MASTER NRC EXAM
Vermont Yankee
December 17, 2010

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295028 EA1.03	
	Importance Rating	3.9	

(K&A Statement) EA1.03- Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell cooling system

Proposed Question: RO 1

While operating at rated power and ALL drywell RRUs running, a leak in the drywell has resulted in entry conditions into EOP-3, "Primary Containment Control", on Drywell Pressure AND Drywell Temperature.

All plant systems respond as expected based on the entry condition into EOP-3.

Drywell parameters are as follows:

- Drywell pressure is 4 psig and rising slow
- Drywell temperature is 173°F and rising slow
- No operator actions have been taken in EOP-3.

Which ONE of the following must be performed to control drywell temperature given the current plant conditions?

The operator must _____.

A. monitor drywell temperature to ensure RRUs continue to operate as drywell pressure rises toward their trip setpoint
B. monitor drywell temperature to ensure RRUs continue to operate until the RRUs trip on thermal overload condition
C. depress the "DRYWELL CLG AND CTRL ROOM A/C BLOCKING RESET" pushbutton on CRP 9-25 and ALL drywell RRUs will automatically restart
D. place the "DRYWELL RRU PCIS TRIP MCA BYPASS SW" keylock in the MCA Bypass position on CRP 9-25 and ALL drywell RRUs will automatically restart

Proposed Answer: D

A. INCORRECT: RRUs are not operating due to tripping at 2.5 psig in the drywell
B. INCORRECT: RRUs are not operating due to tripping at 2.5 psig in the drywell
C. INCORRECT: This switch would be operated if there was a loss of power to buses 9 and/or 9
D. CORRECT: IAW OP 2115 Section F.2

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OP 2115 (discussion and section F.2 (NOTE)) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-288 objective K10 (As available)

Question Source:
- Bank # 246
- Modified Bank #
- New

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295016 AA1.08	
	Importance Rating	4.0	

(K&A Statement) AA1.08- Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: Reactor pressure

Proposed Question: RO 2

As directed by OP 3126, "Shutdown Using Alternate Shutdown Methods", SRV operation is conducted outside the Control Room by realigning power to the SRV control circuit.

Which ONE of the following is needed to allow operation of the selected SRVs to conduct a plant cooldown from outside the Control Room?

Transfer the ____(1)____ to allow operation of the __(2)__ SRVs.

NOTE: Assume all Alternate Shutdown power supplies are available.

A. (1) Appendix R Bypass Switch on CRP 9-3 to BYPASS
   (2) "A" and "B"

B. (1) Appendix R Bypass Switch on CRP 9-3 to BYPASS
   (2) "A" and "C"

C. (1) SRV Control Power Knife switch in the Alternate Shutdown Station ADS Safety Relief Valve Panel (RCIC Corner Room) to EMER
   (2) "A" and "B"

D. (1) SRV Control Power Knife switch in the Alternate Shutdown Station ADS Safety Relief Valve Panel (RCIC Corner Room) to EMER
   (2) "A" and "C"

Proposed Answer: C

A. INCORRECT: Appendix "R" bypass switch is needed ONLY to prevent adverse conditions in the Control Room from affecting SRV operation from outside the Control Room.
B. INCORRECT: Appendix "R" bypass switch is needed ONLY to prevent adverse conditions in the Control Room from affecting SRV operation from outside the Control Room.; "C" SRV is not operated outside the Control Room
C. CORRECT:IAW OP 3126, Appendix "C"
D. INCORRECT: "C" SRV is not operated outside the Control Room

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OP 3126, Appendix "C", CWD B191301 Sheet 752 ("A" SRV) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-612 objective EO A.5, LOT-00-218 K1.05 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
Reword enhancement; MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295037 EK1.01	
	Importance Rating	4.1	

(K&A Statement) EK1.01- Knowledge of the operational implications of the following concepts as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Reactor pressure effects on reactor power

Proposed Question: RO 3

Which ONE of the following automatic actions occurs to limit the adverse effect on reactor power in the event of an Anticipated Transient without Scram (ATWS) transient?

A _____(1)_____ will trip the Recirculation pump field breaker causing a rapid cessation of forced circulation which will mitigate the ___(2)_____.

A. (1) low-low RPV water level for 5 seconds
(2) effects of large neutronic/thermal-hydraulic instabilities.

B. (1) low reactor RPV water level for 10 seconds
(2) effects of large neutronic/thermal-hydraulic instabilities.

C. (1) high RPV pressure signal at 1035 psig
(2) pressure spike expected in the unlikely event that rods fail to insert on the automatic scram signal.

D. (1) high RPV pressure signal at 1150 psig
(2) pressure spike expected in the unlikely event that rods fail to insert on the automatic scram signal.

Proposed Answer: D

A. INCORRECT: low-low water level signal is for 10 seconds
B. INCORRECT: low-low water level signal is for 10 seconds
C. INCORRECT: high pressure at 1150 psig
D. CORRECT: IAW FSAR section 7.18.3.2.1

Technical Reference(s): FSAR Section 7.18.3.2.1, Figures 7.18-1a, 7.18-1b (Attach if not previously provided)

Proposed references to be provided to applicants during None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

examination: _____

Learning Objective: LOT-00-216, K1.09 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 8,9,10
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295003 2.1.20	
	Importance Rating	4.6	

(K&A Statement) 2.1.20- Ability to interpret and execute procedure steps

Proposed Question: RO 4

With the plant operating at full rated power, a loss of Bus 1 occurs.

Shortly after all immediate actions had been taken IAW OT 3169, "Loss of Bus 1", a steam leak develops in the steam tunnel. Main Steam Line Tunnel conditions are as follows:

- Main Steam Line tunnel temperature at 204°F and slowly rising

No other electrical distribution operations have been performed.

Twenty minutes after the steam leak developed, which ONE of the following is NOT an option for Reactor pressure control?

Reactor pressure CANNOT be controlled using the _____ system.

A. Mechanical Hydraulic Control (MHC)
B. High Pressure Coolant Injection (HPCI)
C. Reactor Core Isolation Cooling (RCIC)
D. Safety Relief Valve (SRV)

Proposed Answer: A

A. CORRECT: MHC system Auxiliary oil pump is powered from Bus 6 which is powered from bus 1; oil pressure to operate the bypass valves will be lost prior to 20 minutes.

B. INCORRECT: HPCI will not isolate at the 20 minute point thus will still be available

C. INCORRECT: RCIC will not isolate at the 20 minute point thus will still be available

D. INCORRECT: Nothing will prevent SRVs from being operated given the plant conditions

Technical Reference(s): OPOT-3169-01 (NOTES), OP 2120, OP 2121, EOP-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-602 RO EO5 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295018 AK3.03	
	Importance Rating	3.1	

(K&A Statement) AK3.03- Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Securing individual components (prevent equipment damage)

Proposed Question: RO 5

IAW ON 3148, "Loss of Service Water", which ONE of the following is the basis for automatically isolating Turbine Building non-essential SW loads upon lowering SW pressure?

The basis behind the automatic isolation of non-essential SW loads is to _____.

A. reduce the leak rate of a postulated design basis rupture downstream of the valves

B. preclude the possibility of inadequate cooling to the EDGs during pump runout conditions

C. provide adequate flow to CT-2 and the Deep Basin in the event that Alternate Cooling is required

D. provide design flow to the EDGs during accident conditions by limiting the flow to the Standby Fuel Pool Cooling Heat Exchangers

Proposed Answer: B

A. INCORRECT: Not the basis for isolating non-essential SW loads
B. CORRECT: ON 3148 discussion and SW DBD
C. INCORRECT: Not the basis for isolating non-essential SW loads
D. INCORRECT: Not the basis for isolating non-essential SW loads; 678 gpm is an administrative limit for the Standby Fuel Pool Cooling Heat Exchangers when the EDGs are being operated during accident conditions (OP 2179).

Technical Reference(s): ON 3148 discussion, Service Water DBD sections 3.4 and 3.5 (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-603, objective RO EO4 (As available)

Question Source:
Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content:
55.41 5
55.43 _____

Comments:

Deemed UNSAT by NRC during prep week for having 2 correct answers. Replaced distractor "D" and modified correct answer "B" to make it clear what most operators relate to and that's inadequate flow to the EDGs during pump runout conditions. (11-12-10); Additional discussion with NRC on 11-16-10: allowed answer "B" to be modified to include the entire basis including inadequate flow to the EDGs.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295026 EK3.01	
	Importance Rating	3.8	

(K&A Statement) EK3.01- Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Emergency/normal depressurization

Proposed Question: RO 6

EOP-3, "Primary Containment Control", directs an Emergency Depressurization (RPV-ED) if Torus temperature cannot be maintained below the Heat Capacity Temperature Limit (HCTL) curve.

Which ONE of the following identifies the basis for this action?

Performing an RPV-ED at this point will ensure that the subsequent rise in _____.

A. Torus temperature will not raise Torus pressure above the Primary Containment Pressure Limit-A
B. Torus level will not raise Torus pressure above the Primary Containment Pressure Limit-A.
C. Torus temperature will not raise Torus pressure above the Pressure Suppression Pressure
D. Torus level will not raise Torus pressure above the Pressure Suppression Pressure

Proposed Answer: A

A. CORRECT: Basis is IAW Volume 4 section 8, page 9 of 43
B. INCORRECT: Concern is Torus temperature
C. INCORRECT: Concern is PCPL-A
D. INCORRECT: Concern is PCPL-A

Technical Reference(s): EOP Volume 4 Study Guide section 8, page 9 of 43 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-607 objective RO3 (As available)

Question Source: Bank #

Modified Bank # 3548 (Q51 2007 exam)

New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 5

55.43

Comments:
MH Operations review SAT (9-15-10)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295038 EK1.02	
	Importance Rating	4.2	

(K&A Statement) EK1.02 Knowledge of the operational implications of the following concepts as they apply to HIGH OFF-SITE RELEASE RATE: Protection of the general public

Proposed Question: RO 7

Which ONE of the following identifies the10CFR50.67 dose limit for the Accident Source Term (AST) and subsequent exposure received at the boundary of the Low Population Zone (LPZ)?

A. 10 REM TEDE
B. 25 REM TEDE
C. 50 REM TEDE
D. 75 REM TEDE

Where TEDE = Total Effective Dose Equivalent

Proposed Answer: B

A. INCORRECT: Emergency Dose Limit for Saving property and plant equipment
B. CORRECT: IAW 10CFR50.67 and UFSAR section 1.8.3
C. INCORRECT: Not a correct limit
D. INCORRECT: Emergency Dose Limit for Saving lives on a voluntary basis

Technical Reference(s): UFSAR section 1.8.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-616, objective 8 (As available)

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 8,9,10
55.43 _____

Comments:
MH Operations review SAT (9-15-10); Discussion with the NRC revealed that the stem was too wordy. Removed superfluous information (11-1-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295006 AA1.06	
	Importance Rating	3.5	

(K&A Statement) AA1.06- Ability to operate and/or monitor the following as they apply to SCRAM: CRD hydraulic system

Proposed Question: RO 8

A low reactor water level condition resulted in a full scram. Water level during the transient went as low as 85" and is currently being maintained in the normal post scram water level control band. OP 0109, "Plant Restoration", actions have NOT been performed.

Which ONE correctly describes the CRD Hydraulic system response following a valid auto scram signal by RPS which resulted in the insertion of ALL control rods?

A. The Scram Solenoid Pilot Valves (CRD-117 and CRD-118) de-energize; the ARI/RPT Valves (ARI-A and ARI-B) energize.
B. The Scram Solenoid Pilot Valves (CRD-117 and CRD-118) energize; the ARI/RPT Valves (ARI-A and ARI-B) de-energize.
C. The Scram Solenoid Pilot Valves (CRD-117 and CRD-118) de-energize; the Back-up Scram Valves (CRD-140A and CRD-140B) energize.
D. The Scram Solenoid Pilot Valves (CRD-117 and CRD-118) energize; the Back-up Scram Valves (CRD-140A and CRD-140B) de-energize.

Proposed Answer: C

A. INCORRECT: ARI valves will not energize for this scenario
B. INCORRECT: 117/118 valves de-energize, ARI valves are not affected for this scenario
C. CORRECT: RPS is de-energize to function; Backup scram valves are energized to function (DC power)
D. INCORRECT: 117/118 valves de-energize

Technical Reference(s): RPS DBD page 2 of 72 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-01-201, objective K1.07 (As available)

Question Source: Bank # 6746
Modified Bank #
New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43

Comments:
MH: Why are we telling the candidate what level lowered to? To take away the possibility that ARI valves energized on low-low level for 82.5 inches.

At the request of the NRC, made the level closer to the low-low setpoint (11-1-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295023 AK2.04	
	Importance Rating	3.2	

(K&A Statement) AK2.07- Knowledge of the interrelations between REFUELING ACCIDENTS and the following: RMCS/rod control and information system

Proposed Question: RO 9

Which ONE of the following describes a refueling interlock that is designed to prevent inadvertent criticality during refueling operations?

NOTE: The mode switch is in REFUEL for each

A. Operation of the frame mounted hoist is prevented when the hoist is unloaded over the core with more than one fuel assembly removed from the core.
B. Movement of the Refuel Platform over the spent fuel pool is prevented with more than one control rod removed from the core and the grapple loaded with fuel.
C. Operation of the fuel grapple is prevented over the core while fully loaded with fuel with one control rod fully withdrawn from the core.
D. Control Rod withdrawal is prevented with the grapple fully loaded with a fuel assembly and full up over the Spent Fuel Pool.

Proposed Answer: C

A. INCORRECT: As long as the hoist is unloaded, operation of the hoist is permitted. PLAUSIBILITY: There is a frame mounted hoist interlock that is prevented while over the core, all control rods not in and the hoist loaded.
B. INCORRECT: Refuel Platform over the Spent Fuel Pool is never prevented. Once near or over the core under the given conditions, then it will be prevented. PLAUSIBILITY: Under the given conditions, bridge movement is prevented when near or over the core.
C. CORRECT: OP 1100 discussion- Operation of the telescoping fuel grapple is prevented when the following three conditions exist concurrently: Not all rods in, Refueling platform near or over the core, and Telescoping fuel grapple fuel-loaded.
D. INCORRECT: Control rod withdraw is prevented under these conditions if the grapple was loaded while near or over the core. PLAUSIBILITY: Under these conditions withdrawal would be prevented id near or over the core.

PLAUSIBILITY if distractors: The candidate needs to understand the concept of refueling interlocks and arrangement of refueling equipment that is designed to prevent inadvertent criticality and a potential subsequent refueling accident.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OP 1100 Discussion, pages 10-11. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-620 objective EO2 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis

10 CFR Part 55 Content:
- 55.41 7
- 55.43

Comments:
MH Operations review SAT (9-15-10)

Discussed with the NRC (11-16-10) the operational vlidity issues we have had with this question. Validators do not believe it's operationally valid for ROs. Based on this, received approval to redraw K/A. Rewrote a question for the new K/A and discussed it with the NRC.
This question is UNSAT since revision occurred after the original submittal.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295025 EA1.03	
	Importance Rating	4.4	

(K&A Statement) EA1.03- Ability to operate and/or **monitor** the following as they apply to HIGH REACTOR PRESSURE: Safety/relief valve: Plant specific

Proposed Question: RO 10

Which ONE of the following identifies how Safety Relief Valves (SRVs) and Safety Valves (SVs) operate to prevent exceeding the pressure Safety Limit during an overpressure transient?

A. 4 SRVs lift by 1080 psig and 3 Safety valves lift at 1140 psig

B. 4 SRVs lift by 1100 psig and 3 Safety valves lift at 1240 psig

C. 3 SRVs lift by 1080 psig and 4 Safety valves lift at 1140 psig

D. 3 SRVs lift by 1100 psig and 4 Safety valves lift at 1240 psig

Proposed Answer: B

A. INCORRECT: SRVs lift by 1100 psig; SVs lift at 1240 psig
B. ***CORRECT TS Table 2.2.1 and TS bases 3.6.D***
C. INCORRECT: SRVs life by 1100 psig; 3 SVs lift at 1240 psig
D. INCORRECT: 3 SRVs do by 1100 psig, however there are only 3 SVs that lift at 1240 psig.

Technical Reference(s): TS Table 2.2.1 and TS bases 3.6.D (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-308, objective RO EO 4 (As available)

Question Source: Bank #

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Modified Bank # _____

New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

55.43 _____

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295030 EK3.03	
	Importance Rating	3.6	

(K&A Statement) EK3.03- Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION POOL WATER LEVEL: RCIC operation

Proposed Question: RO 11

In accordance with EOP-3, "Primary Pressure Control", which ONE of the following describes the action and associated bases to be taken when Torus level cannot be maintained above 7 feet?

A. Safety relief valve operation is prohibited based on uncovering the T-Quenchers. Operation below this level will directly pressurize the Torus airspace, thus reducing the margin to exceeding PCPL-A.
B. Only HPCI operation is prevented based on uncovering the exhaust discharge device, thus reducing the margin to PCPL-A. The RCIC discharge device is not uncovered until Torus level reaches 5.5 feet in the Torus.
C. Only HPCI operation is prevented based on uncovering the exhaust discharge device. RCIC operation exhaust flow is negligible and will not result in exceeding PCPL-A.
D. Both HPCI and RCIC operation is prevented due to uncovering each exhaust discharge device. Operation of both systems below this Torus level will result in reducing the margin to PCPL-A.

Proposed Answer: C

A. INCORRECT: T Quenchers uncover at 5.5 feet
B. INCORRECT: RCIC exhaust is sized such that the adverse affects are negligible
C. CORRECT: IAW EOP Volume 4 study guide
D. INCORRECT: RCIC exhaust is sized such that the adverse affects are negligible

Technical Reference(s): EOP Volume 4 Study Guide, Section 8, page 34 of 43. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-607, objective RO 3 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

At the request of the NRC, interchanged HPCI with RCIC in distractor "B" (11-1-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295019 AK2.05	
	Importance Rating	3.4	

(K&A Statement) AK2.05- Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and the following: Main steam system

Proposed Question: RO 12

The plant was operating at 80% RTP when the plant was manually scrammed due to a complete loss of instrument AIR. The lowest level that was reached during the scram was 98 inches before recovering to the normal band.

Which ONE of the following identifies the response to the Main Steam System on a LOSS OF INSTRUMENT AIR

A. ONLY the inboard MSIVs will fail shut
B. ONLY the outboard MSIVs will fail shut
C. ALL MSIVs will fail shut
D. ALL MSIVs will remain open

Proposed Answer: B

A. INCORRECT: inboard MSIVs are unaffected by a loss of air during normal operations
B. CORRECT: outboard MSIVs will fail closed
C. INCORRECT: Inboard MSIV are unaffected by a loss of air during normal operations
D. INCORRECT: outboard MSIVs will fail closed

Technical Reference(s): ON 3146, Appendix "A" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-239, objective K1a.1.12a (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # 7223

Modified Bank #

New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7

55.43

Comments:

Changed "C" from Both inboard and outboard to: ALL

MH Operations review SAT (9-15-10)

After discussing with the NRC (11-16-10), capitalized AIR and LOSS OF INSTRUMENT AIR to avoid confusion of loss of Instrument AC.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295031 EA2.04	
	Importance Rating	4.6	

(K&A Statement) EA2.04- Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling

Proposed Question: RO 13

A large break Loss of Coolant Accident (LOCA) coincident with an Anticipated Transient without Scram (ATWS) event has occurred.

EOP-2, "ATWS RPV Control" has been entered and due to the inability to maintain the required minimum RPV level band, an RPV-ED has been ordered.

Which ONE of the following scenarios will Adequate Core Cooling (ACC) be assured of?

ACC can be assured as long as _____ following the RPV-ED.

