries for both CCW subsystems is considered satisfactory in TS 3.7.5. However, 3.7.5 has no allowance for both subsystems being OOS at same time, only one.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

2/1

K/A Info

008G2.4.50

008 Component Cooling Water System (CCWS)

2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual

SRO Importance

4.0

Technical References

Tech Spec 3.7.5, Component Cooling System

Tech Spec 3.6.6, Containment Spray and Cooling Systems

OI-16-1, Component Cooling System (Rev 35)

AOP-7C, Loss of Component Cooling (Rev 5)

1C13-ALM, SRW and MISC Station Services Alarm Manual (Rev 55)

References Provided to Applicants

None

Learning Objective

Identify actions to be taken when either a rupture or system blockage occurs in the Saltwater System.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

Justification as a SRO Question: Examinee must apply LCO 3.0.3 in addition to the Containment Spray TS

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

13

ID: 2041164

Points: 1.00

****SRO ONLY****

Which ONE of the following component's settings are ALL credited in the Tech Spec Bases to prevent exceeding the Reactor Coolant System Pressure Safety Limit?

- A. PZR Relief Valve RV-201 AND;
12 SG Relief Valve RV-4002 AND;
RPS Loss of Load trip.
- B. PZR Relief Valve RV-200 AND;
11 SG Relief Valve RV-3998 AND;
RPS High Pressure trip.
- C. PZR Power Operated Relief Valve PORV-402 AND;
12 SG Relief Valve RV-4006 AND;
RPS Loss of Load trip.
- D. PZR Power Operated Relief Valve PORV-404 AND;
11 SG Relief Valve RV-3995 AND;
RPS High Pressure trip.

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-RV-201 and RV-4002 are both credited in the bases. Loss of Load is plausible since a loss of turbine load will result in a high RCS pressure condition. However, the LOL trip is not included in the bases.

B. Correct- Per TS Bases 2.1.2, the RCS Pressurizer Safety valves (RV-200 and 201), SG Main Steam Safety Valves (RVs 3992-4007), and the RPS Trip Unit for High RCS Pressure all have settings established to ensure RCS Safety Limit will not be exceeded.

C. Incorrect-PORV-402 is plausible since it will lift on a high RCS pressure condition to limit the RCS pressure rise. However, only the Code Safety Valves, the PZR Safety Valves (RV-200/201) are credited in the bases. The SG Main Steam Safety Valves are credited. Loss of Load is plausible since a loss of turbine load will result in a high RCS pressure condition. However, the LOL trip is not included in the bases.

D. Incorrect-PORV-404 is plausible since it will lift on a high RCS pressure condition to limit the RCS pressure rise. However, only the Code Safety Valves, the PZR Safety Valves (RV-200/201) are credited in the bases. The SG Main Steam Safety Valves and the High RCS Pressure trip are credited.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

2/1

K/A Info

010G2.2.25

010 Pressurizer Pressure Control System

2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits

SRO Importance

4.2

Technical References

Tech Spec 2.1.2 Bases

References Provided to Applicants

None

Learning Objective

State the purpose/design basis for the SG Safety Valves

Question Source

Bank

Question History

Last used on 2006 NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(2)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

14

ID: 2041186

Points: 1.00

****SRO ONLY****

Unit-2 conditions are as follows:

- Large Break LOCA in progress
- RCS pressure is 100 PSIG
- 21 RWT level is 10 ft and lowering slowly

The ACTUATION SYS RAS TRIP alarms on 2C08.

Which ONE of the following is:

1. The assessment of RAS and;
2. What actions are currently required?
 - A.
 1. RAS is INVALID;
 2. Reset RAS.
 - B.
 1. RAS is VALID;
 2. Place 21 and 22 LPSI Pumps in PULL TO LOCK.
 - C.
 1. RAS is VALID;
 2. Place 21 and 23 HPSI Pumps in PULL TO LOCK.
 - D.
 1. RAS is INVALID;
 2. Place all HPSI, LPSI, and Containment Spray Pumps in PULL-TO-LOCK.

Answer: A

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Correct-Per 2C08 ALM, RAS actuates on U-2 when indicated level of 9-13". With RWT level at 10', this means the RAS is invalid. Per the 2C08 ALM, an invalid RAS is to be reset.

B. Incorrect-RAS valid is plausible since at 10' several RWT low level alarms on 1C09 would be in. However, RAS does not actuate on U-2 until an indicated level of 9-13". Placing LPSI pump HS in PTL is the correct action when RAS is valid.

C. Incorrect-RAS valid is plausible since at 10' several RWT low level alarms on 1C09 would be in. However, RAS does not actuate on U-2 until an indicated level of 9-13". Placing HPSI in PTL is plausible since HPSI flow is lowered after RAS is initiated. However, both HPSI are not placed in PTL.

D. Incorrect-Per 2C08 ALM, RAS actuates on U-2 when indicated level of 9-13". With RWT level at 10', this means the RAS is invalid. Placing all SI pumps in PTL is plausible if RWT Outlet MOVs are believed to shut with the invalid RAS. However, RWT outlet MOVs remain open and the HPSI and CS pumps continue with suction from the RWT when the RAS initially actuates.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

2/1

K/A Info

013A2.01

013 Engineered Safety Features Actuation System (ESFAS)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations;

A2.01 LOCA

SRO Importance

4.8

Technical References

2C08-ALM, ESFAS 21 Alarm Manual (Rev 36)

EOP-5-2, Loss Coolant Accident (Rev 29)

References Provided to Applicants

None

Learning Objective

Given a loss of Reactor Coolant, identify and understand the basis and actions to mitigate the event in accordance with EOP-5

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(5)

Comments

Justification as a SRO Question: Examinee must assess plant conditions during an emergency and select appropriate section of an Alarm Manual and the EOPs that will be used. At Calvert Cliffs, only SROs are responsible for assigning directions in EOPs.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

15

ID: 2041253

Points: 1.00

****SRO ONLY****

Using Provided References

Unit-2 is operating at 100% power when the following transient occurs:

- Excess Steam Demand in the Containment
- Reactor is manually tripped
- SIAS, CIS, and CSAS all actuated
- 21 4KV Bus faults
- 23 and 24 CAC fail to shift to Low Speed
- 24 CAC trips on thermal overload
- RCS temperature is 480°F and lowering
- RCS pressure is 1900 PSIA and lowering

Which ONE of the following is:

1. The applicability of Tech Spec 3.6.6, Containment Spray and Cooling Systems, for the current conditions and;
2. What is the HIGHEST EAL Classification required for the current conditions?
 - A.
 1. BOTH the CACs and CS are currently required to be Operable;
 2. Unusual Event
 - B.
 1. BOTH the CACs and CS are currently required to be Operable;
 2. Alert
 - C.
 1. ONLY the CACs are currently required to be Operable;
 2. Unusual Event
 - D.
 1. ONLY the CACs are currently required to be Operable;
 2. Alert

Answer: A

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Correct-Per TS 3.6.6, 2 Containment Spray and 2 CAC trains are required operable when in Mode 3 with RCS > 1750 PSIA. Given conditions are Mode 3 with RCS pressure of 1900 PSIA. An Unusual Event would be declared due to the Potential loss of the Containment, Containment Barrier Potential Loss #5. With conditions given, 22 CS and 23 CAC are all that will be operating. This is below equipment requirements listed under Containment Barrier Potential Loss #5. Therefore, FU1.1 would be classified for the potential loss of Containment.

B. Incorrect-Per TS 3.6.6, 2 Containment Spray and 2 CAC trains are required operable when in Mode 3 with RCS > 1750 PSIA. Alert is plausible if Operator interprets ruptured SG under RCS Barrier Loss as a SG with a steam leak. However, ruptured, per the EAL Bases, refers to SG tube leak, and does not apply.

C. Incorrect-Only the CACs required to be operable is plausible since there is a RCS pressure requirement to the 2 Containment Spray operability. 1900 PSIA would result in low RCS pressure alarms and Operator could interpret as low RCS pressure below TS requirement. An Unusual Event would be declared due to the Potential loss of the Containment, Containment Barrier Potential Loss #5.

D. Incorrect-Only the CACs required to be operable is plausible since there is a RCS pressure requirement to the 2 Containment Spray operability. 1900 PSIA would result in low RCS pressure alarms and Operator could interpret as low RCS pressure below TS requirement. Alert is plausible if Operator interprets ruptured SG under RCS Barrier Loss as a SG with a steam leak. However, ruptured, per the EAL Bases, refers to SG tube leak, and does not apply.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group
2/1

K/A Info
022A2.03

022 Containment Cooling System (CCS)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations;

A2.03 Fan motor thermal overload/high-speed operation

SRO Importance
3.0

Technical References

Tech Spec 3.6.6

EP-AA-1011 Addendum 3, Calvert Cliffs Emergency Action Levels (Rev 3)