A. RPV pressure can be maintained greater than Minimum Steam Cooling Pressure (MSCP) regardless of RPV level
B. a Core Spray Pump can be started with at least 3250 gpm flow to restore and maintain RPV level above -25 inches
C. BOTH Core Spray Pumps can be started with each providing at least 1625 gpm flow to restore and maintain RPV level above -48 inches
D. the Residual Heat Removal (RHR) System can provide adequate injection to restore and maintain RPV level above -48 inches

Proposed Answer: A

A. CORRECT: Steam Cooling is provided during an ATWS as long as pressure remains above MSCP during RPV-ED

B. INCORRECT: Core Spray is not taken credit for ACC during an ATWS due to uncertainties in the power distribution ensuring all areas are cooled by receiving the uniform spray pattern. Although it can be used after the RPV-ED to provide steam cooling, it needs to be at least -19 inches (MSCRWL)

C. INCORRECT: Core Spray is not taken credit for ACC during an ATWS due to uncertainties in the power distribution ensuring all areas are cooled by receiving the uniform spray pattern.

D. INCORRECT: Level must be TAF to ensure core submergence using the RHR system

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): EOP Study Guide, Volume 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610 objective EO 2.4.18 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43

Comments:
Upon Operations review, two correct answers (A,D); changed "D" to -48 inches to make incorrect and changed "B" to -19 inches to balance out distractors
MH Operations review SAT (9-15-10)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	700000 AA2.03	
	Importance Rating	3.5	

(K&A Statement) AA2.03- Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Generator current outside the capability curve

Proposed Question: RO 14

The plant is operating at full rated power when a leak in the Main Generator casing has resulted in Generator hydrogen pressure being reduced from 43.8 psig to 32 psig.

The following are the current Main Generator parameters:

- Generator Gross: 634.0 MW_e and steady
- Gross VARS: 16 MVAR (lag) and steady
- Generator H_2 pressure: 32 psig and steady

Which ONE of the following is required based on the current Main Generator parameters?

NOTE: OP 2140 Figure 1 is provided as a reference

A. Reduce real load on the Main Generator
B. Reduce Reactive load (in) on the Main Generator
C. Reduce Reactive load (out) on the Main Generator
D. Monitor H_2 pressure and take appropriate action ONCE outside the Generator Capability Curve.

Proposed Answer: A

A. CORRECT: IAW OP 0105 precaution, maintain within the limits of the Generator Capability Curve

B. INCORRECT: Reactive load reduction will not result in getting within the limits of the Generator Capability Curve

C. INCORRECT: Reactive load reduction will not result in getting within the limits of the Generator Capability Curve

D. INCORRECT: The current plant conditions place operation outside the Generator Capability Curve.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OP 2140
RP 2161
OP 0105
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: OP 2140, Figure 1

Learning Objective: LOT-00-305, objective RO EO2 (As available)

Question Source:
Bank #
Modified Bank #
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 5
55.43

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295004 AK3.01	
	Importance Rating	3.4	

(K&A Statement) AK3.01 Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: load shedding: Plant specific

Proposed Question: RO 15

With the plant operating at 70% RTP, a loss of DC-1 occurs. NO actions have been taken for the loss of DC-1.

Shortly thereafter, a loss of Bus 4 occurs. The electrical distribution system operated as designed for the loss of Bus 4.

Which ONE of the following describes the load shed response?

Due to DC control power being _____.

A. available to Bus 8, all equipment on Bus 8 and MCCs 8A→8C and 8E will load shed as designed

B. unavailable to Bus 8, the load shed feature for Bus 8 and MCCs 8A→8C and 8E will be disabled resulting in loads starting immediately when power is restored

C. available to Bus 9, all equipment on Bus 9 and MCCs 9A→9D will load shed as designed

D. unavailable to Bus 9, the load shed feature for Bus 9 and MCCs 9A→9D will be disabled resulting in loads starting immediately when power is restored

Proposed Answer: C

A. INCORRECT: A loss of DC-1 will result in normal control power being lost to buses 1,3,8; Bus 8 equipment will NOT load shed on a loss of Bus 4
B. INCORRECT: A loss of DC-1 will result in normal control power being lost to buses 1,3,8; Bus 8 equipment will NOT load shed on a loss of Bus 4
C. CORRECT: Bus 9 control power is available (normal is DC-2) thus Bus 9 equipment will load shed as designed after bus 4 power is lost.
D. INCORRECT: A loss of DC-1 will result in normal control power being lost to buses 1,3,8; Bus 8 equipment will NOT load shed on a loss of Bus 4

Technical Reference(s): OP 2145, Appendix "C" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-01-262, objective K6.01 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 5
- 55.43 _____

Comments:

MH Operations review SAT (9-15-10)

11-10-10: Rewirded the stem to make it easier to read. Added "to Bus 8" or "to Bus 9" in answers to allow better organization.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	
Group #	1	
K/A #	600000 AA2.16	
Importance Rating	3.0	

(K&A Statement) AA2.16 Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: Vital equipment and control systems to be maintained and operated during a fire

Proposed Question: RO 16

With the plant operating at full power operations, a Loss of Normal Power (LNP) occurs. All plant equipment operates as designed.

Shortly after, a fire in the "A" EDG Room breaks out due to a lube oil rupture.

Which ONE of the following identifies a system component that has been analyzed to be available for the safe shutdown of the plant if needed for the current plant conditions?

A. SW Pump "B" for auxiliary support
B. RHRSW Pump "A" for auxiliary support
C. Reactor Feed Pump "C" for inventory control
D. CRD Pump "A" for coolant inventory and reactivity control

Proposed Answer: A

A. ***CORRECT: Analyzed to be available IAW OP 3020 Appendix "M"***
B. INCORRECT: B, C, D could be adversely affected by a fire in the "A" EDG under the given conditions. Thus they have not been analyzed to be available. The "C" RFP is lost on an LNP (Bus 2)

Technical Reference(s): OP 3020, Appendix M (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-286, K3.03 (As available)

Question Source: Bank #

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Modified Bank # _____

New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

55.43 _____

Comments:

Question originally stated fire in the East Switchgear room and the distractors were deemed to difficult to be able to recall from memory.

MH Operations review SAT (9-15-10)

Discussed with the NRC on 11-16-10: Removed the statement in the stem concerning OP 3020, Appendix "M" due to making the question wordy and possibly confusing with the additional information.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295021 AK2.07	
	Importance Rating	3.1	

(K&A Statement) AK2.07- Knowledge of the interrelations between LOSS OF SHUTDOWN COOLING and the following: Reactor recirculation

Proposed Question: RO 17

With the reactor shutdown and vessel head installed, a trip of the ONLY available RHR pump has resulted in the loss of Shutdown Cooling. The CRS enters ON 3156, "Loss of Shutdown Cooling", and directs that RPV water level be raised due to the inability to re-establish forced circulation.

Which ONE of the following identifies the MINIMUM RPV water level which will promote natural circulation?

A. 156 inches
B. 166 inches
C. 176 inches
D. 186 inches

Proposed Answer: D

A. INCORRECT: Minimum level is185 inches
B. INCORRECT: Minimum level is185 inches
C. INCORRECT: Minimum level is185 inches
D. CORRECT: IAW ON 3156, maintaining vessel level above 185 inches allows a natural circulation path between the inside and outside of the shroud. (GE SIL-357)

Technical Reference(s): ON 3156 Note page 8, GE SIL-357 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-205, objective K4.02b (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:

Question needs to be replaced due to double jeopardy with another question; Operations rep recommends to ask why we secure a recirculation loop when going into SDC (9-15-10)

Questioned replaced a second time 10-4-10

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295005 AA1.04	
	Importance Rating	2.7	

(K&A Statement) AA1.04- Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP: Main generator controls

Proposed Question: RO 18

With the plant operating at 50% RTP, a plant transient results in activation of BOTH the primary and backup Main Generator lockout relays (86G-P and 86G-B).

Which ONE of the following describes subsequent response to the 345/115KV Electrical Distribution system and Main Turbine?

The primary and backup lockout relays will result in the loss of the ____(1)____ Transformer and will initiate a Main Turbine trip via ____(2)____.

A. (1) Auto
   (2) MTS-1

B. (1) Auto
   (2) MTS-3

C. (1) Auxiliary
   (2) MTS-1

D. (1) Auxiliary
   (2) MTS-3

Proposed Answer: C

A. INCORRECT: Auto Transformer is not affected
B. INCORRECT: Auto Transformer is not affected; MTS-3 does not trip the turbine for this scenario; MTS-1 does
C. CORRECT:
D. INCORRECT: MTS-3 does not trip the turbine for this scenario; MTS-1 does

Technical Reference(s): CWD Sheet 234/235 and OP 0105, Figure 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-262, objective K4.01 and K6.03 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295024 2.2.44	
	Importance Rating	4.2	

(K&A Statement) 2.2.44- Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions

Proposed Question: RO 19

A loss of coolant accident has occurred. Post scram plant conditions are as follows:

- Reactor power is <2% RTP
- 3 control rods remain full out
- Reactor pressure is 880 psig and lowering slowly
- Reactor water level is 120 inches and slowly rising
- Drywell pressure is 3.8 psig and rising slowly

All systems operate as designed and the crew has entered the appropriate EOPs.

Which ONE of the following identifies the…

(1) Operating status of HPCI and CS/RHR pumps
(2) direction provided for operation of the system(s) that automatically started

A. (1) ONLY HPCI is operating. HPCI is injecting.
(2) Inhibit HPCI.

B. (1) BOTH HPCI AND CS/RHR pumps are operating AND injecting
(2) Continue to inject with HPCI and CS/RHR until direction to terminate and prevent is required.

C. (1) BOTH HPCI AND CS/RHR pumps are operating. ONLY HPCI is injecting.
(2) Inhibit HPCI AND place CS/RHR pumps in "Pull to Lock" if NOT required for Adequate Core Cooling (ACC).

D. (1) ONLY HPCI is operating. HPCI is injecting.
(2) Continue to inject with HPCI until direction to terminate and prevent is required.

Proposed Answer: C

A. INCORRECT: RHR/CS pumps are operating
B. INCORRECT: RHR/CS pumps are operating but NOT injecting; HPCI may most likely be inhibited once adequate core cooling is ensured- for this scenario the CRS may not secure HPCI based on what sources are injecting. If there is reason to believe level will decrease after being secured, then HPCI will remain operating until Terminate and Prevent is ordered.
C. CORRECT:
D. INCORRECT: RHR/CS pumps are operating

Technical Reference(s): EOP-2, override ARC/OR-1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610, objective 2.4.37, 2.4.39 (As available)

Question Source:
Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 5
55.43 _____

Comments:

Rewording enhancement → potential of 2 correct answers if a CRS felt HCI needed to remain running if unsure whether securing it would result in level lowering toward +6 inches with a leak present.

MH Operations review SAT (9-15-10)

Question deemed UNSAT by NRC 11-1-10 due to level of knowledge. Revised the question to include injection operation and injection of both systems in each answer.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	295001 AA2.05	
	Importance Rating	3.1	

(K&A Statement) AA2.05- Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Jet pump operability: Not BWR-1&2

Proposed Question: RO 20

The Reactor was operating at 80% RTP when a plant transient resulted in the following indications:

- Power decreases, steadying out at ~74%
- Steam flow decreases from 6.0 Mlbm/hr to 5.6 Mlbm/hr
- Condenser backpressure decreases from 2.3 Hg abs. to 2.2 inches Hg abs.

Which ONE of the following are these indications of?

NOTE: Assume these are the indications with NO operator actions taken

A. A condensate pump has tripped.
B. A displaced jet pump mixer has occurred.
C. An inadvertent RCIC injection has occurred.
D. The EPR has failed and the MPR has taken control.

Proposed Answer: B

A. INCORRECT: An automatic runback will not occur due to a condensate pump trip from 80%.
B. CORRECT: some core flow is bypassed decreasing power and flow (ON 3141 symptoms (Core thermal power and generator output will decrease due to lower core flow and a sudden decrease in steam flow)
C. INCORRECT: RCIC injection will result in a power rise (reactivity addition)
D. INCORRECT: This would result in a pressure rise and subsequent reactivity addition.

NOTE: Ran this malfunction on the Simulator to get the plant data. Ran a trip of a condenstae pump as well to determine the affects of the level transient and power decreased to 78% before returning to 80%.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OPON-3141-01 Symptoms (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-601, objective RO EO1 (As available)

Question Source:
- Bank # _____
- Modified Bank # 6353
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Comments:

Changed vacuum from 1.4 to 1.8 to make it more legitimate of actual plant response.

MH Operations review SAT (9-15-10)

After discussing with the NRC (11-16-10), modified initial conditions to move further away from runback setpoint to reduce the possibility of 2 correct answers. Ran the response on the Simulator to get new data from these conditions.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295022 AA1.02	
	Importance Rating	3.6	

(K&A Statement) AA1.02- Ability to operate and/or monitor the following as they apply to LOSS OF CRD PUMPS: RPS

Proposed Question: RO 21

A plant startup is in progress with RPV pressure at 950 psig. As the startup continues, the following annunciator is received:

- 5-C-1, "CRD PUMP B TRIP"

Two minutes after the annunciator 5-C-1, rod 14-23 accumulator low pressure alarm comes in.

In accordance with OPON-3145-01, "Loss of CRD Regulating Function", which ONE of the following identifies how the crew should respond to the given conditions?

Immediately insert all control rods _____.

A. AFTER the second accumulator alarm comes in
B. AFTER the third accumulator alarm comes in
C. if charging water pressure is NOT restored to 940 psig within 10 minutes AFTER the 2nd accumulator alarm is received
D. if charging water pressure is NOT restored to 940 psig within 20 minutes AFTER the 2nd accumulator alarm is received

Proposed Answer: D

A. INCORRECT: There is no reason to believe that pressure cannot be restored with the "A" CRD pump. This action is not required for another 20 minutes.
B. INCORRECT: Second accumulator alarm is for pressure <900 psig
C. INCORRECT: 20 minutes is the time criteria
D. CORRECT IAW OPON-3145-01

Technical Reference(s): OPON-3145-01 (Attach if not previously provided)

_____

_____

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-601 objective RO EO3 (As available)

Question Source: Bank # 7244
Modified Bank # _____
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
Revised the stem to remove the "A" CRD pump being unavailable
MH Operations review SAT (9-15-10)

Modified distractor at request of NRC (11-1-10): one distractor was too extreme of an action (plausibility); replaced that distractor with what is now "B".

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295013 2.1.31	
	Importance Rating	4.6	

(K&A Statement) 2.1.31- Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup

Proposed Question: RO 22

A plant startup is in progress IAW OP 0105, "Reactor Operations", Phase 2C. The following plant conditions exist:

- RPV pressure 860 psig
- Main Condenser backpressure at 3.8 psig controlled by AOG
- CRP 9-5 annunciators reflect current plant conditions

Which ONE of the following identifies the required position and location of the "MSIV LOW COND VAC ISOL BYPASS" keylock switches IAW OP 0105, based on these plant conditions?

The "MSIV LOW COND VAC ISOL BYPASS" keylock switches are in the ____(1)____ position located on ____(2)____

A. (1) NORMAL
(2) CRP 9-5

B. (1) NORMAL
(2) CRP 9-15 and CRP 9-17

C. (1) BYPASS
(2) CRP 9-5

D. (1) BYPASS
(2) CRP 9-15 and CRP 9-17

Proposed Answer: B

Comprehension: Candidate needs to analyze plant data to determine the required position of the switches.

A. INCORRECT: switches are located on CRP 9-15 and CRP 9-17

B. CORRECT: IAW OP 0105, Phase 2C, step 20- WHEN: AOG system is controlling back pressure, (less than 5 inches HgA), AND Reactor Press <850 psig AND, COND LOW VAC GRP 1 ISOL TRIP alarm on CRP 9-5 (5-J-7) is clear (this can be verified by observing computer points D504 through D507 NORMAL).THEN perform the following: Restore the four MSIV LOW COND VAC ISOL BYPASS switches (keylock) (two at CRP 9-15 and two at CRP 9-17) to NORMAL.

C. INCORRECT: Plant conditions warrant taking the switches to NORMAL on CRP 9-15 and CRP 9-17.

D. INCORRECT: Plant conditions warrant taking the switches to NORMAL.

Technical Reference(s): OP 0105, Phase 2C, step 20 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-302, objective RO2 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295015 AA2.02	
	Importance Rating	4.1	

(K&A Statement) AA2.02- Ability to determine and/or interpret the following as they apply to INCOMPLETE SCRAM: Control rod position

Proposed Question: RO 23

Following an automatic scram, power remained high in the Intermediate range (Range 7) due to six control rods that remained at position 48. The CRS entered EOP-2, "ATWS RPV Control".

All operator actions for the Anticipated Transient without Scram (ATWS) have been performed IAW station procedures.

Which ONE of the following conditions identifies the EARLIEST point at which the CRS can exit EOP-2 and enter EOP-1, "RPV Control"?

A. Four control rods inserted to position 00 and two control rods inserted to position 02
B. Five control rods inserted to position 00 and one control remained at position 48
C. After Hot Shutdown Boron weight has been injected and based on this, Reactor Engineering determines the reactor will remain shutdown under all conditions. Additionally, boron injection has been terminated.
D. After Cold Shutdown Boron weight has been injected and based on this, Reactor Engineering determines the reactor will remain shutdown under all conditions. Additionally, boron injection has been terminated.

Proposed Answer: B

A. INCORRECT: Can only be one rod at any other position than 00
B. CORRECT: The reactor will remain shutdown under this condition IAW Table "B"
C. INCORRECT: HSBW will not ensure the reactor remains shutdown under all conditions IAW Table "B".
D. INCORRECT: CSBW will not ensure the reactor remains shutdown under all conditions IAW Table "B".

Technical Reference(s): EOP-2 Table B and EOP-2 override (ARC/OR-1) (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610 objectives 2.4.32, 2.4.39, and 2.4.48 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295012 AK2.01	
	Importance Rating	3.4	

(K&A Statement) AK2.01- Knowledge of the interrelations between HIGH DRYWELL TEMPERATURE and the following: Drywell ventilation

Proposed Question: RO 24

The following pre-transient Drywell RRU line up exists:

- DWL Air Cooler RRU-1 and RRU-2 have their switches in "A+B Run"
- DWL Air Cooler RRU-3 and RRU-4 have their switches in "A+B STBY"

A leak develops in Primary Containment resulting in the following plant conditions:

- Drywell pressure is 2.2 psig and slowly rising.
- Average Drywell temperature is 155°F and slowly rising.
- CRD Area temperature in the Drywell is 170°F and slowly rising.

Which ONE of the following identifies the correct Drywell RRU lineup based on current containment conditions?

NOTE: Assume NO operator actions have been taken.

A. All RRUs will be tripped.
B. All RRUs will be running.
C. RRU-1 and RRU-2 (A and B RRUs) will remain running. RRU-3 and RRU-4 (A and B RRUs) will remain off.
D. RRU-3 and RRU-4 (A and B RRUs) will start. RRU-1 and RRU-2 (A and B RRUs) will trip off.

Proposed Answer: B

A. INCORRECT: Still below the high drywell pressure setpoint
B. CORRECT: All RRUs in standby will automatically start at 160F CRD area temperature
C. INCORRECT: All RRUs will be operating
D. INCORRECT: All RRUs will be operating

Technical Reference(s): OP 2115 Section F
ARS 5-C-9

(Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-288 objective K10 (As available)

Question Source: Bank #
Modified Bank # 6930
New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295032 EK 3.01	
	Importance Rating	3.5	

(K&A Statement) EK3.01-Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: Emergency/normal depressurization

Proposed Question: RO 25

A primary system leak into the Secondary Containment has resulted in entry into EOP-4, Secondary Containment Control. Temperatures in two areas have exceeded their Maximum Safe Operating Limit. As a result, the CRS has directed an RPV Emergency Depressurization (RPV-ED).

Which ONE of the following identifies the basis for performing an RPV-ED?

An RPV-ED is performed to _____.