References Provided to Applicants

EAL-HOT Fission Product Barrier Matrix and Fission Product (F) EALs

EAL Bases for RCS and Containment Barrier Matrix

Learning Objective

Given an event, determine EAL Classification and Regulatory Reporting requirements per site EP procedures

Question Source
New

Question History
N/A for new question

Cognitive Level
Comprehension or Analysis

10 CFR Part 55 Content
55.43(b)(5)

Comments
None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

16

ID: 2041308

Points: 1.00

****SRO ONLY****

Using Provided References

Unit-1 is operating at 100% power when the following transient occurs:

- 1-LT-1114A loses power at 1000 on 3/10
- Affected Trip Units and/or Sensors are placed in bypass at 1030

Which ONE of the following:

1. Trip Units and/or Sensors are affected and;
2. If repairs are not completed, when would the affected Trip Units and/or Sensors have to be placed in the TRIP condition?
 - A. 1. ZD Sensor for SG 11 Level Low (AFAS) ONLY;
2. Place in TRIP by 2200 on 3/10.
 - B. 1. ZD Sensor for SG 11 Level Low (AFAS) ONLY;
2. Place in TRIP by 1000 on 3/12.
 - C. 1. ZD Sensor for SG 11 Level Low (AFAS) AND Channel "A" SG Level (RPS);
2. Place in TRIP by 2200 on 3/10.
 - D. 1. ZD Sensor for SG 11 Level Low (AFAS) AND Channel "A" SG Level (RPS);
2. Place in TRIP by 1000 on 3/12.

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Per 60702SH0004, LT-1114A only feeds AFAS. Time of 2200 on 3/10 is plausible since this is 12 hour action time of TS 3.3.4 if required completion time could not be met. Per LCO 3.3.4, AFAS sensor could remain in TRIP indefinitely.

B. Correct-Per 60702SH0004, LT-1114A only feeds AFAS. With failure, per OP-CA-103-102-0200, only SG 11 Level Low sensor is impacted on AFAS. Per TS 3.3.4, affected sensor must be placed in TRIP within 48 hours of failure, which is 1000 on 3/12.

C. Incorrect-RPS SG Level being affected is plausible since LT-1114A and LT-1113A share a common reference line. However, since LT-1114A failure was electrical and not mechanical, RPS is not affected, just AFAS. Time of 2200 on 3/10 is plausible since this is 12 hour action time of TS 3.3.4 if required completion time could not be met. Per LCO 3.3.4, AFAS sensor could remain in TRIP indefinitely.

D. Incorrect-RPS SG Level being affected is plausible since LT-1114A and LT-1113A share a common reference line. However, since LT-1114A failure was electrical and not mechanical, RPS is not affected, just AFAS. Per TS 3.3.4, affected sensor must be placed in TRIP within 48 hours of failure, which is 1000 on 3/12.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group
2/2

K/A Info

016A2.01

016 Non-Nuclear Instrumentation System (NNIS)

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations;

A2.01 Detector failure

SRO Importance

3.1

Technical References

Tech Spec 3.3.4

Drawing 60702SH0004

OP-CA-103-102-0200, Watch Standing Practices (Rev 1)

References Provided to Applicants

Print 60702SH0004

Tech Spec 3.3.4

Learning Objective

Given any ESFAS alarm condition assess the impact on plant operation.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

17

ID: 2041371

Points: 1.00

****SRO ONLY****

Unit-2 is operating at 100% power when the following transient occurs:

- RCS level starts to rapidly lower
- Reactor is manually tripped on AOP-2A trip criteria

During EOP-0, the following conditions exist:

- Containment pressure rises to 5 PSIG
- 23 AFW Pump is started
- 22 SG Motor Driven Flow Control Valve fails shut
- 21 AFW Pump is started
- 21 SG level is (-)100" and rising
- 22 SG is (-)130" and steady
- None of the Containment Iodine Removal Units are available
- A single event is in progress

Which ONE of the following is:

1. The Optimal EOP that should be implemented and:
2. What will ensure Iodine removal in the Containment?
 - A.
 1. EOP-6, Steam Generator Tube Rupture;
 2. Containment Spray will be operating and will remove the Iodine.
 - B.
 1. EOP-6, Steam Generator Tube Rupture;
 2. Containment Cooling will be operating and will remove the Iodine.
 - C.
 1. EOP-5, Loss of Coolant Accident;
 2. Containment Cooling will be operating and will remove the Iodine.
 - D.
 1. EOP-5, Loss of Coolant Accident;
 2. Containment Spray will be operating and will remove the Iodine.