A. preclude further area temperature increases, which will prevent operator access required for performance of EOPs
B. precludes further area temperature increases, which may pose a direct and immediate threat to equipment and secondary containment integrity
C. reject the RPV energy to the main condenser in preference to the secondary containment
D. reject the RPV energy to the main condenser in preference to the primary containment

Proposed Answer: B

A, C, D: INCORRECT: Not basis for RPV-ED on high area temperature IAW EOP-4

B: CORRECT: Basis IAW EOP-4

Technical Reference(s): EOP Study Guide (Volume 4) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-611 objective EO RO3 (As available)

Question Source:
- Bank # 3705
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 5
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)
At the request of the NRC, added the word "secondary" to answer "B".

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295014 2.1.23	
	Importance Rating	4.3	

(K&A Statement) 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Proposed Question: RO 26

With a plant startup in progress and reactor pressure at 880 psig, a control rod drifts out from position 20 to 26.

In accordance with OT 3167, "Control Rod Drift", which ONE of the following actions is required at a MINIMUM?

A. Select the control rod that drifted out and make an attempt to insert the rod to its original position
B. Select the control rod that has drifted out and insert it to position 00.
C. Manually scram the control rod that has drifted out.
D. Electrically disarm the control rod locally at the Hydraulic Control Unit (HCU)

Proposed Answer: A

A. CORRECT: IAW OT 3167

B. INCORRECT: This step is not performed anywhere in OT 3167; the rod will be scrammed.
C. INCORRECT: This is not done until the drifted control rod has been inserted to its original position.
D. INCORRECT: This is not done IAW OT 3167. It is done for inoperable control rods IAW Technical Specifications.

Technical Reference(s): OT 3167 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-602, objective RO EO5 (As available)

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:

Revised the stem to remove the fact there was a 2nd rod drifted out from 20→26 before the other rod drifter out. A CRS may deem that as 2 rods at the same time.

MH Operations review SAT (9-15-10)

At the request of the NRC (11-1-10), replaced an implausible distractor with one that is less severe of an action. That has been repalced with what is now "D".

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	295007 AK1.03	
	Importance Rating	3.8	

(K&A Statement) AK1.03- Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Pressure effects on reactor power

Proposed Question: RO 27

With the plant operating at 80% RTP the Control Room receives annunciator 7-G-2, "EPR CONTROL POWER LOSS/TROUBLE" due to a loss of power to the Electro-Hydraulic Pressure Regulator (EPR).

Which ONE of the following describes the MHC system and reactor plant response to the subsequent transient?

The EPR output stroke will fail _____(1)_____ resulting in a(an) _____(2)_____ in reactor power.

A. (1) high
   (2) increase
B. (1) high
   (2) decrease
C. (1) low
   (2) increase
D. (1) low
   (2) decrease

Proposed Answer: C

A. INCORRECT: The EPR stroke fails low
B. INCORRECT: The EPR fails low resulting in an increase in power
C. CORRECT: EPR fails low resulting in a pressure rise, thus adding positive reactivity and a subsequent power increase.
D. INCORRECT: The EPR fails low resulting in an increase in power

Technical Reference(s): GEK (Attach if not previously provided)

Proposed references to be provided to applicants during None

NUREG-1021, Revision 9, Supplement 1

examination: _____

Learning Objective: LOT-00-249, objective K3.02 (As available)

Question Source: Bank # _____
Modified Bank # Question 1 from 2009 SRO re-exam
New _____

Question History: Last NRC Exam Yes (modified)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 8
55.43 _____

Comments:
MH Operations review SAT (9-15-10)
At the request of the NRC (11-1-10), added the word "ouput" to the stem.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	209001 A3.06	
	Importance Rating	3.6	

(K&A Statement) A3.06- Ability to monitor automatic operations of the LOW PRESSURE CORE SPRAY SYSTEM including: Lights and alarms

Proposed Question: RO 28

The Emergency Operating Procedures have been entered to control RPV water level. Water level is steady with ONLY the "A" Core Spray Pump running.

Which of the following is (are) the expected annunciator(s) and operator action to be taken on CRP 9-3 in the event the 51C device (timed overcurrent) setpoint for the "A" Core Spray Pump is reached? (CWD B-191301 (Sheet 1164) provided as an open reference)

NOTE: Assume that the overcurrent condition exists on the "C" phase ONLY.

A. Annunciator 3-D-1 (CORE SPRAY A PUMP TRIP) ONLY; another means of injection is required to control level.
B. Annunciator 3-D-2 (CORE SPRAY A PUMP OVLD) ONLY; reduce Core Spray "A" flow by throttling CS-11A (Pump Discharge) to clear the alarm.
C. Annunciator 3-D-2 (CORE SPRAY A PUMP OVLD) ONLY; reduce Core Spray "A" flow by throttling CS-12A (Pump Discharge) to clear the alarm.
D. Annunciator 3-D-1 (CORE SPRAY A PUMP TRIP) AND Annunciator 3-D-2 (CORE SPRAY A PUMP OVLD); another means of injection is required to control level.

Proposed Answer: A

A. CORRECT: CWD 1164

B. INCORRECT: OVLD annunciator does not come in on the 51C device; CS pump trips therefore another means of injection is required.
C. INCORRECT: OVLD annunciator does not come in on the 51C device; CS pump trips therefore another means of injection is required.
D. INCORRECT: OVLD annunciator does not come in on the 51C device.

Technical Reference(s): ARS 3-D-1, CWD 1164 (Attach if not previously provided)

Proposed references to be provided to applicants during CWD 1164

examination: _____

Learning Objective: LOT-00-209, objective A3.06 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:

MH Operations review SAT (9-15-10)

After discussion with the NRC (11-16-10), added a NOTE identifying that the overcurrent condition was on the "C" phase only. Otherwise, a very knowledgable individual might deduce that if the 51C device is activated, then the 51B is also activated (lower setpoint). This would make the correct answer "D".

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	217000 A1.05	
	Importance Rating	3.7	

(K&A Statement) A1.05 Ability to predict and/or monitor changes in parameters associated with operating the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) controls including: RCIC turbine speed

Proposed Question: RO 29

The Reactor Core Isolation Cooling (RCIC) System has been started to control RPV water level. A failure of the automatic feature of the controller has resulted in taking MANUAL control of RCIC. Pressure is currently steady at 930 psig.

If pressure lowered to 600 psig, which ONE of the following describes the RCIC governor valve (RCIC-1) response?

A. It will open to maintain flow constant.
B. It will close to maintain flow constant.
C. It will open to maintain pump speed constant.
D. It will close to maintain pump speed constant.

Proposed Answer: C

A. INCORRECT: In manual, the controller will operate the governor valve to maintain pump speed constant; as pressure decreases the governor valve opens more to accomplish this.
B. INCORRECT: In manual, the controller will operate the governor valve to maintain pump speed constant; as pressure decreases the governor valve opens more to accomplish this.
C. CORRECT: RCIC GEK operation
D. INCORRECT: In manual, the controller will operate the governor valve to maintain pump speed constant; as pressure decreases the governor valve opens more to accomplish this.

Technical Reference(s): RCIC GEK Manual 32441 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-217 objective A1.05, K5.06 (As available)

Question Source:
- Bank # 6901
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 5
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	211000 2.4.11	
	Importance Rating	4.0	

(K&A Statement) 2.4.11- Knowledge of abnormal condition procedures

Proposed Question: RO 30

Which ONE of the following identifies an alternate Boron injection flowpath identified in OE 3107, "EOP/SAG Appendices", in the event normal means of Boron injection fail?

A. SLC Test tank → SLC Pump suction → squib valves → RPV
B. SLC Tank → temporary hose → CRD pump suction → RPV
C. Drums of Borax and Boron into RWCU pump suction → Cleanup Filter Demineralizer → Regenerative Heat Exchanger → RPV → Recirculation Loop "A"
D. Drums of Borax and Boron into RWCU pump discharge → Cleanup Filter Demineralizer Bypass line → Regenerative Heat Exchanger → RPV → Recirculation Loop "B"

Proposed Answer: B

A, C, D: INCORRECT: These are not operationally driven flowpaths IAW OE 3107 for SLC injection.

B: Correct flowpath IAW OE 3107 Appendix "K"

Technical Reference(s): OE 3107 Appendix K, P&IDs G-191170 and 191171 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-626 objective RO EO4 (As available)

Question Source: Bank #

Modified Bank #

New X

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 10
55.43

Comments:
MH Operations review SAT (9-15-10)

Deemed UNSAT by the NRC (11-1-10) due to implausible distractors C/D. Added the origin of SLC up front in the answers to be consistent with A/B.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	400000 K4.01	
	Importance Rating	3.4	

(K&A Statement) K4.01- Knowledge of CCWS design feature(s) and or interlocks which provide for the following: Automatic start of standby pump.

Proposed Question: RO 31

The following lineup exists for the Turbine Building Closed Cooling Water (TBCCW) system:

- "B" TBCCW pump is operating
- "A" TBCCW pump is in AUTO

From the list below, which of the following identifies ALL of the conditions that would result in the "A" TBCCW pump automatically starting?

1. Loss of power to MCC-9C
2. Overcurrent trip of the running pump
3. Discharge header pressure at 58 psig
4. Load sequencing following a LNP

A. #1, 2, and 3 ONLY
B. #1, 3, and 4 ONLY
C. #1, 2, and 4 ONLY
D. #2, 3, and 4 ONLY

Proposed Answer: A

A. CORRECT: All three will result in the AUTO start of the standby TBCCW pump
B. INCORRECT: Load sequencing is not an auto start feature of the TBCCW pump
C. INCORRECT: Load sequencing is not an auto start feature of the TBCCW pump
D. INCORRECT: Load sequencing is not an auto start feature of the TBCCW pump

Technical Reference(s): OT 3165, CWD Sheet 456 (Attach if not previously provided)

Proposed references to be provided to applicants during None

examination: _____

Learning Objective: LOT-00-274, objective EO K4.01 (As available)

Question Source: Bank # _____
Modified Bank # 3296
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	205000 K5.02	
	Importance Rating	2.8	

(K&A Statement) K5.02- Knowledge of the operational implications of the following concepts as they apply to SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE): Valve operation

Proposed Question: RO 32

The plant is shutdown for a refueling outage with the "A" Loop of RHR in Shutdown Cooling.

Which ONE of the following identifies the operational impact on Shutdown Cooling if RPV pressure rises to 160 psig?

A. RHR-17 and RHR-18 (RHR Shutdown Cooling Suction valves) will remain open
"A" Loop RHR pump will continue to run

B. RHR-17 and RHR-18 (RHR Shutdown Cooling Suction valves) will close
"A" Loop RHR pump will trip

C. RHR-17 and RHR-18 (RHR Shutdown Cooling Suction valves) will close
RHR-13A and RHR-13C (pump suction valves) will open
"A" Loop RHR pump will continue to run

D. RHR-17 and RHR-18 (RHR Shutdown Cooling Suction valves) will close
RHR-15A and RHR-15C (pump suction valves) will open
"A" Loop RHR pump will continue to run

Proposed Answer: B

A. INCORRECT: RHR-17 and RHR-18 will shut on high pressure isolation signal and the pump will trip on no suction flowpath; this answer would be correct if pressure was <150 psig.
B. CORRECT: The high pressure will result in a high pressure isolation (RHR-17 and RHR-18 will close) and subsequent pump trip.
C. INCORRECT: RHR-13A and 13C will not auto open
D. INCORRECT: RHR-15A and 15C will not auto open

Technical Reference(s): RHR DBD Page 57 of 104; ON 3156 automatic actions (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-205, objective K4.02b (As available)

Question Source: Bank # 1821
Modified Bank # _____
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

After discussion with the NRC (11-1-10), removed an implausible distractor and replaced with what is now "D".

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	261000 A2.03	
	Importance Rating		

(K&A Statement) A2.03- Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, **control**, or mitigate the consequences of those abnormal conditions or operations: High area radiation by refuel bridge

Proposed Question: RO 33

With the plant operating at 90% RTP, the Control Room received the following annunciators:

- 5-H-1, "RX BLDG/REFUEL FLR CH A RAD HI"
- 5-J-1, "RX BLDG/REFUEL FLR CH B RAD HI"

Indications on CRP 9-10 are as follows:

- Reactor Building (RB) ventilation radiation monitors are reading 6 mr/hour and steady
- Refuel Floor radiation monitors are reading 120 mr/hour and steady

Which ONE of the following describes the:

(1) response of the SBGT system and
(2) the required verification of SGT-1A/B (Inlet Bypass), SGT-2A/B (Inlet Isolation), and SGT-3A/B (Discharge Isolation)

IAW OPOP-SGT-2117, "Standby Gas Treatment", section 7.3?

A. (1) Both trains of SBGT started based on high radiation from the RB ventilation radiation monitors.
(2) Open/check open SGT-1A/B, SGT-2A/B, and SGT-3A/B

B. (1) Both trains of SBGT started based on high radiation from the Refuel Floor radiation monitors.
(2) Open/check open SGT-1A/B, SGT-2A/B, and SGT-3A/B

C. (1) Both trains of SBGT started based on high radiation from the RB ventilation radiation monitors.
(2) Open/check open SGT-2A/B, and SGT-3A/B. Check closed SGT-1A/B.

D. (1) Both trains of SBGT started based on high radiation from the Refuel Floor radiation monitors.
(2) Open/check open SGT-2A/B, and SGT-3A/B. Check closed SGT-1A/B.

Proposed Answer: B

A. INCORRECT: Both trains started on high RF radiation at 100 mr/hour.
B. CORRECT: OE 3107 Appendix "A" and OPOP-SGT-2117 section "7.3"
C. INCORRECT: Both trains started on high RF radiation at 100 mr/hour. SGT-1A/B should have opened on auto start due to high radiation. Plausible since these valves will remain shut on an auto HPCI start and the candidate must distinguish the train response for various plant transients.
D. SGT-1A/B should have opened on auto start due to high radiation. Plausible since these valves will remain shut on an auto HPCI start and the candidate must distinguish the train response for various plant transients.

NOTE: Different from S-6 JPM in that the cause is Refuel Floor high radiation and NOT reactor building high radiation. Additionally the failure mode of the JPM dealt with RB ventilation failing to isolate.

Technical Reference(s): OPOP-SGT-2117, Section "7.3"
OE 3107, Appendix "B"
ARS 5-H-1 and 5-J-1
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-261, objective A2.15 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
After discussion with the NRC (11-1-10) K/A redrawn on 11-8-10 based on difficulty

writing an operationally valid RO question from original K/A (A2.03)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262001 A2.11	
	Importance Rating	3.2	

(K&A Statement) A2.11- Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Degraded system voltages

Proposed Question: RO 34

With a plant startup in progress and house loads powered from the Startup Transformers, the Control Room receives annunciator 8-J-9, "SAFETY BUS VOLTAGE LO".

Plant conditions when the annunciator was received are as follows:

- Bus 3 voltage: 2900 volts and lowering
- Bus 4 voltage: 4400 volts and steady
- Drywell pressure: 1.9 psig and steady
- Reactor water level: 160 inches and steady

Which ONE of the following describes the electric plant response (if any) and the actions the Balance of Plant (BOP) operator should take (if any) for the given plant conditions?

A. A LNP signal is not generated. The applicable EDG will not auto start. The BOP should contact ISO-NE for operational guidance.
B. A LNP signal will be generated once voltage drops <1925 volts. The applicable EDG will not auto start and load shed will not occur until this voltage is reached.
C. A LNP signal is generated. The applicable EDG will auto start ONLY. The BOP should verify a load shed occurs.
D. A LNP signal is generated. The applicable EDG will auto start AND breaker will shut. The BOP should verify a load shed occurs.

Proposed Answer: D

A. INCORRECT: LNP signal is generated on low bus 3 voltage; with the plant on the Startup Transformers, if voltage drops to 2900V, an LNP will result in the "B" EDG auto starting.
B. INCORRECT: Setpoint is 2900V
C. INCORRECT: The EDG breaker will shut
D. CORRECT: ARS 8-J-9

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): ARS 8-J-9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-264, objective EO K6.08 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
MH Operations review SAT (9-15-10)
After discussing with the NRC (11-16-10), modified initial conditions to state we are on the Startup Transformers instead of stating we are at 10%.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	300000 A4.01	
	Importance Rating	2.6	

(K&A Statement) A4.01- Ability to manually operate and / or **monitor** in the control room: Pressure gages

Proposed Question: RO 35

The plant is operating at 100% RTP with the Instrument Air system in a normal lineup.

If an instrument air leak develops, which ONE of the following reflects the setpoint at which the LAG air compressors will auto start as indicted on CRP 9-6, "A" and "B" Air Header Pressures?

NOTE: Assume the pressure indication in the Control Room is the same as the air receiver pressure.

A. 90 psig
B. 95 psig
C. 100 psig
D. 105 psig

Proposed Answer: B

A, C, D: INCORRECT: The auto start setpoint is 95psig
B: CORRECT: Lag air compressors start at 95psig

Technical Reference(s): OP 2190 discussion (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-279 K16, A4.01 (As available)

Question Source: Bank #

Modified Bank #

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7
55.43

Comments:
Wording enhancing (point → setpoint)
MH Operations review SAT (9-15-10)

Afte discussion with the NRC (11-1-10), removed superfluous information in the stem to make less wordy and easier to read.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	259002 A4.03	
	Importance Rating	3.8	

(K&A Statement) A4.03- Ability to manually operate and/or monitor in the control room: All individual component controllers in the automatic mode

Proposed Question: RO 36

The plant is operating at full rated power. In accordance with OP 4120, "HPCI System Surveillance", HPCI is placed in Full Flow test.

Which ONE of the following describes the automatic Feedwater Level Control (FWLC) system response as observed by the Operator at the Controls (OATC) with HPCI in the Full Flow test lineup?

The FWLC system will _____.

A. raise water level initially, then restore water level to the initial setting
B. raise water level to some value higher than the initial setting
C. lower water level initially, then restore water level to the initial setting
D. lower water level to some value lower than the initial setting

Proposed Answer: D

A. INCORRECT: FRVs throttle closed to lower water level
B. INCORRECT: FRVs throttle closed to lower water level
C. INCORRECT: water level will remain at a lower setting until the steam supply for HPCI is secured.
D. CORRECT: When HPCI is started in full flow test, steam is used to start HPCI. However, in this lineup, there is no injection to the vessel. The steam supply is before the steam flow venturi for the FWLC system. This results in a reduction in sensed steam flow. The FWLC system will shut the FRVs to match the sensed reduced steam flow since the system is in 3 element control. Water level will lower as a result.

Technical Reference(s): P&ID G-191167 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-01-259, objective A4.03, K10.04 (As available)

Question Source:
- Bank # 6907
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	212000 K4.10	
	Importance Rating	3.3	

(K&A Statement) K4.10- Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Individual rod SCRAM testing

Proposed Question: RO 37

Single rod scram testing is in progress. The toggle switch for control rod 22-15 was just operated to scram the Control Rod.

Which ONE of the following describes how a single rod scram is reset for Control Rod 22-15?

The toggle switch for Control Rod 22-15 is _____.

A. returned to the full up position
B. returned to the full down position
C. placed in the neutral position until the rod drift is reset then returned to the full up position
D. placed in the neutral position until the rod drift is reset then returned to the full down position

Proposed Answer: A

A. CORRECT: IAW OP 4424, the toggle switch is returned to the full up position
B. INCORRECT: full up position
C. INCORRECT: Rod drift does not have to be reset; returned to the full up position
D. INCORRECT: full up position

Technical Reference(s): OP 4424, page 22 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-212, objective K4.10 (As available)

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam X

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215004 A3.02	
	Importance Rating	3.4	

(K&A Statement) A3.02- Ability to monitor automatic operations of the SOURCE RANGE MONITOR (SRM) SYSTEM including: Annunicator and alarm signals.