Answer: D

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-EOP-6 is plausible due to the mismatch in SG levels. However, the level mismatch would result from AFW response and since a single event is in progress, a SGTR would not cause elevated Containment conditions. CS will be running and lowering Iodine levels.

B. Incorrect-EOP-6 is plausible due to the mismatch in SG levels. However, the level mismatch would result from AFW response and since a single event is in progress, a SGTR would not cause elevated Containment conditions. CACs running to remove Iodine is plausible since the CACs start on a SIAS at 2.8 PSIG in the Containment and the CACs are used in EOP-5 to ensure H2 is disbursed. However, the CACs design has no components that would lower Iodine levels.

C. Incorrect-EOP-5 would be implemented. CACs running to remove Iodine is plausible since the CACs start on a SIAS at 2.8 PSIG in the Containment and the CACs are used in EOP-5 to ensure H2 is disbursed. However, the CACs design has no components that would lower Iodine levels.

D. Correct-Per EOP-0 Dialogistic Flowchart, Containment Environment would not be met due to high pressure. With no indications of low SG pressure or loss of power, the flowchart would result in EOP-5. Per Tech Spec 3.6.6 and 3.6.8 bases, the Containment Spray system would remove Iodine.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group
2/2

K/A Info
027G2.4.4
027 Containment Iodine Removal System (CIRS)
2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

SRO Importance
4.7

Technical References
Tech Spec 3.6.6 Bases
Tech Spec 3.6.8 Bases
EOP-0-2, Post-Trip Immediate Actions (Rev 14)

References Provided to Applicants
None

Learning Objective
Apply the bases for the Technical Specifications

Question Source
New

Question History
N/A for new question

Cognitive Level
Comprehension or Analysis

10 CFR Part 55 Content
55.43(b)(2)

Comments
Justification as a SRO Question: Examinee must assess plant conditions during an emergency and select the Optimal EOP that will be used. At Calvert Cliffs, only SROs are responsible for evaluating plant conditions, performing a diagnostic evaluation using a flowchart, and determining the appropriate procedure to implement following a trip. In addition, knowledge of Tech Spec bases for Containment Spray is required.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

18

ID: 2041580

Points: 1.00

****SRO ONLY****

Using Provided References

Unit-1 is operating at 100% power with the following conditions:

- RIC-5421, 11 MAIN STEAM EFFL RAD MON is OOS
- SG Blowdown is aligned to the condenser at 50 GPM per SG

The following transient occurs:

- RIC-5422, 12 MAIN STEAM EFFL RAD MON, detector fails high

Which ONE of the following is:

1. The immediate impact on SG Blowdown and:
2. The preferred pre-planned alternate monitoring method per EP-CE-121-1002, Calvert Cliffs Equipment Matrix?
 - A.
 1. SG Blowdown will remain in service;
 2. Hand held radiation monitor reading on contact with the Main Steam Line Drains.
 - B.
 1. SG Blowdown will automatically secure;
 2. Hand held radiation monitor reading on contact with the Main Steam Line Drains.
 - C.
 1. SG Blowdown will remain in service;
 2. Wide Range Noble Gas Monitor.
 - D.
 1. SG Blowdown will automatically secure;
 2. Wide Range Noble Gas Monitor.

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-SG blowdown is isolated by RI-4095 only. Failure of both of the MSLRM will have no impact on SG blowdown. Hand held monitor as preferred source is plausible since this is an alternate monitoring method, but only if the MSIVs are shut.

B. Incorrect-SG securing is plausible since both MSLRM and RI-4095 would rise during a SGTR. However, only RI-4095 isolates SG blowdown and loss of both MSLRM would have no automatic impact on blowdown. Hand held monitor as preferred source is plausible since this is an alternate monitoring method, but only if the MSIVs are shut.

C. Correct-SG blowdown is isolated by RI-4095 only. Failure of both of the MSLRM will have no impact on SG blowdown. Per ERPIP-821, with the MSLRM OOS, the alternate monitoring methods are either the WRNGM or a handheld radiation monitor on contact with the Main Steam drain lines. EP-CE-121-1002 directs the use of the WRNGM as the preferred method if the MSIVs are open.

D. Incorrect-SG securing is plausible since both MSLRM and RI-4095 would rise during a SGTR. However, only RI-4095 isolates SG blowdown and loss of both MSLRM would have no automatic impact on blowdown. Per ERPIP-821, with the MSLRM OOS, the alternate monitoring methods are either the WRNGM or a handheld radiation monitor on contact with the Main Steam drain lines. EP-CE-121-1002 directs the use of the WRNGM as the preferred method if the MSIVs are open.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

2/2

K/A Info

072A2.02

072 Area Radiation Monitoring (ARM) System

A2 Ability to (a) predict the impacts of the following malfunctions or operations on the ARM system and

(b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:

A2.02 Detector failure

SRO Importance

2.9

Technical References

TRM 15.3.1

OI-35, Radiation Monitoring System (Rev 44)

ERPIP-821 (Rev 08)

EP-CE-121-1002, Calvert Cliffs Equipment Matrix (Rev 1)

References Provided to Applicants

EP-CE-121-1002, Calvert Cliffs Equipment Matrix

Learning Objective

Determine appropriate emergency response actions while maintaining an overview of plant conditions.

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(2)

Comments

Justification as a SRO Question: Examinee must assess plant conditions and perform actions in the Emergency Plan. At Calvert Cliffs, only SROs are responsible for implementing the Emergency Plan.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

19

ID: 2041613

Points: 1.00

****SRO ONLY****

Unit-1 is being shutdown using the "Planned Reactor Shutdown from > 20% Power" method. The following conditions exist:

- Reactor Power is 25%
- Main Generator load is 200 MWe
- TBV output is 0%
- Main Steam header pressure on PIC-4056 is 850 PSIA and steady

The following operator actions are taken:

- TBV controller setpoint is adjusted to 852 PSIA
- Main Generator output is then lowered
- Reactor power is maintained at ~25 %

The following transient then occurs:

- Main Turbine trips when Generator load reaches 50 MWe

Which ONE of the following is:

1. Where heat removal is initially transferred to as Main Generator load is reduced from 200 MWe and;
2. What procedure should be implemented when the Main Turbine tripped?
 - A. 1. ADVs;
2. EOP-0, Post-Trip Immediate Actions
 - B. 1. TBVs;
2. EOP-0, Post-Trip Immediate Actions
 - C. 1. TBVs;
2. OP-4, Plant Shutdown From Power Operation to Hot Standby
 - D. 1. ADVs;
2. OP-4, Plant Shutdown From Power Operation to Hot Standby

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-ADVs is plausible since the TBVs are initially shut and lowering Generator load will cause RCS temperatures to rise. However, this will cause SG and Main Steam header pressures to rise too, opening the TBVs. EOP-0 would be implemented since trip was not under operator control.

B. Correct-Per OP-4, as Generator load is reduced, heat removal flowpath is shifted from the Turbine to the TBVs. Per OP-4, EOP-0 would be implemented if Reactor trip occurs during the downpower that is not under operator control.

C. Incorrect-Heat removal would be transferred to the TBVs. OP-4 implementation is plausible since, during a planned shutdown from > 20%, the reactor is manually tripped after Turbine load is removed and OP-4 remains the governing procedure. However, the Turbine trip was not under operator control, and OP-4 directs that EOP-0 be implemented under these circumstances.

D. Incorrect-ADVs is plausible since the TBVs are initially shut and lowering Generator load will cause RCS temperatures to rise. However, this will cause SG and Main Steam header pressures to rise too, opening the TBVs. OP-4 implementation is plausible since, during a planned shutdown from > 20%, the reactor is manually tripped after Turbine load is removed and OP-4 remains the governing procedure. However, the Turbine trip was not under operator control, and OP-4 directs that EOP-0 be implemented under these circumstances.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.1.23

2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation

SRO Importance

4.4

Technical References

OP-4-1, Plant Shutdown From Power Operation to Hot Standby (Rev 36)

References Provided to Applicants

None

Learning Objective

With the TBVs in auto operation, recall what controls Tavg and what control Rx. power

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

20

ID: 2042195

Points: 1.00

****SRO ONLY****

A reactor trip has occurred on Unit-1.

Which ONE of the following:

1. Announcements to Control Room personnel are required by the Unit Supervisor and;
2. What briefs are required, assuming an uncomplicated trip, before taking actions in EOP-1, Reactor Trip?
 - A.
 1. "Implement EOP-0";
 2. EOP-1 Transition Brief ONLY.
 - B.
 1. "Reactor Trip Unit-1";
 2. EOP-1 Transition Brief ONLY.
 - C.
 1. "Implement EOP-0";
 2. EOP-0 Wrap-Up Brief AND EOP-1 Transition Brief.
 - D.
 1. "Reactor Trip Unit-1";
 2. EOP-0 Wrap-Up Brief AND EOP-1 Transition Brief.