Proposed Question: RO 38

A plant startup is in progress with power being monitored using Source Range Monitor (SRM) instrumentation.

If the Source Range Monitor (SRM) Channel "A" switch is taken out of OPERATE, which of the following alarm(s) will be received in the Control Room?

1) 5-D-3, "ROD WITHDRW BLOCK"
2) 5-K-7, "MANUAL SCRAM CH A"
3) 5-P-3, "SRM HI/INOP"
4) 5-P-4, "SRM DWNSCL"

A. 1 and 3
B. 1 and 4
C. 2 and 3
D. 2 and 4

Proposed Answer: A

A. ***CORRECT: ARS 5-D-3 causes and automatic action and 5-P-3 causes***
B. INCORRECT: Taking the switch out of operate will not result in a downscale alarm.
C. INCORRECT: scram signals are bypassed in preparation for the Reactor Startup.
D. INCORRECT: scram signals are bypassed in preparation for the Reactor Startup. Taking the switch out of operate will not result in a downscale alarm.

Technical Reference(s): ARS 5-D-3 and 5-P-3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-01-215 objective K4.02, A3.02 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:

Question revised from original submitted question based on validators believing that SRMs with scram protection response is an obscure system interrelation with RPS. (installed affect the manual scram circuitry and not the automatic scram circuitry). 11-12-10 (operational validity).

After discussion with the NRC (11-16-10), the question revision makes it UNSAT since being revised after the submittal.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	263000 K5.01	
	Importance Rating	2.6	

(K&A Statement) K5.01- Knowledge of the operational implications of the following concepts as they apply to D.C. ELECTRICAL DISTRIBUTION: Hydrogen generation during charging

Proposed Question: RO 39

With the DC electrical distribution systems in a normal lineup for rated power operations, the Control Room receives annunciator 6-C-9, "HVAC TROUBLE/BATT RM EXH FAN FLOW LO". The Balance of Plant Operator (BOP) reports that SEF-3, Battery Room Exhaust Fan, does NOT indicate running on CRP 9-25.

Which ONE of the following is the operational impact of operating with this off-normal ventilation lineup?

A. Hydrogen samples are required every four hours to ensure hydrogen concentration remains <2% until portable ventilation to the battery room is established. Sampling can be secured thereafter.
B. Hydrogen samples are required every four hours to ensure hydrogen concentration remains <4% until portable ventilation to the battery room is established. Sampling can be secured thereafter.
C. Hydrogen samples are required daily AND portable ventilation to the battery room is established.
D. Hydrogen samples are NOT required as long as the battery room doors are opened and a 2 hour fire watch established.

Proposed Answer: C

A. INCORRECT: H_2 samples required daily
B. INCORRECT: H_2 samples required daily
C. CORRECT: Precaution and limitation of OP 2192 and guidance in the ARS (both stemming from a TS requirement)
D. INCORRECT: H_2 samples required daily

Technical Reference(s): ARS 6-C-9, Tech Spec 3.10.B.2, and OP 2192 (precaution and limitation) (Attach if not previously provided)

Proposed references to be provided to applicants during: None

examination: _____

Learning Objective: LOT-00-263, objective K5.01 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
Operations rep thought this may be SRO level of knowledge; it is a precaution and limitation as well as a TS action.
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215005 K6.01	
	Importance Rating	3.7	

(K&A Statement) K6.01- Knowledge of the effect that a loss or malfunction of the following will have on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM: RPS

Proposed Question: RO 40

The plant is operating at 60% RTP with the 480V Electrical Distribution system aligned for normal operations.

Which ONE of the following conditions will result in a FULL reactor scram?

NOTE: OP 2456, Figure 1 is provided as a reference.

A. Loss of MCC-8A with the following LPRMs bypassed:
   40-25B, 32-25A, 40-17C, 24-41C, and 16-33D
B. Loss of MCC-8B with the following LPRMs bypassed:
   24-25C, 24-09B, 24-33A, 08-33C, and 08-09D
C. Loss of MCC-9A with the following LPRMs bypassed:
   24-25C, 24-09B, 24-33A, 08-33C, and 08-09D
D. Loss of MCC-9B with the following LPRMs bypassed:
   40-25B, 32-25A, 40-17C, 24-41C, and 16-33D

Proposed Answer: C

A. INCORRECT: This combination will not result in a full scram
B. INCORRECT: This combination will not result in a full scram
C. CORRECT: The loss of MCC-9A results in a trip of RPS channel "B"; The 5 detectors that are bypassed will result in a trip of RPS channel "A" on a "too few inputs" signal. The combination will result in a full scram
D. INCORRECT: This combination will not result in a full scram

Technical Reference(s): OP 2132, OP 2456 (Open reference for figure 1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: OP 2456 Figure 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-03-215 objective K6.01 (As available)

Question Source:
- Bank # 7218
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	215003 K4.01	
	Importance Rating	3.7	

(K&A Statement) K4.01- Knowledge of INTERMEDIATE RANGE MONITOR (IRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Rod withdrawal blocks:

Proposed Question: RO 41

During a normal reactor shutdown, IRM Channel "C" is indicating 30 on Range 6. The Operator at the Controls (OATC) inadvertently ranges down too far on IRM Channel "C" to Range 4.

Which ONE of the following describes the plant response to this action?

A. ONLY a rod block will be initiated
B. ONLY a full scram will be initiated
C. BOTH a rod block will be initiated AND a half-scram will be initiated in RPS Trip System "B".
D. BOTH a rod block will be initiated AND a half-scram will be initiated in RPS Trip System "A".

Proposed Answer: D

A. INCORRECT: RPS trip to channel "A"
B. INCORRECT: Rod Block Trip generated to system "B"
C. INCORRECT: Rod Block trip channel "B" and RPS trip channel "A"
D. CORRECT: IRM "C" is a channel input to RPS trip system "A" and Rod Block Trip system "B". When you inadvertently range down 2 channels, that channel will read high off scale resulting in an IRM Hi-Hi signal. Thus, RPS channel "A" and RB channel "B" will trip.

Technical Reference(s): OP 2131 discussion, ARS 5-N-1 (causes and automatic actions) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-01-215 objective 4.01 (As available)

Question Source: Bank #
Modified Bank # 6854
New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	218000 A4.02	
	Importance Rating	4.2	

(K&A Statement) A4.02: Ability to manually operate and/or monitor in the control room: ADS logic initiation

Proposed Question: RO 42

With RHR pumps "B" and CS "B" running, an Automatic Depressurization System (ADS) blowdown is in progress. Shortly after the blowdown commences, the plant experiences a sustained loss of Bus 3.

In response to this bus transient, which ONE of the following describes how the ADS System will respond?

The ADS system will _____.

A. continue the blowdown with all four SRVs

B. stop the blowdown by shutting all SRVs

C. continue the blowdown with A and C SRVs. The B and D SRVs will fail close

D. continue the blowdown with B and D SRVs. The A and C SRVs will fail close

Proposed Answer: A

A. CORRECT: As long as one CS or RHR pump continues to operate (in this case RHR pump A), all SRVs will remain open due to making up the required discharge pressure in the ADS circuit.

B. INCORRECT: All four SRVs remain open

C. INCORRECT: All four SRVs remain open

D. INCORRECT: All four SRVs remain open

Technical Reference(s): CWD, ARS 3-A-7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-218 objective A4.02, K5.01, K6.05 (As available)

Question Source: Bank # 7126
Modified Bank # _____
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

After discussion with the NRC (11-1-10), added SRVs will fail closed to C/D.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	264000 K4.08	
	Importance Rating	3.8	

(K&A Statement) K4.08- Knowledge of EMERGENCY GENERATORS (DIESEL/JET) design feature(s) and/or interlocks which provide for the following: Automatic startup

Proposed Question: RO 43

The monthly slow start surveillance is in progress on the "B" Emergency Diesel Generator (EDG) IAW OP 4126, "Diesel Generators Surveillance". The start/selector switch at the local diesel generator panel has been placed in the AT ENGINE position.

Moments later, a plant transient has resulted in both EDGs receiving auto start signals.

Which ONE of the following is the response of the "B" EDG to the auto start signal with the control switch in the "AT ENGINE" position?

The "B" EDG will _____.

A. auto start but the output breaker will NOT close

B. auto start and the output breaker will close

C. auto start and the output breaker will attempt to close and trip

D. NOT auto start and its output breaker will NOT close

Proposed Answer: D

A. INCORRECT: EDG will not auto start
B. INCORRECT: The EDG breaker will not close
C. INCORRECT: The EDG will not attempt to close
D. CORRECT: With the EDG control switch in AT ENGINE, the auto start feature of the EDG is disabled (precaution OP 2126)

Technical Reference(s): OP 2126 precaution/limitation #10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-264 K4.08 (As available)

Question Source: Bank # 1395
Modified Bank # _____
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
MH Operations review SAT (9-15-10)
After discussion with the NRC (11-1-10), changed question from C/A to knowledge based.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	212000 K5.02	
	Importance Rating	3.3	

(K&A Statement) K5.02- Knowledge of the operational implications of the following concepts as they apply to REACTOR PROTECTION SYSTEM: Specific logic arrangements.

Proposed Question: RO 44

A plant and turbine startup is in progress with reactor power at 18% RTP.

Which ONE of the following RPS logic arrangements will result in a half scram if the RPS relays associated with the following valves de-energized?

A. #1 AND #3 Turbine Stop Valves are full shut
B. #1 AND #4 Turbine Stop Valves are full shut
C. MS-80A ("A" Inboard Main Steam Isolation) and MS-80D ("D" Inboard Main Steam Isolation) are full shut
D. MS-80B ("B" Inboard Main Steam Isolation) and MS-86D ("D" Outboard Main Steam Isolation) are full shut

Proposed Answer: D

A. INCORRECT: TSV scram signal is bypassed at this power
B. INCORRECT: TSV scram is bypassed at this power; additionally, this logic would not result in a half scram had it not been bypassed.
C. INCORRECT: This logic will not result in a half scram
D. CORRECT: This logic will result in a half scram of the RPS system

Technical Reference(s): ARS 5-K-8, CWD-813 and 815 (B2 scram logic) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-212 objective K5.02 (As available)

Question Source: Bank #

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Modified Bank # _____

New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5

55.43 _____

Comments:
MH Operations review SAT (9-15-10)

After discussion with the NRC (11-1-10) added noun names to the MSIVs in C/D.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	203000 2.2.25	
	Importance Rating	3.2	

(K&A Statement) 2.2.25- Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.

Proposed Question: RO 45

Which of the following plant operations will NOT make the Low Pressure Coolant INJECTION (LPCI) subsystem of the RHR System INOPERABLE after fully lining the system up?

NOTE: Assume all other equipment is OPERABLE

A. Lining up the "B" Loop of RHR for Torus Cooling during RCIC surveillance
B. Lining up the "A" Loop of RHR for Torus Spray during normal operations
C. Lining up the "B" Loop of RHR for Torus pump down to Radwaste following Torus Spray operations
D. Lining up the "A" Loop of RHR for Shutdown Cooling with pressure less than Shutdown Cooling Permissive

Proposed Answer: D

A. INCORRECT: The RHR system is INOPERABLE while in this lineup
B. INCORRECT: The RHR system is INOPERABLE while in this lineup
C. INCORRECT: The RHR system is INOPERABLE while in this lineup
D. CORRECT: TS bases (3.5.A)

Technical Reference(s): OP 2124, Technical Specification Bases 3.5.A (page 110) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-205, objective 2.2.25 (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5, 7
55.43 _____

Comments:

Operations Rep input: Changed distractor "A" from Torus spray during EOP-3 operations to Torus Spray during normal operations (even though it's rarely done, it is within the procedure to spray during normal operations); changed because when you are that far in EOP-3, there is no concern for operability.

MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	206000 K2.01	
	Importance Rating	3.2	

(K&A Statement) K2.01- Knowledge of electrical power supplies to the following: System valves BWR-2,3,4

Proposed Question: RO 46

Which ONE of the following lists the possible power supply source(s) to HPCI-16, "Outboard Steam Supply Isolation" valve?

A. DC-1 ONLY
B. DC-2 ONLY
C. DC-1 AND DC-1AS
D. DC-2 AND DC-2AS

Proposed Answer: A

A. CORRECT: OP 2145 Appendix "A"
B. INCORRECT: DC-2 does not provide power to HPCI-16
C. INCORRECT: HPCI is NOT an alternate shutdown system
D. INCORRECT: HPCI is NOT an alternate shutdown system

Technical Reference(s): OP 2145, Appendix "A" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-206 Objective K2.01 (As available)

Question Source: Bank #

Modified Bank #

New X

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7
55.43

Comments:
MH Operations review SAT (9-15-10)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	223002 A2.01	
	Importance Rating	3.2	

(K&A Statement) A2.01- Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: AC electrical distribution failures.

Proposed Question: RO 47

The plant is operating at 90% RTP with the following drywell cooling lineup on CRP 9-25:

- RRU-1 in A+B RUN
- RRU-2 A+B STDBY
- RRU-3 in A+B RUN
- RRU-4 in A RUN

An electrical transient results in the supply breaker for MCC-8A tripping and a subsequent rise in drywell pressure. Which ONE of the following identifies...

(1) the cause of the drywell pressure increase?
(2) the course of action to restore drywell pressure to normal?

A. (1) Loss of drywell cooling fans RRU-1A and 1B
   (2) Start RRU-2 fans 2A and 2B
B. (1) Loss of drywell cooling fans RRU-3A and 3B
   (2) Start RRU-2 fans 2A and 2B
C. (1) Full PCIS Group 3 isolation
   (2) Reset the group 3 isolation after alternate logic power from MCC-8B is provided
D. (1) Full PCIS Group 3 isolation
   (2) Reset the group 3 isolation after alternate logic power from MCC-9B is provided

Proposed Answer: C

A. INCORRECT: RRUs are unaffected by a loss of MCC-8A
B. INCORRECT: RRUs are unaffected by a loss of MCC-8A
C. CORRECT: On a loss of MCC-8A, RPS "A" trips resulting in a half scram and full PCIS Group 3 isolation. Once the "A" RPS bus is repowered from MCC-8B, the half scram can be rest and PCIS Group 3 isolation reset.
D. INCORRECT: Alternate power for RPS Bus "A" is NOT from MCC-9B

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OP 2134, P&ID G-191300 Sheet 2, CWD 1100 and 1101 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-218 objective A2.01 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	206000 A1.03	
	Importance Rating	3.5	

(K&A Statement) A1.03- Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COLLANT INJECTION SYSTEM controls including: Condensate storage tank level: BWR-2,3,4

Proposed Question: RO 48

Which ONE of the following describes a High Pressure Coolant Injection (HPCI) system automatic valve closure interlock?

A. Steam Supply Isolation valve (HPCI-14) auto closes on a steam line pressure of 75 psig.
B. Isolation valve (HPCI-15) auto closes on high steam line flow of 290%.
C. CST suction valve (HPCI-17) auto closes on low CST level once both torus suction valves are not fully closed.
D. Minimum Flow valve (HPCI-25) auto closes on a HPCI turbine speed of 4750 rpm.

Proposed Answer: C

A. INCORRECT: There are NO auto close signals for HPCI-14
B. INCORRECT: Setpoint for the isolation is 378%
C. CORRECT: HPCI is the bigger system. The valves logic does not have to wait for valves to be completely realigned (Torus valves full open) before closing the suction valves from the CST.
D. INCORRECT: Setpoint for the turbine trip which will shut the valve is 5000 rpm

Technical Reference(s): OP 2120 discussion (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-205, objective K4.02b (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
MH Operations review SAT (9-15-10)
NEW question (10-27)
Deemed UNSAT by the NRC (11-1-10) due to 2 implausible distractors. Revised the question based on this.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	203000 K2.01	
	Importance Rating	3.5	

(K&A Statement) K2.01- Knowledge of electrical power supplies to the following: Pumps.

Proposed Question: RO 49

The plant is operating at full rated power with the "A" RHR pump tagged out for maintenance.

A Loss of Normal Power (LNP) with a Loss of Coolant Accident (LOCA) occurs. ALL plant equipment operated as designed.

Which ONE of the following is the FIRST load sequenced on Bus 4 when the applicable Emergency Diesel Generator repowers the Bus?

A. RHR pump "B"
B. RHR pump "D"
C. Core Spray pump "A"
D. Core Spray pump "B"

Proposed Answer: A

A. CORRECT: 5 seconds after power is restored
B. INCORRECT: Powered from Bus 3
C. INCORRECT: 10 seconds after power is restored
D. INCORRECT: Powered from Bus 3

Technical Reference(s): OP 4100, OP 2142 Appendix "A" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-205 objective K2.01 (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # 3741
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

At the request of the NRC (11-1-10), added an RHR pump OOS in the stem. Changed question from knwoledge based to C/A.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	217000 K1.02	
	Importance Rating	3.5	

(K&A Statement) K1.02- Knowledge of the physical connections and/or cause/effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the following: Nuclear boiler system.

Proposed Question: RO 50

Which ONE of the following identifies the physical arrangement of the Reactor Core Isolation Cooling (RCIC) System as it pertains to the Nuclear Boiler System for the following?

1) interconnection with the RCIC steam supply
2) interconnection with RCIC pump discharge

A. (1) "C" Main Steam line
   (2) "A" Feedwater line

B. (1) "D" Main Steam line
   (2) "A" Feedwater line

C. (1) "C" Main Steam line
   (2) "B" Feedwater line

D. (1) "D" Main Steam line
   (2) "B" Feedwater line

Proposed Answer: C

A. INCORRECT: "B" Feedwater line for RCIC discharge
B. INCORRECT: "C" Main Steam line for supply and "B" Feedwater line for RCIC discharge
C. CORRECT: P&ID G-191174 Sheet 1
D. INCORRECT: "C" Main Steam Line for supply

Technical Reference(s): P&ID G191174, Sheet 1 (Attach if not previously provided)

Proposed references to be provided to applicants during None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

examination: _____

Learning Objective: LOT-00-217 objective K1.02 (As available)

Question Source: Bank # 3288
Modified Bank # _____
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 2 to 9
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	239002 K3.03	
	Importance Rating	4.3	

(K&A Statement) K3.03- Knowledge of the effect that a loss or malfunction of the RELIEF/SAFETY VALVES will have on following: Ability to rapidly depressurize the reactor.

Proposed Question: RO 51

With the plant operating at rated power conditions, one tracking Technical Specification LCO is in effect:

- The "D" SRV is inoperable due to a failed control switch

A recirculation leak and Loss of Normal Power (LNP) occurred and the plant was scrammed. EOP-3, "Primary Containment Control", was entered based on adverse Primary Containment conditions.

As the SRVs cycled following the scram, a broken "A" Safety Relief Valve (SRV) tailpipe resulted in approaching the Pressure Suppression (PSP) curve. The "A" SRV was ordered shut by the CRS and preparations made to conduct an RPV-ED IAW EOP-5.

Based on plant conditions, which ONE of the following describes the ability to conduct and emergency depressurization using the available safety relief valves?

A. Alternate depressurization systems will be required. The RWCU System in "Recirculation Mode" is an available option.
B. Alternate depressurization systems will be required. The Reactor Head Vents, RV-17 and RV-18, are an available option.
C. Alternate depressurization systems will NOT be required. The Minimum number of SRVs required for Emergency Depressurization is 2.
D. Alternate depressurization systems will NOT be required. The Minimum number of SRVs required for Emergency Depressurization is 1.

Proposed Answer: B

A. INCORRECT: LNP will result in the loss of containment
B. CORRECT: we have less than the MNSRV-ED, therefore alternate depressurization is required.
C. INCORRECT: MNSRV-ED is 3
D. MNSRV-ED is 3

Technical Reference(s): EOP, Volume 4 study Guide (Attach if not previously

Section 13.15; OE 3107 Appendix Q. provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-239 K3.03 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	211000 A3.05	
	Importance Rating	4.1	

(K&A Statement) A3.05- Ability to monitor automatic operations of the STANDBY LIQUID CONTROL SYSTEM including: Flow indication.

Proposed Question: RO 52

Which ONE of the following are the indications the Operator at the Controls (OATC) monitors to verify that there is adequate Standby Liquid Control (SLC) flow and subsequent Boron injection when the SLC control switch is positioned to "SYS 1" IAW OP 2114, Appendix "B", "Injecting SLC into the Reactor Vessel"?

Along with verifying the "A" SLC pump starts and discharge pressure increases, the OATC will verify that _____(1)_____ squib valve(s) fire(s) and that the red indicator light Illuminates _____(2)_____.

A. (1) ONLY one
   (2) after adequate flow is achieved

B. (1) ONLY one
   (2) after adequate discharge pressure is achieved

C. (1) BOTH
   (2) after adequate flow is achieved

D. (1) BOTH
   (2) after adequate discharge pressure is achieved

Proposed Answer: A

A. CORRECT: one squib valve fires off the associated side; the red light comes of flow and NOT discharge pressure.

B. INCORRECT: the red light comes of flow and NOT discharge pressure.

C. INCORRECT: one squib valve fires off the associated side

D. INCORRECT: one squib valve fires off the associated side; the red light comes of flow and NOT discharge pressure.

Technical Reference(s): OP 2114, Appendix B (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-214 objective A3.05 (As available)

Question Source: Bank #
Modified Bank #
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7
55.43

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	262002 K1.01	
	Importance Rating	2.8	

(K&A Statement) K1.01- Knowledge of the physical connections and/or cause/effect relationships between UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) and the following: Feedwater level control: Plant specific

Proposed Question: RO 53

While operating at 100% RTP, the plant experiences a loss of 120V Vital AC power.

Which ONE of the following describes how reactor water level is controlled?

A. Manually with the "A" Feedwater Regulating valve in manual control
B. Manually with the "B" Feedwater Regulating valve in manual control
C. Automatically with the Master Feedwater controller AND "A" Feedwater Regulating valve
D. Automatically with the Master Feedwater controller AND "B" Feedwater Regulating valve

Proposed Answer: B

A. INCORRECT: "B" FRV in manual control
B. CORRECT: ON 3168 symptoms
C. INCORRECT: "B" FRV in manual control
D. INCORRECT: "B" FRV in manual control

Technical Reference(s): ON 3168 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-04-262 objective K1.01, K3.01 (As available)

Question Source: Bank # 7216

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Modified Bank # _____

New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 2 to 9

55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	271000 K4.09	
	Importance Rating	2.8	

(K&A Statement) K4.09- Knowledge of OFFGAS SYSTEM design feature(s) and/or interlocks which provide for the following: Filtration of radioactive particulate

Proposed Question: RO 54

The AOG System is operating with dryer skid and Adsorber Bed Bypass valves as follows:

- OG-145 (Adsorber Bed Bypass valve) closed
- OG-146 (Adsorber Bed Bypass valve) closed

With the lineup as described, the AOG radiation monitor, RAN-OG-3127, trips on a valid Hi-Hi signal.

Which ONE of the following describes the response of the AOG system?

A. FCV-11 (stack isolation) will close in 2 minutes AND OG-3 (delay line drain) will close in 30 minutes.
B. FCV-11 (stack isolation) will close in 30 minutes AND OG-3 (delay line drain) will close in 2 minutes.
C. FCV-11 (stack isolation) and OG-3 (delay line drain) will close in 30 minutes.
D. FCV-11 (stack isolation) and OG-3 (delay line drain) will close in 2 minutes.

Proposed Answer: C

A. INCORRECT: it takes 30 minutes with a Hi-Hi signal to close both valves
B. INCORRECT: it takes 30 minutes with a Hi-Hi signal to close both valves
C. CORRECT- Rad Level to Holdup and Stack, RAN-OG-3127 and RAN-OG-3128 will close OG-FCV-11, Off Gas to Stack Isolation, at the stack and, Delay Pipe Solenoid Drain to Radwaste Bypass, OG-3 under the following condition: when the AOG dryer skid and adsorber bed bypass valves *OG-145 or OG-146* are closed and *either* radiation monitor has a Hi-Hi trip signal present for *30 minutes*,
D. INCORRECT: it takes 30 minutes with a Hi-Hi signal to close both valves

Technical Reference(s): OP 2150 Discussion (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-271, objective K4.09 (As available)

Question Source: Bank # 5838
Modified Bank # _____
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:
MH Operations review SAT (9-15-10)
At the request of the NRC (11-1-10), added noun names to the stem and changed the timing of the valves in A/B.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	215002 A3.01	
	Importance Rating	3.1	

(K&A Statement) A3.01- Ability to monitor automatic operations of the ROD BLOCK MONITOR SYSTEM including: Four rod display

Proposed Question: RO 55

Which ONE of the following describes the Rod Block Monitor (RBM) indications and inputs on the four rod display when the given control rod is selected?

A. When a 1-string control rod is selected, there will be…
   - six "A" and "B" LPRM level bypass lights input to RBM "A"
   - four "C" and "D" LPRM level bypass lights input to RBM "B"

B. When a 2-string control rod is selected there will be…
   - four "A" and "C" LPRM level bypass lights input to RBM "A"
   - four "B" and "D" LPRM level bypass lights input to RBM "B"

C. When a 3-string control rod is selected there will be…
   - two "B" and "C" LPRM level bypass lights input to RBM "A"
   - two "A" and "D" LPRM level bypass lights input to RBM "B"

D. When a 4-string control rod is selected there will be…
   - no bypass lights
   - RBM "A" will receive all eight "B" and "D" LPRM level inputs
   - RBM "B" will receive all eight "A" and "C" LPRM level inputs

Proposed Answer: B

A. INCORRECT: A/C go to RBM "A", B/D to RBM "B"
B. CORRECT:
C. INCORRECT: A/C go to RBM "A", B/D to RBM "B"
D. INCORRECT: A/C go to RBM "A", B/D to RBM "B"

Technical Reference(s): OP 2133 (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-03-201, objective A3.01 (As available)

Question Source: Bank #

Modified Bank # 6358

New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7

55.43

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	202002 K3.04	
	Importance Rating	2.9	

(K&A Statement) K3.04- Knowledge of the effect that a loss or malfunction of the RECIRCULATION FLOW CONTROL SYSTEM will have on following: Reactor/Turbine pressure regulation system.

Proposed Question: RO 56

The plant is operating at 79% RTP when the "A" Recirculation pump flow controller fails downscale.

Which ONE of the following describes how the MHC system will respond to the flow controller failure?

A. Bypass valves will open to control pressure at the EPR setpoint
B. Bypass valves will open to control pressure at the MPR setpoint
C. Control valves will close to maintain pressure at the pressure averaging manifold
D. Control valves will open to maintain pressure at the pressure averaging manifold

Proposed Answer: C

A. As the flow controller fails downscale, reactor power will lower. This will result in steam flow and steam pressure to lower. The steam pressure is compared to the EPR setpoint which is in control.

   A. INCORRECT: Bypass valves will not operate
   B. INCORRECT: Bypass valves will not operate
   C. CORRECT: Bypass valves will not operate; Control valves do not open on a downpower.
   D. INCORRECT: Bypass valves will not operate

Technical Reference(s): GEK (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-202, objective K3.04 (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam X

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 2 to 9
55.43 _____

Comments:
AT the request of the NRC (11-1-10), changed BPVs from close to open in "A".
After discussing with the NRC (11-16-10), removed the word constant in C/D.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	219000 K1.01	
	Importance Rating	3.9	

(K&A Statement) K1.01 Knowledge of the physical connections and/or cause/effect relationships between RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE and the following: Suppression Pool.

Proposed Question: RO 57

In accordance with OP 2124, "Residual Heat Removal System", Appendix "C", "Torus Cooling/Containment Spray", you are directed to initiate Torus Cooling with RHR Loop "B" twenty minutes after a LOCA. The following conditions are present:

- Drywell and Torus pressures are 10 psig and slowly rising.
- RPV level is +15 inches on LT-2-3-91A/B (Shroud Level) and slowly rising.
- RPV pressure is 500 psig.

Which of the following switches must be operated in order to place the "B" Loop in Torus Cooling for the given plant conditions??

1) Place RHRSW PP B&D LPCI AUTOSTOP OVERRIDE SWITCH keylock switch to MANUAL OVERRD

2) Place the RHR B/D LOGIC CTMT SPRAY VLV LPCI SIG BYPASS SWITCH (pistol grip) in the MANUAL position.

3) Place the RHR B/D LOGIC CTMT SPRAY VLV SHROUD LEVEL OVRD SWITCH (keylock) in the MANUAL OVERRIDE position.

4) Place the UPS FDR TRIP keylock switches (10A-S36B) to BLOCK.

A. #1 and 2 ONLY
B. #1 and 3 ONLY
C. #2 and 4 ONLY
D. #3 and 4 ONLY

Proposed Answer: A

A. ***CORRECT: IF a LPCI initiation signal is present, THEN place RHRSW PP A&C (B&D) LPCI AUTOSTOP OVERRIDE SWITCH keylock switch to MANUAL OVERRD; IF reactor water level is greater than TAF as indicated on the shroud indicators, THEN turn the RHR A/C (B/D) LOGIC CTMT SPRAY VLV LPCI SIG BYPASS to MAN.***

B. INCORRECT: Not <TAF therefore not required to place the RHR A/C (B/D) LOGIC CTMT SPRAY VLV SHROUD OVRD keylock switch to MANUAL OVERRIDE

C. INCORRECT: No requirement to operate UPS FDR BLOCK keylock for this scenario and thus is NOT addressed in Appendix "C"

D. INCORRECT: No requirement to operate UPS FDR BLOCK keylock for this scenario and thus is NOT addressed in Appendix "C". Additionally, not <TAF therefore not required to place the RHR A/C (B/D) LOGIC CTMT SPRAY VLV SHROUD OVRD keylock switch to MANUAL OVERRIDE

Technical Reference(s): OP 2124, discussion and Appendix "C" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-205, objective K1.01 (As available)

Question Source: Bank # _____
Modified Bank # 5874
New _____

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 2 to 9
55.43 _____

Comments:
MH Operations review SAT (9-15-10)
Af the request of the NRC (11-1-10), removed "ONLY" in the stem (2 and 3)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	290001 K1.09	
	Importance Rating	2.9	

(K&A Statement) K1.09- Knowledge of the physical connections and/or cause/effect relationships between SECONDARY CONTAINMENT and the following: Plant air systems

Proposed Question: RO 58

With the plant operating at rated full power operations, which ONE of the following describes the system inter-relationship between the Instrument Air and Secondary Containment systems?

A. The INNER and OUTER Reactor Building Railroad Airlock Doors each have inflatable seals. On a loss of instrument air, they will deflate until the backup air bottle supply can be placed in service.
B. The INNER and OUTER Reactor Building Railroad Airlock Doors each have inflatable seals. On a loss of instrument air, they will remain inflated automatically by the backup air bottle supply.
C. ONLY the OUTER Reactor Building Railroad Airlock Door has an inflatable seal. On a loss of instrument air, the seal will deflate until the backup air bottle supply can be placed in service.
D. ONLY the OUTER Reactor Building Railroad Airlock Door has an inflatable seal. On a loss of instrument air, the seal will remain inflated automatically by the backup air bottle supply.

Proposed Answer: B

A. INCORRECT: backup air supply will maintain the seals inflated
B. CORRECT:
C. INCORRECT: Both seals have inflatable seals; backup air supply will maintain the seals inflated
D. INCORRECT: Both seals have inflatable seals

Technical Reference(s): OP 2116 discussion, ON 3146 Appendix "A" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-02-224, objective K1.09 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 2 to 9
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201001 K6.03	
	Importance Rating	3.0	

(K&A Statement) K6.03- Knowledge of the effect that a loss or malfunction of the following will have on the CONTROL ROD DRIVE HYDRAULIC System: Plant air systems

Proposed Question: RO 59

With the plant operating at 100% RTP, the instrument air line to CRD-FCV-19A (Control Rod Drive "A" Flow Control Valve) ruptures resulting in a loss of air to the valve.

Which ONE of the following are the expected Control Rod Drive Hydraulic (CRD-H) indications on CRP 9-5 (Control Room Panel)?

Charging pressure will ____(1)____ and Drive water D/P will ____(2)____.

A. (1) decrease
   (2) increase

B. (1) decrease
   (2) decrease

C. (1) increase
   (2) increase

D. (1) increase
   (2) decrease

Proposed Answer: D

B, C, D INCORRECT: charging pressure increases and drive D/P will decrease
D. ***CORRECT:***

Technical Reference(s): ON 3146 Appendix "A" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-01-201 objective K6.03. (As available)

Question Source:
- Bank # 3635
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201003 A1.02	
	Importance Rating	2.8	

(K&A Statement) A1.02- Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: CRD Drive Pressure.

Proposed Question: RO 60

While attempting to withdraw a Control Rod from position 30 to 32 during a plant startup, the operator notices that the selected Control Rod did not move.

Current Control Rod Drive (CRD) parameters are steady as follows:

- Flow controller set at 56 gpm
- Drive water D/P is 255 psig
- Cooling water flow is 22 gpm
- Cooling water D/P is 27 psig
- There are no annunciators associated with the CRD system

Which ONE of the following identifies the symptom and a possible course of action taken in order to permit Control Rod movement?

A. Drive water D/P is low out of band. Restore Drive Water D/P to the normal band by throttling closed CRD-PCV-20 (Drive Water Pressure Control valve).

B. Drive water D/P is low out of band. Restore Drive Water D/P to the normal band by throttling open CRD-PCV-20 (Drive Water Pressure Control valve).

C. The Control Rod is stuck. Raise Drive Water pressure incrementally to not exceed 350 psig by throttling closed CRD-PCV-20 (Drive Water Pressure Control valve).

D. The Control Rod is stuck. Raise Drive Water pressure incrementally to not exceed 350 psig by throttling open CRD-PCV-20 (Drive Water Pressure Control valve).

Proposed Answer: C

A. INCORRECT: Drive water D/P normal band is 250-275 pig as defined in OP 2111 and OPON-3145-01.
B. INCORRECT: Drive water D/P normal band is 250-275 pig as defined in OP 2111 and OPON-3145-01. The Drive water D/P valve is not throttled open. This will lower Drive water pressure.
C. CORRECT: IAW ON 3143, Raise Drive water pressure IAW OP 2111 in increments of 10-50 psig not to exceed 350 psig. This is done by throttling closed the Drive Water D/P valve.
D. INCORRECT: The Drive water D/P valve is not throttled open. This will lower Drive water pressure.

Technical Reference(s): ON 3143, OP 2111 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-01-201, objective A1.02 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
Deemed UNSAT by the NRC (11-1-10) due to K/A mismatch. Rewrote the question to match the K/A.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	239001 K3.15	
	Importance Rating	3.5	

(K&A Statement) K3.15 Knowledge of the effect that a loss or malfunction of the MAIN AND REHEAT STEAM SYSTEM will have on following: Reactor water level control

Proposed Question: RO 61

With the plant operating at 100% RTP and RPV water level at 160 inches, the "A" Safety Relief Valve (RV-71A) inadvertently opens.

Which ONE of the following describes the RPV water level response for the full open Safety Relief Valve?

NOTE: Assume no operator action.

RPV water level will _____.

A. lower to ~153 inches and remain there
B. rise to ~167 inches and remain there
C. lower to ~153 inches before returning to 160 inches
D. rise to ~167 inches before returning to 160 inches

Proposed Answer: A

A. CORRECT: IAW OT 3121 symptoms, water level decreases up to ~7inches for a full open Safety relief valve.

B. INCORRECT: Water level decreases due to steam flow/feed flow mismatch
C. INCORRECT: The feed flow/steam flow mismatch will result in water level remaining low
D. INCORRECT water level lowers

Technical Reference(s): OPOT-3121-01 Symptoms (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-602, objective RO EO7 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	272000 K5.01	
	Importance Rating	3.2	

(K&A Statement) K5.01- Knowledge of the operational implications of the following concepts as they apply to RADIATION MONITORING SYSTEM: Hydrogen injection operation's effect on process radiation indications

Proposed Question: RO 62

A plant startup is in progress with reactor power at 40% RTP. As Hydrogen Water Chemistry is being lined up to the "A" and "C" Reactor Feedwater Pumps (RFP), the Control Room received the following annunciators:

- 5-H-6, "MN STM LN RAD CH A HI"
- 5-J-6, "MN STM LN RAD CH B HI"

Which ONE of the following will occur as a result of the Hydrogen injection spike as sensed by the radiation monitors causing these two alarms?

A. The Mechanical Vacuum pump will trip.
B. The Mechanical Vacuum pump suction valve (AE-FCV-35) will close.
C. The Steam Packing Exhauster discharge valve (AE-12A) will close.
D. The Air Ejector Suction Press Control (OG-516A) will close.

Proposed Answer: C

A. INCORRECT: MVP is not running from this power
B. INCORRECT: with the MVP secured at this power, the suction valve will be closed.
C. CORRECT: ARS 5-H-6 and 5-J-6
D. INCORRECT: No affect on OG-516 valves

Technical Reference(s): OP 2199, OP 0105, ARSs 5-H-6 and 5-J-6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-272, objective K5.01 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

At the request of the NRC (11-1-10), removed and implausible distractor and replaced with what is now "C".

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	259001 K2.01	
	Importance Rating	3.3	

(K&A Statement) K2.01 Knowledge of electrical power supplies to the following: Reactor feedwater pump(s): Motor-driven-only

Proposed Question: RO 63

The plant is running at 95% power when power is lost to 4 KV Bus 2.

Based on these initial conditions, which ONE of the following lists the 4KV loads that will be operating following a loss of Bus 2 for the following systems?

(1) Feed system
(2) Condensate System

A. (1) "A" AND "B" Reactor Feed Pumps
   (2) ONLY "C" Condensate Pump
B. (1) ONLY "C" Reactor Feed Pump
   (2) ONLY "A" Condensate Pump
C. (1) ONLY "B" Reactor Feed Pump
   (2) ONLY "C" Condensate Pump
D. (1) ONLY "A" Reactor Feed Pump
   (2) ONLY "A" Condensate Pump

Proposed Answer: D

A. INCORRECT: B RFP is not running, C Condensate pump is not running
B. INCORRECT: C RFP is not running
C. INCORRECT: B RFP is not running, C Condensate pump is not running
D. CORRECT: OPOT-3170-01

Technical Reference(s): OP 2172, OPOT-3170-01 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-259 objective K2.01 (As available)

Question Source:
- Bank # 6835
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	223001 K5.01	
	Importance Rating	3.1	

(K&A Statement) K5.01- Knowledge of the operational implications of the following concepts as they apply to PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES: Vacuum breaker/relief valve operation

Proposed Question: RO 64

Which ONE of the following describes the operation of the Reactor Building (RB) to Torus vacuum breaker relief valve system?

The vacuum breakers FIRST open to relieve pressure when _____ .

A. RB pressure exceeds Torus pressure by 0.5 psid

B. RB pressure exceeds Torus pressure by 1.0 psid

C. Torus pressure exceeds RB pressure by 0.5 psid

D. Torus pressure exceeds RB pressure by 1.0 psid

Proposed Answer: A

A. CORRECT: CPS DBD

B. INCORRECT: setpoint is 0.5

C. INCORRECT: RB exceeds Torus pressure

D. INCORRECT: RB exceeds Torus pressure; setpoint is incorrect

Technical Reference(s): CPS DBD page 56 of 94 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-223, objective 5.01 (As available)

Question Source: Bank # _____

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Modified Bank # 368

New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 5

55.43

Comments:

Revised the question to remove the portion that questions solenoid power affects on the vacuum breakers. The Operations rep believed that was information a candidate should not have to know from memory.

MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	201006 A1.02	
	Importance Rating	3.4	

(K&A Statement) A1.02- Ability to predict and/or monitor changes in parameters associated with operating the ROD WORTH MINIMIZER SYSTEM (RWM) (PLANT SPECIFIC) controls Including: Status of control rod movement blocks: Plant specific (not BWR-6)

Proposed Question: RO 65

A power reduction is in progress. Plant conditions are as follows:

- feed flow is 32% and lowering
- steam flow is 28% and lowering

Which ONE of the following identifies the EARLIEST the Rod Worth Minimizer (RWM) will enforce rod blocks?

The RWM will enforce all blocks ONCE _____.

A. EITHER feed flow or steam flow is below 21%
B. BOTH feed flow and steam flow are below 21%
C. EITHER feed flow or steam flow is below 25%
D. BOTH feed flow and steam flow are below 25%

Proposed Answer: A

A. CORRECT: OP 2450
B. INCORRECT: either signal
C. INCORRECT: 21%
D. Either signal at 21%

Technical Reference(s): OP 2450 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-04-201 objective K4.01, K4.02, A1.02 (As available)

Question Source:
- Bank # 6853
- Modified Bank # _____
- New _____

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 5
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.3.4	
	Importance Rating	3.2	

(K&A Statement) 2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions

Proposed Question: RO 66

In accordance with EN-RP-201, "Dosimetry Administration", which ONE of the following identifies the ROUTINE Annual Administrative Guideline Total Effective Dose Equivalent (TEDE) limit for a qualified radiation worker?

NOTE: Assume there are no cases of undocumented quarters.

A. 2000 mrem per calendar quarter
B. 2000 mrem per year
C. 4500 mrem per calendar quarter
D. 4500 mrem per year

Proposed Answer: B

A. INCORRECT: per calendar year
B. CORRECT: EN-RP-102
C. INCORRECT: 2000 mrem limit per quarter
D. INCORRECT: 2000 mrem limit

Technical Reference(s): EN-RP-201, section 5.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-404, objective 2.3.4 (As available)

Question Source: Bank # 6778
Modified Bank #
New

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 12
55.43

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.2.38	
	Importance Rating	3.6	

(K&A Statement) 2.2.38 Knowledge of conditions and limitations in the facility license

Proposed Question: RO 67

The plant was operating at full rated power when a plant transient resulted in a Minimum Critical Power Ratio (MCPR) of 1.02.

Which ONE of the following identifies the required action to be taken based on current plant conditions?

A. MCPR is within the TS limit for current plant conditions thus no action is required.
B. MCPR has exceeded the TS limit for current plant conditions thus a power reduction is required until RE determines MCPR is within TS limits.
C. MCPR has exceeded the TS limit for current plant conditions thus a shutdown to cold shutdown conditions is required within 24 hours.
D. MCPR has exceeded the TS limit for current plant conditions thus an immediate shutdown is required.

Proposed Answer: D

Justification for Comprehension: The candidate must have the knowledge of what a Safety Limit is. Knowing that a Safety Limit was violated in this case, the authorization to resume plant operations comes from the NRC IAW TRM section 6.4.

A. INCORRECT: MRPC has exceeded a Safety Limit thus IAW TS section 6.3, the Reactor shall be shutdown immediately.
B. INCORRECT: MRPC has exceeded a Safety Limit thus IAW TS section 6.3, the Reactor shall be shutdown immediately.
C. INCORRECT: MRPC has exceeded a Safety Limit thus IAW TS section 6.3, the Reactor shall be shutdown immediately.
D. CORRECT: IAW TS section 6.3, ACTION TO BE TAKEN IF A SAFETY LIMIT IS EXCEEDED → Applies to administrative action to be followed in the event a safety limit is exceeded. If a safety limit is exceeded, the reactor shall be shutdown immediately.

Technical Reference(s): TRM section 6.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-308, RO EO6 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7, 10
- 55.43

Comments:

Operations rep believes this is SRO level of knowledge; it's in section 6.0 of TSs which an RO should know from memory. Looking at another question to find a closer RO question.

After discussing with the NRC (11-16-10), changed the wording in answer "D" to match the exact requirement in TSs (immediate shutdown vice immediatlely scram).

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.3.7	
	Importance Rating	3.5	

(K&A Statement) 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions

Proposed Question: RO 68

While operating at rated power, an emergent inspection of the Reactor Cleanup (RCU) Phase Separator Room is required. The following additional information is required:

- The total dose received by the operator will be 45 mRem
- There is no immediate risk of plant safety

Which ONE of the following criteria must be met and whose permission (if any) is required before the operator can enter the area IAW RWP 2010-0053?

A. The dose alarm setpoint must be adjusted to avoid unecessary alarms. The operator can enter with approvals from the Operations AND RP Manager.
B. The dose alarm setpoint must be adjusted to avoid unecessary alarms. The operator can enter with SM approval due to an emergent inspection as long as a CR is generated upon exit.
C. The Cleanup Sludge Discharge Mixing Pump (P-33-1A) and Cleanup Phase Separator Decant Mixing pump (P-34-1A) must be secured. The operator can enter with approvals from the Operations AND RP Manager.
D. The Cleanup Sludge Discharge Mixing Pump (P-33-1A) and Cleanup Phase Separator Decant Mixing pump (P-34-1A) must be secured. The operator can enter with SM approval due to an emergent inspection as long as a CR is generated upon exit.

Plausibility: The candidate must know how to read a multi task RWP. Then once the area is determined, the candidate must go to the correct task and read the information provided for that task. Additionally, the candidate must take into account the additional instructions on the RWP as they pertain to particular tasks. In this case unstructions 1 and 3 apply. Not taking into account instruction 1, a candidate may not seek permission based on an emergenct inspection. If the candidate goes to the incorrect RWP task number, they may incorrectly determine that the dose received is more than the alarm setpoint for the incorrect task.

Proposed Answer: C

A. INCORRECT: The dose alarm will not be received for this task therefore no adjustment is required.
B. INCORRECT: The dose alarm will not be received for this task therefore no adjustment is required; OM and RP Manager permission is required
C. CORRECT: RWP instructions 1 and 3 apply to task 4.
D. INCORRECT: OM and RP Manager permission is required

Technical Reference(s): RWP 2010-0053
OPOP-SRW-2153 (pump noun names)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: RWP 2010-0053

Learning Objective: LOT-00-404, objectives 2.3.10, 2.3.17 (As available)

Question Source:
Bank # ____
Modified Bank # ____
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 12
55.43 ____

Comments:
Original question replaced due to being UNSAT based on low level of knowledge. New question developed on 11-9-10.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.1.45	
	Importance Rating	4.3	

(K&A Statement) 2.1.45 Ability to identify and interpret diverse indications to validate the response of another indication

Proposed Question: RO 69

With the plant operating at full rated power and the electrical distribution system in a normal lineup, a loss of DC-2 occurs. No actions of ON 3160, "Loss of DC-2", have been taken.

The resultant level transient caused water level to lower below the scram setpoint. Both automatic and manual scrams failed. In response to this, the operator depressed the ARI/RPT pushbuttons.

Which of the following indications are available for the operator to determine if the Alternate Rod Insertion (ARI) valves responded as expected to successfully insert ALL control rods?

A. Annunciators "RPT/ARI/AX" AND "RPT/ARI/CX" will alarm on CRP 9-4. ALL the Scram Discharge Volume Vent and Drain Valves as indicated on CRP 9-5 will OPEN.

B. Annunciators "SDV NORTH/SOUTH NOT DRAINED" will alarm on CRP 9-5. ALL the CRD-126/127 scram inlet/outlet valves as indicated on the CRP 9-5 full core display will OPEN.

C. ALL the CRD-126/127 scram inlet/outlet valves as indicated on CRP 9-5 full core display will OPEN. Scram air header pressure as read on CRP 9-5 will lower.

D. ALL the Scram Discharge Volume Vent and Drain Valves as indicated on CRP 9-5 will OPEN. Scram air header pressure as read on CRP 9-5 will lower.

Proposed Answer: C

A. INCORRECT: annunciator power is lost
B. INCORRECT: annunciator power is lost
C. CORRECT: UFSAR
D. INCORRECT: Vent and Drain valve close.

Technical Reference(s): ON 3160, UFSAR, P&ID (Attach if not previously

provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-01-201, objective K4.05 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.4.31	
	Importance Rating	4.2	

(K&A Statement) 2.4.31 Knowledge of annunciator alarms, indications, or response procedures

Proposed Question: RO 70

With the plant operating at full rated power, a Main Steam Line pipe rupture results in the following in Control room annunciators:

- 5-E-3, "REACTOR LEVEL LO-LO"
- 5-E-8, "REACTOR PRESSURE LO"
- 5-H-2, "RX WATER LVL CH A LO-LO"
- 5-J-2, "RX WATER LVL CH B LO-LO"

Which ONE of the following describes an automatic plant response as a result of receiving these annunciators?

A. Bus 3 loads will be carried from the associated EDG that auto started
B. Pressure will be controlled via the Mechanical Hydraulic Control system
C. ADS blowdown will begin eight minutes from receiving the alarm
D. Bus 5 will lose power resulting in the loss of the cooling towers

Proposed Answer: D

A. INCORRECT: The EDGs will start but will not load with bus voltage SAT. There is nothing in the stem to indicate a load shed is required
B. INCORRECT: The MSIVs will shut resulting in the loss of the Main Condenser as a heat sink
C. ADS blowdown will begin in 10 minutes (8 minutes for the pumps to start and simulated high drywell pressure to seal in and then a 2 minute timer
D. CORRECT: breaker 53 trips on MCA signal

Technical Reference(s): ARS 5-E-3 Automatic actions (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-216, K3.06 (affect on CS Logic) (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Comments:

Question is a double jeopardy with #31. Needs to be replaced with another annunciator response question.

Question replaced on 9-16-10

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.3.13	
	Importance Rating	3.4	

(K&A Statement) 2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to **radiation monitor alarms**, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

Proposed Question: RO 71

The Control Room Supervisor (CRS) wishes for a licensed operator and RP Technician to enter the Drywell to identify the source of unidentified leakage.

IAW RPRP-PC-0507-01, "Drywell Clearance Entry", which ONE of the following identifies a completely de-inerted Containment which would allow the individuals to enter the Drywell?

A. O_2 concentration is 18%, LEL is 5%
B. O_2 concentration is 20%, LEL is 5%
C. O_2 concentration is 22%, LEL is 12%
D. O_2 concentration is 24%, LEL is 12%

NOTE: LEL = Lower Explosive Limit for Hydrogen

Proposed Answer: B

A. INCORRECT: O_2 concentration is <19.5%
B. ***CORRECT:*** **Primary Containment is considered de-inerted when two consecutive air samples, taken at least 15 minutes apart on Drywell <u>and</u> Torus, meet <u>both</u> of the following: oxygen concentration GREATER THAN 19.5% <u>AND</u> LESS THAN 23% AND flammable gases** and vapors LESS THAN 10% Lower Explosive Limit (LEL) for Hydrogen LEL is >10%,
C. INCORRECT: LEL is >10%
D. INCORRECT: O_2 concentration is >23%, LEL is 12%

Technical Reference(s): RPRP-PC-0507-01, Definition 5.1.1; OP 2115 P&L #8 (Attach if not previously provided)

Proposed references to be provided to applicants during None

NUREG-1021, Revision 9, Supplement 1

examination: _____

Learning Objective: LOT-00-404, objective K2.3.18 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 12
55.43 _____

Comments:
NEW question as of 9-30-10

After discussing with the NRC (11-16-10), modified B/C by switching the 5%/12% to make an anser more operationally feasible. This makes the correct answer "B".

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.4.34	
	Importance Rating	4.2	

(K&A Statement) 2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects

Proposed Question: RO 72

A fire in the Control Room has resulted in the Control Room Supervisor implementing and directing the actions of OP 3126, "Shutdown Using Alternate Methods".

Which ONE of the following identifies the operational guidance provided to a licensed operator as directed by OP 3126?

A Control Room licensed operator is directed to _____.

A. maintain RPV water level with HPCI during plant cooldown
B. place "B" Loop of RHR in Torus Cooling to support SRV operations
C. lineup the RHR system for Shutdown Cooling mode using the "B" RHR pump
D. restore power to Bus 4 by using the preferred Vernon Tie power source

Proposed Answer: D

A. INCORRECT: HPCI is not an alternate shutdown system
B. INCORRECT: "B" RHR is not an alternate shutdown subsystem
C. INCORRECT: "B" RHR pump is not used for alternate shutdown
D. CORRECT: OP 3126

Technical Reference(s): OP 3126 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-612, EO A.4 and B.2 (As available)

Question Source: Bank #

NUREG-1021, Revision 9, Supplement 1

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Modified Bank # _____

New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.2.21	
	Importance Rating	2.9	

(K&A Statement) 2.2.21 Knowledge of pre- and post-maintenance operability requirements

Proposed Question: RO 73

Which ONE of the following identifies a maintenance activity and associated Post Maintenance Test (PMT) that would be required in order to return the component to a TECHNICAL SPECIFICATION OPERABLE status?

A. Air Start Solenoid replacement for the "A" Emergency Diesel Generator with a PMT of ensuring the Emergency Diesel Generator starts and reaches rated voltage and frequency within 15 seconds.
B. Packing replacement for MS-80A ("A" Main Steam Line inboard isolation valve) with a PMT of verifying the stroke time meets the 6-8 second closing time requirement.
C. Motor replacement for RHR-31A (Drywell Spray valve) with a PMT of ensuring the valve automatically opens on a valid accident signal.
D. Valve replacement for VG-23 (Containment Air Monitor inboard supply isolation valve) with a PMT of ensuring the Local Leak Rate Test (LLRT) is satisfactory.

Proposed Answer: D

A. INCORRECT: EDG required TS start time is 13 seconds
B. INCORRECT: MSIV closure time is 3-5 seconds
C. INCORRECT: RHR-31A does not open on accident signal
D. CORRECT: LLRT required for PCIS valve replacement

Technical Reference(s): EN-WM-107 Attachment 9.3, OP 5281 Acceptance criteria, OP 4030 VYOPF 4030.02 (Type C LLRT for VG-23), OP 4100 (VYOPF 4100.04), TRM, TSs, AP 0125 Appendix A.

(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:
MH Operations review SAT (9-15-10)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.1.23	
	Importance Rating	4.3	

(K&A Statement) 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation

Proposed Question: RO 74

The plant is being started up following a refueling outage IAW OP 0105, "Reactor Operations". In parallel with this, preparations are being made to conduct HPCI and RCIC pump operability surveillances.

The following is a timeline of startup events:

- 1215 Reactor Pressure at 150 psig
- 2045 Mode switch was taken to RUN

Which ONE of the following identifies the LATEST that the HPCI and RCIC pump operability surveillances can be completed IAW OP 0105, "Reactor Operations"?

The LATEST the surveillances can be completed is by _____ the following day.

A. 0015
B. 0845
C. 1215
D. 2045

Proposed Answer: C

A. INCORRECT: 24 hours from 150 psig
B. INCORRECT: 24 hours from 150 psig
C. ***CORRECT: OP 0105 precaution and limitation***
D. INCORRECT: 24 hours from 150 psig

PLAUSIBILITY: In OP 0105, there is a 24 hour requirement from the time of reaching 15% RTP for inerting Primary Containment and there is a 12 hour requirement from going out of RUN on a S/D to perform IRM and reduced APRM calibration surveillances.

Technical Reference(s): OP 0105 Phase 2B, step 8k; (Attach if not previously

Technical Specifications 4.5.E.1 and 4.5.G.1, OP 4120/4121 purpose discussions. provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-304 RO EO4 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Comments:

Question modified from original NRC submitted question based on conflicting time requirements in OP 0105 and OP 2115 for when the 24 hour clock ends for having Containment inerted (OP 0105 Phase 2 precaution #17 and OP 2115 precaution #5. Question changed from C/A to K. 11-12-10.

Discussed this change with NRC on 11-16-10. Question is NOT UNSAT based on procedural issues.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #		
	K/A #	2.2.35	
	Importance Rating	3.6	

(K&A Statement) 2.2.35 Ability to determine Technical Specification Mode of Operation

Proposed Question: RO 75

Which ONE of the following conditions makes up the mode switch position(s) AND MINIMUM power needed to satisfy the Technical Specification definition of "Reactor Power Operation"?

A. Mode switch in RUN ONLY and power above 1% RTP
B. Mode switch in RUN ONLY and power above 5% RTP
C. Mode switch in Startup/Hot Standby OR RUN and power above 1% RTP
D. Mode switch in Startup/Hot Standby OR RUN and power above 5% RTP

Proposed Answer: C

A. INCORRECT: Mode switch can also be in the Startup /Hot Standby position
B. INCORRECT: Mode switch can also be in the Startup /Hot Standby position and minimum power is 1% RTP
C. CORRECT: IAW TS Definition 1.0.R- Reactor power operation is any operation with the mode switch in the "Startup/Hot Standby" or "Run" position with the reactor critical and above 1% rated thermal power
D. INCORRECT: minimum power is 1% RTP

Technical Reference(s): Technical Specifications section 1.0 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-308 objective RO EO2.j (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7, 10
55.43 _____

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295031 EA2.02	
	Importance Rating		4.2

(K&A Statement) EA2.02- Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL: Reactor power

Proposed Question: SRO 76

The reactor is operating at full rated power when the "A" Main Steam Line flow detector fails downscale (MS-51A).

Based on the Feedwater Level Control (FWLC) system response to this failure, which ONE of the following is:

1) the affect on reactor power?
2) the direction provided by the Control Room Supervisor(CRS)?

NOTE: Assuming NO operator actions are taken

A. (1) INDICATED power will increase and ACTUAL power will remain the same
(2) Direct a power reduction of 2-5MW_{th} due to the effect on the core heat balance calculation.

B. (1) INDICATED power will remain the same and ACTUAL power will increase
(2) Contact Reactor Engineering (RE) due to core thermal limits calculations being suspect.

C. (1) Both INDICATED and ACTUAL power will decrease
(2) Direct power be restored to 100% RTP IAW OP 0105, Phase 4B.

D. (1) Both INDICATED and ACTUAL power will decrease
(2) Direct and/or verify the FWLC system be placed in manual control

Proposed Answer: D

A. INCORRECT: RPV water level decreases due to reduced total steam flow with the FWLC system in 3-element. The FF/SF mismatch causes the FWLC system to throttle closed the FRVs to match the lower steam flow input. Water level will stabilize at some lower value. Both indicated and actual power will decrease due to the lower water level. The direction to lower power 2-5MWth would be correct if the core heat balance was being calculated incorrectly (DP 0166) which is not the case here since the input from MS-51A is not used in the calculation.

B. INCORRECT: RPV water level decreases which results in power decreasing. Thermal power calculations are unaffected by the instrument failure.

C. INCORRECT: There is no procedural requirement to raise power to 100%RTP.

D. **CORRECT: RPV water level decreases due to reduced total steam flow with the FWLC system in 3-element. The FF/SF mismatch causes the FWLC system to throttle closed the FRVs to match the lower steam flow input. Water level will stabilize at some lower value. Both indicated and actual power will decrease due to the lower water level. As an immediate action in OT 3113, the FWLC system is placed in manual control.**

Technical Reference(s): OT 3113 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-602, objective RO EO2 (As available)

Question Source:
- Bank # ____
- Modified Bank # ____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge ____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 ____
- 55.43 5

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295004 AA2.04	
	Importance Rating		3.3

(K&A Statement) AA2.04- Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: System lineups

Proposed Question: SRO 77

While operating at steady state 65% RTP, the following indications are observed in the control room:

- Trip of Reactor Water Cleanup
- Loss of EPR/MPR control white light
- Loss of position indication for Feed Pump Recirculation Valves

Based on these indications, which ONE of the following procedures is entered AND what guidance (if any) is provided concerning Emergency Diesel Generator (EDG) control power sources?