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Per OP-CA-103-102-1001, the US announces "Implement EOP-0 in the Control Room." EOP-1 Transition brief only is plausible if Operator believes an uncomplicated trip waives need for EOP-0 Wrap-Up Brief. However, per OP-CA-103-102-1001, an EOP-0 Wrap-Up Brief is required always when exiting EOP-0.

B. Incorrect-Announcing "Reactor Trip" is plausible since this would be announced by the RO. However, per OP-CA-103-102-1001, the US announces "Implement EOP-0 in the Control Room." EOP-1 Transition brief only is plausible if Operator believes an uncomplicated trip waives need for EOP-0 Wrap-Up Brief. However, per OP-CA-103-102-1001, an EOP-0 Wrap-Up Brief is required always when exiting EOP-0.

C. Correct-Per OP-CA-103-102-1001, the US announces "Implement EOP-0 in the Control Room." Per OP-CA-103-102-1001, an EOP-0 Wrap-Up Brief is required always when exiting EOP-0.

D. Incorrect-Announcing "Reactor Trip" is plausible since this would be announced by the RO. However, per OP-CA-103-102-1001, the US announces "Implement EOP-0 in the Control Room." Per OP-CA-103-102-1001, an EOP-0 Wrap-Up Brief is required always when exiting EOP-0.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.1.28

2.1.38 Knowledge of the station's requirements for verbal communications when implementing procedures

SRO Importance

3.8

Technical References

OP-CA-103-102-1001, Strategies for Successful Transient Mitigation (Rev 4)

References Provided to Applicants

None

Learning Objective

Given a Reactor Trip, apply the requirements of NO-1-201, Calvert Cliffs Operating Manual

Question Source

New

Question History

N/A for new question

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

21

ID: 2042226

Points: 1.00

****SRO ONLY****

Using Provided References

Unit-2 is operating at 100% with the following initial conditions:

- Containment temperature input to the Plant Computer is OOS
- Containment temperature was last recorded in the logs on 3/1 at 1000

The following transient occurs:

- Containment temperature indications are lost on 3/2 at 0900

Which ONE of the following is the LATEST that Containment temperature can be restored and recorded to meet Tech Spec requirements without invoking SR 3.0.3?

- A. By 1000 on 3/2
- B. By 1300 on 3/2
- C. By 1600 on 3/2
- D. By 1600 on 3/3

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-1000 is plausible if only the SR frequency of SR 3.6.5.1 is considered. However, SR 3.0.2 allows SR to be extended to 1.25 (24 hours + 6 hours = 30 hours).

B. Incorrect-1300 is plausible if 0.25 allowance is applied to Containment Pressure SR of 12 hours, yielding only 3 additional hours instead of Temperature SR frequency of 24 hours.

C. Correct-Per TS 3.6.5, SR 3.6.5.1 requires Containment temperature to be determined/recorded every 24 hours. Per SR 3.0.2, a SR is met if it is performed within 1.25x its frequency. Therefore, SR 3.0.2 allows SR 3.6.5.1 to be extended to 1.25 (24 hours + 6 hours = 30 hours), yielding a time of 1600 on 3/2

D. Incorrect-1600 on 3/3 is plausible if SR 3.0.3 is applied, which allows LCO to be delayed 24 hours if SR not completed. However, stem states that use of SR 3.0.3 is not desired.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.1.22

2.2.22 Knowledge of limiting conditions for operations and safety limits

SRO Importance

4.7

Technical References

Tech Spec 3.0

Tech Spec 3.6.5

Surveillance Frequency Control Program

References Provided to Applicants

Tech Spec 3.0

Tech Spec 3.6.5

Surveillance Frequency Control Program

Learning Objective

Given a Technical Specification Surveillance Requirement be able to apply the frequency requirements

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(2)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

22

ID: 2042268

Points: 1.00

****SRO ONLY****

Movement of recently irradiated fuel is occurring in the Spent Fuel Pool (SFP) when the following transient occurs:

- Fuel assembly is dropped in the SFP
- AOP-6D, Fuel Handling Incident, is implemented

Which ONE of the following is:

1. The SFP Ventilation fans verified in service and:
2. Which RMS is used to evaluate for an effluent release in progress?
 - A. 1. 11 SFP EXH FAN;
2. WRNGM, RIC-5415
 - B. 1. 11 SFP SUPP FAN;
2. Main Vent, RI-5415
 - C. 1. 12 SFP EXH FAN;
2. SFP Area, RI-7024
 - D. 1. 12 SFP SUPP FAN;
2. Spent Fuel Handling Machine, RI-7025

Answer: A

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Correct-Per AOP-6D, one SFP exhaust fan is verified running and both of the supply fans are verified off to ensure a negative pressure is maintained in the SFP. When evaluating release status, only effluent monitors are used, which include the WRNGM and the Main Vent RMS.