A. Enter ON 3159, "Loss of DC-1", and direct transferring the applicable EDG control power source to DC-2.
B. Enter ON 3160, "Loss of DC-2/3", and direct transferring the applicable EDG control power source to DC-1.
C. Enter ON 3159, "Loss of DC-1". No action to transfer EDG control power is required since both EDGs maintain their normal power source.
D. Enter ON 3160, "Loss of DC-2/3". No action to transfer EDG control power is required since both EDGs maintain their normal power source.

Proposed Answer: D

A. INCORRECT: Indications support a loss of DC-2/3
B. INCORRECT: Control power to the "B" EDG remains on DC-1 and control power for the "A" EDG remains on DC-2AS
C. INCORRECT: Indications support a loss of DC-2/3
D. ***CORRECT: Indications support a loss of DC-2/3; Normal control power to the "B" EDG remains on DC-1 and normal control power for the "A" EDG remains on DC-2AS***

Technical Reference(s): ON 3160 (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-601, RO EO3 (As available)

Question Source: Bank #
Modified Bank # 6713
New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 5

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295037 EA2.02	
	Importance Rating		4.2

(K&A Statement) EA2.02- Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Reactor water level

Proposed Question: SRO 78

An Anticipated Transient without Scram (ATWS) condition has occurred. Plant conditions are as follows:

- Reactor power is 40% RTP
- Reactor water level is being controlled in the required ATWS level band
- Control rod insertion appendices are being performed with NO success thus far

When is the earliest the Control Room Supervisor can order a water level band of 127-177 inches?

A. Once SLC tank level decreases by 20% IAW the EOP-2 level leg.
B. Once SLC tank level decreases by 30% IAW the EOP-2 power leg.
C. Once Reactor power decreases to 2% IAW the EOP-2 level leg.
D. Once Reactor power decreases to 25% IAW the EOP-2 power leg.

Proposed Answer: A

A. CORRECT: Once HSBW is added, we can place level 127-177 inches.
B. INCORRECT: HSBW is 20%
C. INCORRECT: Power has no impact on when we can raise level 127-177"
D. INCORRECT: Power has no impact on when we can raise level 127-177"

Technical Reference(s): EOP-2 flowchart and EOP Volume 4 study guide (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-610 objective 2.4.44 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 5

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295005 2.4.45	
	Importance Rating		4.3

(K&A Statement) 2.4.45- Ability to prioritize and interpret the significance of each annunciator or alarm

Proposed Question: SRO 79

A plant startup is in progress IAW OP 0105, "Reactor Operation" with the turbine online. The reactor is at 18% RTP.

Additionally, Annunciator 7-F-2, "TURB Excessive Vibration" alarms in the control room. The ERFIS screen for "Turbine Bearing Performance" indicates the following:

- Bearings 1X, 1Y and 8X are alarming with a slowly rising trend in all three values.
- All other bearing temperatures and trends are stable.

Failure to take operator action in a timely manner will result in:

(1) Which ONE of the following plant responses?
(2) What required actions to be taken?

A. (1) Bearings 1X and 1Y reach the trip setpoint causing MTS-1 to trip resulting in a turbine trip.
(2) Enter ONLY ON 3154, "Load Reject". Verify 1T ACB, 81-1T ACB and T-1 MOD open.

B. (1) Bearings 1X and 8X reach the trip setpoint causing MTS-1 to trip resulting in a turbine trip.
(2) Enter ONLY ON 3154, "Load Reject". Verify 1T ACB, 81-1T ACB and T-1 MOD open.

C. (1) Bearings 1X and 1Y reach the trip setpoint causing MTS-1 to trip resulting in a turbine trip.
(2) Enter OT 3100, "Reactor Scram" AND ON 3154, "Load Reject". Verify house loads have transferred to the Startup Transformers.

D. (1) Bearings 1X and 8X reach the trip setpoint causing MTS-1 to trip resulting in a turbine trip.
(2) Enter OT 3100, "Reactor Scram" AND ON 3154, "Load Reject". Verify house loads have transferred to the Startup Transformers.

Proposed Answer: A

A. CORRECT: Logic made up for a turbine trip only

B. INCORRECT: required logic not made up (X/Y on the same bearing)

C. INCORRECT: A scram will not occur

D. INCORRECT: required logic not made up (X/Y on the same bearing); A scram will not occur

Technical Reference(s): ARS 5-K-8, ARS 7-F-2, ON 3154 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-601; objective RO EO3 (As available)

Question Source: Bank # #22 (2009 SRO-Re-exam)

Modified Bank #

New

Question History: Last NRC Exam Yes (2009 SRO Re-Exam)

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41

55.43 5

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295038 EA2.04	
	Importance Rating		4.5

(K&A Statement) EA2.04- Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE: Source of off-site release

Proposed Question: SRO 80

EOP-3, "Primary Containment Control", has been entered do to adverse Primary Containment conditions. The CRS wishes to vent Primary Containment using OE 3107, "EOP/SAG Appendices", Appendix "HH", section 4, "8" Vent to SGT-6 SBGT to Stack.

The following plant conditions exist:

- Primary Containment pressure is 5.0 psig and rising slow
- ONLY one SBGT is operational

Which ONE of the following is correct regarding the use of this flowpath for the given conditions?

Use of this section _____.

A. allows the vent path to be throttled
B. cannot be done using remote operations
C. can damage RTF-5 resulting in a ground level release
D. can overheat the charcoal element in the operating SBGT train

Proposed Answer: C

***SRO ONLY justification:** This question ties to a specific SRO ONLY objective that also does not require ROs to have the same knowledge level concerning Containment venting.

A. INCORRECT: This flow path is monitored

B. INCORRECT: This flow path is remotely operated

C. CORRECT: If containment pressure is greater than 2.0 psi, RTF-5 will fail when AC-7A or AC-7B is opened. Alert personnel to the potential for the reactor building or ground level releases.

D. INCORRECT: This flow path will not damage the SBGT train

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OE 3107, Appendix HH Section 4 and Table 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-625, objective SRO 1 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41
- 55.43 5*

Comments:
After discussion with the NRC (11-16-10), changed distractor "D" based on being too close to RTF-5 damage which is expected; additionally reworded the stem to make it read better.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295001 2.4.50	
	Importance Rating		4.0

(K&A Statement) 2.4.50- Ability to verify system alarm setpoints and operate controls identified in the alarm response manual

Proposed Question: SRO 81

The plant is operating at 95% RTP. Early in the shift, an electrical fault results in the "A" Recirculation Pump discharge valve (RV-53A) closing.

Electrical maintenance has determined the fault will result in the valve remaining shut for the remainder of the shift.

In addition to entering the applicable Operational Transient Procedure, which ONE of the following Alarm Response Sheet (ARS) procedural actions is required based on the given information?

A. In accordance with ARS 4-D-1, "RECIRC MG A/B RUNBACK", verify the "A" Recirculation pump runs back to ~35Mlbm/hour flow AND the Master FWLC sets RPV water level down to 155 inches.
B. In accordance with ARS 4-D-1, "RECIRC MG A/B RUNBACK", verify the "A" Recirculation pump runs back to 20% speed AND the Master FWLC sets RPV water level down to 155 inches.
C. In accordance with ARS 4-B-6, "RECIRC PUMP A FW FLOW LO INTLK", verify the "A" Recirculation pump runs back ~35Mlbm/hour flow AND trip the "A" Recirculation pump.
D. In accordance with ARS 4-B-6, "RECIRC PUMP A FW FLOW LO INTLK", verify the "A" Recirculation pump runs back to 20% speed AND trip the "A" Recirculation pump.

Proposed Answer: D

A. INCORRECT: A high power runback does not occur
B. INCORRECT: A high power runback does not occur
C. INCORRECT: runback is to 20% speed
D. CORRECT: ARS 4-B-6

Technical Reference(s): ARS 4-B-6 (Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-602; objective RO EO3 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 5

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	295018 2.2.44	
	Importance Rating		4.4

(K&A Statement) 2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions

Proposed Question: SRO 82

While operating at 90% RTP, a Loss of Normal Power (LNP) occurred. All plant equipment operated as designed. The Emergency Operating Procedures have been entered to control Reactor Plant parameters.

Which ONE of the following identifies an available level AND pressure control method to be used based on current plant conditions?

A. (1) Control Level utilizing the Feed and Condensate Systems IAW EOP-1, "RPV Control"
(2) Operate SRVs in the order of A, B, C, D and commence a cooldown IAW EOP-1, "RPV Control"

B. (1) Control Level utilizing the Feed and Condensate Systems IAW EOP-1, "RPV Control"
(2) Operate SRVs in the order of A, C, B, D and commence a cooldown IAW EOP-1, "RPV Control"

C. (1) Control Level utilizing the HPCI System IAW EOP-1, "RPV Control"
(2) Operate SRVs in the order of A, B, C, D and commence a cooldown IAW EOP-1, "RPV Control"

D. (1) Control Level utilizing the HPCI System IAW EOP-1, "RPV Control"
(2) Operate SRVs in the order of A, C, B, D and commence a cooldown IAW EOP-1, "RPV Control"

Proposed Answer: D

A. INCORRECT: Feed and Condensate is not available for level control (Loss of Bus 1 and 2) and the Main Condenser is not available (Loss of Bus 1 and 2)
B. INCORRECT: Feed and Condensate is not available for level control (Loss of Bus 1 and 2)
C. INCORRECT: the Main Condenser is not available (Loss of Bus 1 and 2)
D. CORRECT: HPCI is available as a preferred injection source (Table "C") and SRVs are available as an alternate pressure control system (Table "F")

Technical Reference(s): EOP-1 Flowchart
OT 3122
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610, objective 2.4.44 (As available)

Question Source:
Bank #
Modified Bank #
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41
55.43 5

Comments:
Deemed UNSAT by the NRC (11-1-10) due to plausibility od distractors A2/B2. rewrote A2/B2 to make plausible.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	295029 EA 2.03	
	Importance Rating		3.5

(K&A Statement) EA2.03- Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL: Drywell/containment water level

Proposed Question: SRO 83

EOP-3, "Primary Containment Control" has been entered following a large break LOCA. Plant conditions are as follows:

- All control rods are inserted
- RPV water level is 50 inches and steady
- RPV pressure is 150 psig and lowering
- Core Spray pump "A" is injecting as designed
- Drywell pressure is 32 psig and rising slow
- Torus Pressure is 30 psig and rising slow
- Torus Water level is 11.5 feet and rising slow

Based on these conditions, which ONE of the following actions is required to be directed by the CRS?

A. Lineup BOTH loops of RHR for Torus AND Drywell Spray ONLY.
B. Lineup BOTH loops of RHR for Torus AND Drywell Spray AND enter EOP-5, "RPV-Emergency Depressurization" to perform an Emergency Depressurization.
C. Vent Primary Containment prior to prevent exceeding PCPL-A IAW OE 3107, Appendix "HH" using the Torus Hardened vent (TVS-86).
D. Vent Primary Containment exceeding Off Site release rates IAW OE 3107, Appendix "HH" using both trains of SBGT vent through the Stack.

Proposed Answer: B

A. INCORRECT: While conditions are met to spray both the Torus AND drywell (Torus pressure >10 psig), this is NOT the minimum requirement based on plant conditions. While this step is still directed, before RPV-ED, it is not necessary to wait for those steps to be completed before directing an RPV-ED.
B. CORRECT: Torus pressure cannot be maintained in the safe region of the PSP graph. This is required at a minimum.
C. INCORRECT: Plant pressure is not high enough to allow the use of the Hardened Vent
D. INCORRECT: Torus Pressure has not exceeded PCPL-A yet, therefore operator cannot advance down that leg.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): EOP-3, EOP-5, Study Guide Volume 4 Section 8, page 26 of 43. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: DWSIL, PSP and PCPL-A curves provided

Learning Objective: LOT-00-607, objective RO 4 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41
- 55.43 5

Comments:
At the request of the NRC (11-1-10) replaced distractor "A" with an distractor that's based in EOP-3 and NOT in EOP-1. Reworded answer to avoid subset issues of distractors.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	295033 2.4.6	
	Importance Rating		4.7

(K&A Statement) 2.4.6 Knowledge of EOP mitigation strategies

Proposed Question: SRO 84

While operating at 80% RTP, a leak from the RWCU system results in the following secondary containment temperature and radiation conditions:

Temperature:

Channel	Temperature
9	86°F
10	85°F
11	86°F
12	86°F
13	174°F
14	208°F
15	112°F

Radiation:

ARM#	Rad Level
1	10 mr/hr
2	4 mr/hr
3	2 mr/hr
4	20 mr/hr
6	1300 mr/hr
7	9 mr/hr
8	9 mr/hr

The crew has entered EOP-4, "Secondary Containment and Radioactivity Release Control".

In addition to EOP-4, which ONE of the following identifies the additional operational requirements to control secondary containment parameters?

A. Continue to monitor Secondary Containment parameters. When conditions are met, begin a reactor shutdown in accordance with OP 0105, "Reactor Operations".

B. Immediately commence a reactor shutdown in accordance with OP 0105, "Reactor Operations".

C. Scram the reactor and enter ONLY EOP-1, "RPV Control". Continue monitoring secondary Containment parameters to determine if additional EOPs are required to be implemented.

D. Scram the reactor and enter EOP-1, "RPV Control". Additionally, perform an RPV-ED as directed by EOP-1, "RPV Control" and EOP-5, RPV Emergency Depressurization".

Proposed Answer: C

A. INCORRECT: Primary leak present
B. INCORRECT: Primary leak present
C. CORRECT:Conditions result in one area above the Maximum Safe Operating Temperature/Radiation level in one area with a primary leak. This will require a scram and entry into EOP-1.
D. INCORRECT: Only when the second area reaches max safe operating limit for that parameter.

Technical Reference(s): EOP-4 flowchart (provided without the entry conditions); AP 3125 Off site radioactivity release row provided. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: EOP-4 flowchart

Learning Objective: LOT-00-611 (SRO 3 and RO 12) (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	295008 AA2.01	
	Importance Rating		3.9

(K&A Statement) AA2.01- Ability to determine and/or interpret the following as they apply to HIGH REACTOR WATER LEVEL: Reactor water level

Proposed Question: SRO 85

A seismic event and subsequent reactor scram has rendered ALL Reactor Pressure Vessel (RPV) water level instrumentation inoperable such that the water level CANNOT be determined. EOP-6, "RPV Flooding", has been entered.

Plant conditions are as follows:

- All control rods are fully inserted
- RPV pressure is 920 psig and steady
- Torus level is 11 feet and steady

What direction is provided in EOP-6 to flood the RPV and how are flooding conditions achieved in the RPV IAW EOP-6, Table "Y"?

A. Following Terminate and Prevent, open all SRV's. Flooding conditions are assured if RPV pressure is above the Minimum Steam Cooling Pressure (MSCP).
B. Following Terminate and Prevent, open all SRV's. Flooding conditions are assured once RPV pressure decreases below the Minimum Steam Cooling Pressure (MSCP).
C. Open all SRVs and bypass both HPCI and Reactor Feedwater pump high level trips. Flooding conditions are assured once the RPV is flooded to the MSLs.
D. Open all SRVs and bypass ONLY the Reactor Feedwater pump high level trip. Flooding conditions are assured once the RPV is flooded to the MSLs.

Proposed Answer: D

A. INCORRECT: ATWS conditions for flooding is MSCP however all rods are inserted.
B. INCORRECT: ATWS conditions for flooding is above MSCP
C. INCORRECT: There is no HPCI high level trip bypass. Feed and condensate is used to flood the RPV at higher pressures.
D. **CORRECT:**

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): EOP-6 flowchart (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-608 (RO EO 16 and SRO EO 2) (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 5

Comments:

Developed a new question based on NRC feedback of UNSAT question (11-1-10). Original question was deemed to be a direct lookup in EOP-6. There will be no open reference for the new question.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	262002 A2.01	
	Importance Rating		2.8

(K&A Statement) A2.01 Ability to (a) predict the impacts of the following on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Under voltage

Proposed Question: SRO 86

The plant is operating at rated power conditions with the electrical distribution system in a normal lineup when an electrical fault results in a trip of the normal AC supply breaker for the Vital Motor Generator (MG).

Which ONE of the following describes the response of the 120V Vital AC electrical distribution system AND the action to be taken by the CRS based on the undervoltage trip?

A. The Vital MG will be powered from DC-3. Investigate the cause of the Vital MG trip IAW ARS 8-P-8, "VITAL MG SET DC LOSS/DC RUN".
B. The Vital AC bus will be powered from MCC-9A. Enter and direct actions from ON 3168, "Loss of 120/240 Vac Vital Bus".
C. The Vital MG will be powered from DC-3. Investigate the cause of the Vital MG trip IAW ARS 8-N-9, "DC-3/INST AC AUTO XFER".
D. The Vital AC bus will be powered from MCC-9B. Enter and direct actions from ON 3168, "Loss of 120/240 Vac Vital Bus".

Proposed Answer: A

Technical Reference(s): ARS 8-P-8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-601, objective RO EO3 (As available)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:
After discussing with the NRC (11-16-10), replaced 480V with 120V. Additionally, replaced Vital "Bus"... in A/C with Vital "MG"...

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	218000 2.4.23	
	Importance Rating		4.4

(K&A Statement) 2.4.23 Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations

Proposed Question: SRO 87

The following plant transient occurs from full rated power:

- Reactor SCRAM due to rising Drywell pressure
- EOP-2, "RPV ATWS Control" was entered due to NOT being shutdown under all conditions
- Reactor power is ~25% RTP
- Failure to transfer Buses 1 and 2 to their immediate access source
- Drywell pressure 3.5 psig and rising slowly
- RPV water level restored to 120 inches from a minimum of 90 inches within 2 minutes using available high pressure injection systems.
- All ECCS systems operated as expected
- All operator immediate actions are completed

1. What action should the Control Room Supervisor direct?
2. What is the basis for this action?

A. (1). Trip the running Recirculation Pumps
(2). This will assist in reducing reactor power by raising the boiling boundary

B. (1). Implement Appendix "P"
(2). This will allow the MSIVs to be kept open when water level is intentionally lowered below the isolation setpoint.

C. (1). Inhibit ADS
(2). ADS blowdown can result in a power excursion that could result in core damage.

D. (1). Secure RCIC
(2). RCIC injection will complicate EOP-2 level control

Proposed Answer: C

A. INCORRECT: The Recirculation pumps already tripped due to the LNP.
B. INCORRECT: MSIVs are shut due to LNP
C. CORRECT: EOP-2 bases
D. INCORRECT: RCIC is not running; when water level is intentionally lowered and RCIC starts, RCIC can be left running due to injection being negligible.

Technical Reference(s): EOP-2 study guide bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610, objective (As available)

Question Source:
Bank #
Modified Bank #
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41
55.43 5

Comments:
Modified from the original question at the request of the NRC (11-1-10) due to distractor "D" not being a basis but a statement of fact. Based on the inability to come up with a plausible reason to inhibit ADS, revised A,B, and D to include actions from EOP-2 with associated bases. 11-12-10.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	261000 A2.10	
	Importance Rating		3.2

(K&A Statement) A2.10 Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low reactor water level: Plant specific

Proposed Question: SRO 88

The plant is commencing a shutdown due to an electrical fault on MCC-8B. The rest of the electrical distribution system is in its NORMAL lineup.

A loss of normal power occurs and ALL systems operate as designed. Post scram conditions are as follows:

- Water level lowered to 106 inches and is now being controlled in the prescribed post scram level band.
- Drywell temperature is 152°F and rising slow
- All control rods fully inserted

For these given conditions, determine the following:

(1) How is the status of the Standby Gas Treatment (SBGT) system verified?
(2) What is the current status of the SBGT system?