B. Incorrect-SFP Supply fan is plausible if SFP area is thought to need to be maintained at a positive pressure, like SCBAs. However, SFP area is maintained at a negative pressure while moving fuel. Main Vent RMS would be used to evaluate for a release.

C. Incorrect-One SFP exhaust fan would be verified running. SFP Area RMS is plausible since the RMS would rise during a fuel handling incident. However, this RMS would not be used to evaluate for a release as only effluent RMS are used.

D. Incorrect-SFP Supply fan is plausible if SFP area is thought to need to be maintained at a positive pressure, like SCBAs. However, SFP area is maintained at a negative pressure while moving fuel. SFP Handling Machine RMS is plausible since the RMS would rise during a fuel handling incident. However, this RMS would not be used to evaluate for a release as only effluent RMS are used.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.3.11

2.3.11 Ability to control radiation releases

SRO Importance

4.3

Technical References

AOP-6D, Fuel Handling Incident (Rev 17)

EAL-HOT (Rev 4)

References Provided to Applicants

None

Learning Objective

Given various plant conditions, identify the indications of a fuel handling incident and determine the required actions in accordance with AOP-6D

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(4)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

23

ID: 2046115

Points: 1.00

****SRO ONLY****

Unit-1 is in Mode 3 with the following conditions:

- A Site Area Emergency has been declared
- Entry into the 11 ECCS Pump Room is required
- Dose rates in the 11 ECCS Pump Room are 2 Rem/hr

The Radiation Work Permit has the following alarm settings:

- Dose Limit-500 mrem
- Dose Rate Limit-5000 mrem/hr

Which ONE of the following is:

1. The MAXIMUM an Operator could stay in the 11 ECCS Pump Room without exceeding RWP limits and:
2. What is the MAXIMUM emergency exposure allowed to protecting valuable property in the 11 ECCS Pump Room?
 - A. 1. 15 minutes;
2. 25 REM
 - B. 1. 15 minutes;
2. 10 REM
 - C. 1. 2.5 hours;
2. 25 REM
 - D. 1. 2.5 hours;
2. 10 REM

Answer: B

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-15 mins is limit for RWP. 25 REM is plausible since this is emergency exposure limit for lifesaving activities. However, per EP-CE-113, emergency exposure limit is 10 REM for saving valuable property.

B. Correct-Based on given dose rates in the ECCS Pump room, the RWP dose limit of 500 mrem would be reached in 15 mins ($500 \text{ mrem} / 2000 \text{ mrem/hr} = 0.25 \text{ hrs} = 15 \text{ mins}$.) Per EP-CE-113, emergency exposure limit is 10 REM for saving valuable property.

C. Incorrect-2.5 hours is plausible if 5000 mrem is used as dose limit instead of 500 mrem. 25 REM is plausible since this is emergency exposure limit for lifesaving activities. However, per EP-CE-113 limit is 10 REM for saving valuable property.

D. Incorrect-2.5 hours is plausible if 5000 mrem is used as dose limit instead of 500 mrem. Per EP-CE-113, emergency exposure limit is 10 REM for saving valuable property.

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Tier/Group

3/NA

K/A Info

G2.3.7

2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions

SRO Importance

3.6

Technical References

EP-CE-113, Personnel Protective Actions (Rev 0)

References Provided to Applicants

None

Learning Objective

Apply the requirements of the Calvert Cliffs Radiation Safety Manual

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

24

ID: 2046278

Points: 1.00

****SRO ONLY****

Unit-1 is operating at 75% power when the following transient occurs:

- Two of three (2 of 3) Condensate Pumps trip
- The TBO reports the Condensate Header has ruptured, spraying water near the Condensate Booster Pumps

Which ONE of the following strategies is employed to combat this condition?

- A. First perform a Rapid Power Reduction to remove Unit-1 from service per OP-3, Normal Power Operation;
Then secure Main Feed and Condensate systems and initiate AFW flow at < 1% reactor power per AOP-3G, Malfunction Of Main Feedwater System.
- B. First trip the reactor and implement EOP-0, Post-Trip Immediate Actions;
Then secure Main Feedwater during Core and RCS Heat Removal in EOP-0, Post-Trip Immediate Actions.
- C. First trip the Reactor and verify Reactivity Control per EOP-0 Post-Trip Immediate Actions;
Then secure the Main Feed and Condensate systems and initiate AFW per AOP-3G, Malfunction of Main Feedwater System.
- D. First commence a Rapid Power Reduction to lower Condensate Header flow to < 8000 GPM per OP-3, Normal Power Operation;
Then direct TBO to isolate leak per AOP-3G, Malfunction Of Main Feedwater System.

Answer: C

CALVERT CLIFFS AUGUST 2018 SRO

EXAM KEY

Answer Explanation

A. Incorrect-Rapid downpower is plausible since OP-3 would be used to remove unit from service. However, AOP-3G would require unit to be first tripped for a rupture. Securing MFW and initiating AFW < 1% is plausible since these are AOP-3G actions when initially < 5% power. However, power is initially 75%.

B. Incorrect-The Reactor would be tripped and EOP-0 implemented. Securing MFW during CHR is plausible since this is EOP-0 action if MFW is lost. However, because of the rupture, AOP-3G requires the MFW system be first shutdown before continuing on with actions in EOP-0, which include CHR.

C. Correct-Per AOP-3G, actions for a condensate rupture include first tripping the reactor and verifying it is shutdown per EOP-0. Then, AOP-3G directs that MFW be secured and AFW started before continuing in EOP-0.

D. Incorrect-Downpower to < 8000 GPM is plausible since this is action for loss of 2 Condensate pumps in AOP-3G. Locating and isolating the leak is an action in AOP-3G.

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EXAM KEY

Tier/Group

3/NA

K/A Info

G2.4.16

2.4.16 Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines

SRO Importance

4.4

Technical References

AOP-3G-1, Malfunction of Main Feedwater System (Rev 13)

References Provided to Applicants

None

Learning Objective

Determine the required actions taken for a Condensate or Feedwater header rupture at power or while shutdown

Question Source

Bank

Question History

Last used on 2014 NRC Exam

Cognitive Level

Memory or Fundamental Knowledge

10 CFR Part 55 Content

55.43(b)(5)

Comments

None

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EXAM KEY

25

ID: 2046393

Points: 1.00

SRO ONLY

EOP-8, Functional Recovery Procedure, has been implemented on Unit-1. The Success Paths have been evaluated against the Resource Assessment Table with the following results

RESOURCE ASSESSMENT

Safety Functions NOT met in EOP-0 or Optimal Recovery Procedure					
—	—	X	—	X	X
MET RC-1	MET VA-1	MET PIC-1	MET HR-1	MET CE-1	NOT MET RLEC-1
RC-2	VA-2	PIC-2	HR-2	CE-2	RLEC-2
RC-3	VA-3	PIC-3	HR-3	CE-3	
		PIC-4	HR-4		

Which ONE of the following is the FIRST Safety Function recovery action to commence?

- A. RC-1
- B. VA-2
- C. PIC-4
- D. RLEC-2

Answer: D

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EXAM KEY

Answer Explanation

A. Incorrect-RC-1 is plausible since Reactivity is normally performed first in Safety Function hierarchy. However, any Safety Function not met in EOP-8 or not met in EOP-0/Optimal EOP would be performed before Reactivity if Reactivity is met.

B. Incorrect-VA-2 is plausible since this is first Safety Function with number above 1. However, any Safety Function not met in EOP-8 or not met in EOP-0/Optimal EOP would be performed before Vital Auxiliaries since VA is met.

C. Incorrect-PIC-4 is plausible since it is the Safety Function with the highest Resource Assessment number. However, any Safety Function not met in EOP-8 would be performed before any Safety Function not met in EOP-0/Optimal EOP.

D. Correct-Per EOP-8, the priority that Safety Functions are given in EOP-8 is Safety Function not met in EOP-8 then Safety Functions not met in EOP-0/Optimal EOP would be next. RLEC-2 is not met in EOP-8, so it would be performed first.

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EXAM KEY

Tier/Group

3/NA

K/A Info

G2.4.19

2.4.19 Knowledge of EOP layout, symbols, and icons

SRO Importance

4.1

Technical References

EOP-8-1, Functional Recovery Procedure (Rev 40)

References Provided to Applicants

None

Learning Objective

Given plant conditions recognize the success paths and order of their priority

Question Source

New

Question History

N/A for new question

Cognitive Level

Comprehension or Analysis

10 CFR Part 55 Content

55.43(b)(5)

Comments

None