The SBGT system status is checked by verifying the applicable automatic actions of Table "A", "Initiations/Isolations", in accordance with _____(1)_____.

_____(2)_____ train(s) of the Standby Gas Treatment System will be running.

A. (1) EOP-1, "RPV Control"
   (2) BOTH the "A" AND "B"

B. (1) EOP-1, "RPV Control"
   (2) ONLY the "A"

C. (1) EOP-3, "Primary Containment Control"
   (2) BOTH the "A" AND "B"

D. (1) EOP-3, "Primary Containment Control"
   (2) ONLY the "B"

Proposed Answer: A

A. CORRECT:Both trains auto start on low level and are verified IAW Table "A" in EOP-1 override.

B. INCORRECT: power is available to both trains.

C. INCORRECT: Table "A" verification is in EOP-1 only

D. INCORRECT: Table "A" verification is in EOP-1 only; power is available to both trains.

Technical Reference(s): EOP-1, OE 3107 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610, objective 2.4.44 (As available)

Question Source: Bank #

Modified Bank #

New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41

55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	215004 A2.05	
	Importance Rating		3.5

(K&A Statement) A2.05 Ability to (a) predict the impacts of the following on the SOURCE RANGE MONITOR (SRM) SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Faulty or erratic operation of detectors/system

Proposed Question: SRO 89

With control rods being withdrawn during a reactor startup to bring the reactor critical, the following Control Room annunciator is received:

- 5-P-4, "SRM DWNSCL"

Source Range indications are:

- SRM "A" 1000 cps
- SRM "B" 950 cps
- SRM "C" 0 cps
- SRM "D" 1020 cps

Based on these indications, what plant response and direction should the Control Room Supervisor (CRS) provide and what guidance exists for continuing the Reactor Startup?

A. Clear the Control Rod Block by bypassing SRM "C". The startup can continue with the remaining three SRMs IAW OP 0105, "Reactor Operations".

B. Clear the Control Rod Block by bypassing SRM "C". The startup can continue ONLY after referring to the primary and alternate Control Rod Quadrants IAW OP 2130, "Source Range Monitoring System".

C. No Rod Block will occur. The CRS should direct bypassing SRM "C" and continuing the startup with the remaining three SRMs IAW OP 0105, "Reactor Operations".

D. No Rod Block will occur. The CRS should direct bypassing SRM "C" and continuing the startup ONLY after referring to the primary and alternate Control Rod Quadrants IAW OP 2130, "Source Range Monitoring System".

Proposed Answer: A

A. CORRECT: With the reactor not critical yet, the IRMs are <range 3, therefore an SRM downscale will give a Rod Block. OP 2130 and TSs state that rod withdrawals are allowed with only three SRMs. To continue rod withdrawals, the detector needs to be bypassed.

B. INCORRECT: Primary and alternate quadrants are only required with 2 SRMs INOP

C. INCORRECT: A Control Rod Block will occur.

D. INCORRECT: A Control Rod Block will occur. Primary and alternate quadrants are only required with 2 SRMs INOP

Technical Reference(s): OP 2130
OP 0105
ARS 5-D-3 and 5-P-4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-01-215, A2.05 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:
Deemed to be UNSAT by the NRC (11-1-10) due to poor question which may lead to multiple correct answers (definition of "sustained"). Replaced the question.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	206000 2.1.32	
	Importance Rating		4.0

(K&A Statement) 2.1.32 Ability to explain and apply system limits and precautions

Proposed Question: SRO 90

In accordance with OP 2120, High Pressure Coolant Injection System (HPCI)", which ONE of the following identifies an operational concern with operating HPCI with a low Condensate Storage Tank (CST) volume?

A. When CST level lowers to <27%, the system must be filled and vented to ensure compliance with the Technical Specification requirement for maintenance of a filled discharge pipe.
B. When CST level lowers to <35%, the system must be filled and vented to ensure compliance with the Technical Specification requirement for maintenance of a filled discharge pipe.
C. When CST level lowers to <27%, the level no longer meets the Technical Specification required volume of 150,000 gallons needed prior to the HPCI suction automatically shifting to the Torus.
D. When CST level lowers to <35%, the level no longer meets the Technical Specification required volume of 150,000 gallons needed prior to the HPCI suction automatically shifting to the Torus.

Proposed Answer: B

Technical Reference(s): OP 2120 (Precautions and Limitations), HPCI DBD Section 2.3.9, and Technical Specifications Section 4.5.I.3 Bases. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Learning Objective: LOT-00-206, objective K5.04 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	233000 2.2.25	
	Importance Rating		4.2

(K&A Statement) 2.2.25- Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.

Proposed Question: SRO 91

Which ONE of the following identifies the Technical Specification oxygen limit in Primary Containment and the associated bases?

Oxygen is reduced to _____(1)_____ in order to minimize the potential for combustion of hydrogen produced from the _____(2)_____.

E. (1) <4%
(2) disassociation of H_2O at high powers and a high neutron flux

F. (1) <15%
(2) disassociation of H_2O at high powers and a high neutron flux

G. (1) <4%
(2) zirconium-steam water reaction during a Loss of Coolant Accident

H. (1) <15%
(2) zirconium-steam water reaction during a Loss of Coolant Accident

Proposed Answer: C

A. INCORRECT: The basis is the amount of hydrogen produced from a hypothesized 0.1% zirconium-steam reaction at very high temperatures. This Hydrogen when in the presence of high oxygen will combust.
B. INCORRECT: 15% is the power limit from which the oxygen concentration needs to be reduced to 4% within 24 hours.
C. CORRECT: The basis is the amount of hydrogen produced from a hypothesized 0.1% zirconium-steam reaction at very high temperatures. This Hydrogen when in the presence of high oxygen will combust.
D. INCORRECT: The basis is the amount of hydrogen produced from a hypothesized 0.1% zirconium-steam reaction at very high temperatures. This Hydrogen when in the presence of high oxygen will combust. 15% is the power limit from which the oxygen concentration needs to be reduced to 4% within 24 hours.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): Technical Specifications (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-308 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis

10 CFR Part 55 Content:
- 55.41
- 55.43 2

Comments:
Replaced original question submitted to the NRC based on conflicting information contained in the TS bases and the design basis for Standby Fuel Pool Cooling. This may have resulted in two correct answers. Developed a new question to meet the orinal K/A. (11-1-10)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	286000 A2.11	
	Importance Rating		3.2

(K&A Statement) A2.11- Ability to (a) predict the impacts of the following on the FIRE PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump trips: Plant specific

Proposed Question: SRO 92

A leak in the Service Water system has resulted in SW pressure throughout the system at 80 psig and lowering slow.

Which ONE of the following is the operational impact on the Fire Suppression system and the subsequent operational guidance in the event there was a loss of Bus 9 from the given condition?

A. The Electric Fire pump will trip. When pressure lowers to 75 psig, verify the Diesel Fire Pump auto starts IAW ARS 6-M-9, "ELEC FIRE PUMP/LOSS OF POWER".

B. The Electric Fire pump will NOT auto start at 75 psig due to a loss of power to the pump. When pressure lowers to 65 psig, verify the Diesel Fire Pump auto starts IAW ARS 6-M-9, "ELEC FIRE PUMP/LOSS OF POWER"the Diesel Fire pump will auto start.

C. The Diesel Fire pump will trip due to a loss of power to the pump battery charger from MCC-9D. When pressure lowers to 75 psig, verify the Electric Fire Pump auto starts IAW ARS 6-K-9, "DIESEL FIRE PUMP TROUBLE"

D. The Diesel Fire pump will NOT auto start at 75 psig due to a loss of power to the pump battery charger from MCC-9D. When pressure lowers to 65 psig, verify the Electric Fire Pump auto starts IAW ARS 6-K-9, "DIESEL FIRE PUMP TROUBLE".

Proposed Answer: A

A. CORRECT
B. INCORRECT: Electric Fire pump auto starts at 85 psig and is running at the time of the loss of Bus 9. The Diesel fire pump is verified to auto start IAW the given ARS however, it starts at 75 psig.
C. INCORRECT: The Diesel Fire pump is not running at the time of the Bus loss. The battery is powered from MCC-8D. The Electric Fire pump is running at the time of the Bus loss.
D. INCORRECT: The Diesel Fire pump will auto start at 65 psig.

Technical Reference(s): OP 2186 discussion (Attach if not previously provided)
ARS 6-M-9

Proposed references to be provided to applicants during examination: _____

Learning Objective: LOT-00-286, K6.01, K16.04 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 1, 5

Comments:
Deemed UNSAT by the NRC (11-1-10) due to being a direct lookup in the TRM. Replaced the question. No reference will be provided.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	216000 2.1.23	
	Importance Rating		4.4

(K&A Statement) 2.1.23- Ability to perform specific system and integrated plant procedures during all modes of plant operation

Proposed Question: SRO 93

While operating at rated power, the plant has been manually scrammed due to a leak in the Torus. Post scram conditions are as follows:

- All control rods inserted
- RPV water level 140 inches and rising slow
- RPV pressure 910 psig and steady
- Torus water level is 8.5 feet and lowering slow with all available makeup water sources aligned to the Torus
- Torus area level is 7 inches and slowly rising
- HPCI Room area is 3 inches and slowly rising

Which ONE of the following directions should the CRS provide for RPV pressure control and how is water level subsequently controlled IAW EOP-1, "RPV Control"?

The CRS should direct the control room operators to ____(1)____.

IAW DP 0166, Operations Department Standards, the controlling water level instrumentation associated with this pressure control is the ____(2)____.

A. (1) commence a normal cooldown
(2) compensated shroud level ERFIS point SHDAB046 or SHDBB045 down to 350 psig

B. (1) anticipate a RPV-ED due to adverse EOP-4 conditions
(2) compensated shroud level ERFIS point SHDAB046 or SHDBB045 down to 350 psig

C. (1) commence a normal cooldown
(2) compensated wide range level ERFIS point WIDEM071 down to 350 psig

D. (1) anticipate a RPV-ED IAW due to adverse EOP-3
(2) compensated wide range level ERFIS point WIDEM071 down to 350 psig

Proposed Answer: D

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): EOP-1, EOP-3, EOP-4, and DP 0166. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-610, objective 2.4.44 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41
- 55.43 5

Comments:

At the request of the NRC (11-1-10), added "all available makeup water sources" to stem. Additionally, added slowly rising to Torus area and HPCI room to make operationally valid (was steady which did not make sense to validators.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.1.43	
	Importance Rating		4.3

(K&A Statement) 2.1.43 Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.

Proposed Question: SRO 94

With a plant startup in progress and operating at 60% RTP, the extraction steam supply from the High Pressure Turbine is lost to the applicable Heater on the "A" string.

Mechanical Maintenance has determined the supply will not be restored for another ten hours.

(1) How is the Feedwater Heater string bypassed
(2) What is the operational restriction with a Feedwater Heater String bypassed?

A. (1) isolate the heater string IAW OP 2172, "Feedwater System"
(2) IAW OT 3110, "Positive Reactivity Insertion", reduce reactor power to <23% RTP

B. (1) isolate the heater string IAW OP 2172, "Feedwater System"
(2) IAW OP 0105, "Reactor Operations", do not exceed 75% with A Feedwater Heater string isolated.

C. (1) isolate the heater string IAW RP 2170, "Condensate System"
(2) IAW OT 3110, "Positive Reactivity Insertion", IAW OT 3110, "Positive Reactivity Insertion", reduce reactor power to <23% RTP

D. (1) isolate the heater string IAW RP 2170, "Condensate System"
(2) IAW OP 0105, "Reactor Operations", do not exceed 75% RTP with A Feedwater Heater string isolated.

Proposed Answer: A

A. CORRECT: Extraction steam is from the high pressure turbine, therefore goes to the high pressure Feedwater string which is part of the Feedwater System. If a Feedwater heater string is bypassed for grater than 2 hours, then power must be reduced to <23% in the next 8 hours due to the uncertainty in the power shift and subsequent adverse affects on MCPR and APLHGR.

B. INCORRECT: 75% is the operational limit with a MSL isolated. Power must be reduced to <23%.

C. INCORRECT: This is a high pressure Feedwater heater string therefore it's isolated IAW OP 2172.

D. This is a high pressure Feedwater heater string therefore it's isolated IAW OP 2172; 75% is the operational limit with a MSL isolated. Power must be reduced to <23%.

Technical Reference(s): OP 2172
OT 3110
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-602, objective RO EO5 (As available)

Question Source:
Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 _____
55.43 5

Comments:
New question as of 10-1-10

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.3.14	
	Importance Rating		3.8

(K&A Statement) 2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

Proposed Question: SRO 95

Several of the in-plant emergency responders to a General Emergency (GE) have been exposed to radioiodine air concentrations of 650 mRem/hour.

Which ONE of the following is the correct guidance concerning the administration of Potassium Iodine (KI) tablets IAW OP 3507, "Emergency Radiation Exposure Control"?

The threshold for the administration of KI tablets has _____.

A. not been met and no actions concerning KI are required until 1Rem/hour

B. not been met and no actions concerning KI are required until 5Rem/hour

C. been met, however injestion by the responders is voluntary under ALL emergency response conditions

D. been met, however injestion by the responders is required if the emergency involves life saving emergency response.

Proposed Answer: C

A. INCORRECT- above 500mRem/hour, therefore evaluate.
B. INCORRECT- above 500mRem/hour, therefore evaluate.
C. CORRECT: IAW OP 3507, Attachment 9.4, When emergency responders have been or may be exposed to elevated radioiodine air concentrations in excess of 500 mRem/hr (4.0 e-6 μCi/cc), evaluate the need for administration of KI. It is NOT mandatory for any person to take or ingest KI tablets
D. INCORRECT- voluntary under all conditions

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Technical Reference(s): OP 3507: Attachment 9.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-900 (As available)

Question Source:
- Bank #
- Modified Bank #
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis

10 CFR Part 55 Content:
- 55.41
- 55.43 4

Comments:
New question developed following NRC review (11-1-10) of original question which was classified as UNSAT due to poor K/A match.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.2.37	
	Importance Rating		4.6

(K&A Statement) 2.2.37 Ability to determine operability and/or availability of safety related equipment.

Proposed Question: SRO 96

In preparation for the upcoming refueling outage, a plant shutdown and cooldown are being performed IAW OP 0105, "Reactor Operations". A malfunction with the MHC System has resulted in the crew shifting pressure control for the cooldown to the High Pressure Coolant Injection (HPCI) system.

Plant conditions are as follows:

- All rods inserted
- RPV pressure: 600 psig
- Cooldown rate: 60°F/hr with HPCI
- Both House Heating Boilers have tripped due to low fuel oil level.
- Outside air temperature is 24°F.

The Outside AO reports Condensate Storage Tank temperature 37°F

Determine the operability of the HPCI system and the correct guidance for assessing availability.

HPCI is _____(1)_____.

Risk assessment availability will be assessed in accordance with _____(2)_____.

A. (1) OPERABLE due to being aligned to the Torus
(2) AP 0172, "Work Schedule Risk Management – Online"

B. (1) OPERABLE due to being aligned to the Torus
(2) AP 0173, "Work Schedule Risk Management – Outage"

C. (1) INOPERABLE due to Condensate Storage Tank temperature
(2) AP 0172, "Work Schedule Risk Management – Online"

D. (1) INOPERABLE due to Condensate Storage Tank temperature
(2) AP 0173, "Work Schedule Risk Management – Outage"

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed Answer: C

Technical Reference(s): AP 0173 discussion, RP 2194 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-287 (RO 2.3), LOT-00-400 (SRO 10) (As available)

Question Source: Bank #

Modified Bank # Modified from 2009 SRO Re-exam question number 23 and bank question 1044

New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41

55.43 5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.2.40	
	Importance Rating		4.7

(K&A Statement) 2.2.40 Ability to apply Technical Specifications for a system.

Proposed Question: SRO 97

Following a recent refueling outage, ALL control rod speeds were declared operable and within the limits of T.S Table 4.4.C-1.

The plant has been operating 180 days into the operating cycle. The following are the results from a sampling of Control Rod Speed Checks. These have been performed to satisfy the requirement of Technical Specification section 4.3.C.1.b.

Based on these results, what (if any) is(are) the required Technical Specification action(s) to be taken by the Shift Manager?

CONTROL ROD	SPEED FROM POSITION 48 to 06 (seconds)
26-43	3.23
38-35	3.21
10-35	7.28
30-31	2.95
42-27	4.14
22-27	4.01
34-23	3.31
18-23	3.42
10-23	4.48
26-19	3.19
06-15	5.28
30-11	3.62
14-11	2.90
18-07	3.11

A. No action is required. There are several slow control rods however, the criteria for these slow rods as defined by Technical Specifications is met.

B. The deficient control rod(s) shall be considered inoperable, fully inserted into the core within 3 hours, and disarmed within the following 4 hours ONLY.

C. The reactor shall be placed in the HOT SHUTDOWN condition within 12 hours ONLY.

D. The deficient control rod shall be considered inoperable, fully inserted into the core within 3 hours, and disarmed within the following 4 hours. Additionally, the reactor

shall be placed in the HOT SHUTDOWN condition within 12 hours.

Proposed Answer: B

Technical Reference(s): Technical Specifications section 3.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Technical Specifications 3.3 and core map.

Learning Objective: LOT-01-201 (SRO K13) (As available)

Question Source: Bank # 7054
Modified Bank #
New

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 2

Comments:
After discussing with the NRC (11-16-10), put the Control Rod data in table format to improve readability.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.1.40	
	Importance Rating		3.9

(K&A Statement) 2.1.40 Knowledge of refueling administrative requirements.

Proposed Question: SRO 98

Which ONE of the following is correct regarding refueling activities?

In accordance with Technical Specifications, the reactor shall be shut down for a minimum of _____(1)_____ hours prior to fuel movement within the reactor core.

The basis for this time requirement is to satisfy the assumption for _____(2)_____.

A. (1) 12
(2) radiation exposure received by refueling bridge operators

B. (1) 24
(2) radiation exposure received by refueling bridge operators

C. (1) 12
(2) post refueling accident radiation levels associated with fission product poisons

D. (1) 24
(2) post refueling accident radiation levels associated with fission product poisons

Proposed Answer: D

A. INCORRECT: Requirement IAW TSs and procedurally is 24 hours;Time requirement based on post accident FPPs
B. INCORRECT: Time requirement based on post accident FPPs
C. INCORRECT: Requirement IAW TSs and procedurally is 24 hours
D. CORRECT:TS 3.12.F and bases

Technical Reference(s): TS Section 3.12.F and bases
UFSAR Section 14.6.4.3.2
OP 1101 Prerequisites
VYOPF 1101.01 (20)

(Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-620, Objective 2 (As available)

Question Source: Bank #
Modified Bank #
New X

Question History: Last NRC Exam No

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 2, 7

Comments:
Deemed UNSAT by the NRC (11-1-10) due to implausible distractors A2/B2. Changed the dstractors to the recommendation of the NRC.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.4.9	
	Importance Rating		4.2

(K&A Statement) 2.4.9 Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.

Proposed Question: SRO 99

To ensure that off site dose rate limits are not exceeded, there is a minimum Technical Specification requirement for OPERABLE systems required during "Operations with the Potential to Drain the Reactor Vessel" (OPDRV) with the reactor in a cold shutdown condition.

Which ONE of the following identifies the MINIMUM requirements IAW Technical Specifications for an OPDRV scheduled to last 12 hours?

In addition to 2 ECCS Subsystems, _____ are required.

A. 2 Emergency Diesel Generators, and a source of water for the ECCS system equivalent to >75,000 gallons of water

B. 1 Emergency Diesel Generator, and a source of water for the ECCS system equivalent to >75,000 gallons of water

C. 2 Emergency Diesel Generators, and a source of water for the ECCS system equivalent to >300,000 gallons of water

D. 1 Emergency Diesel Generator, and a source of water for the ECCS system equivalent to >300,000 gallons of water

Proposed Answer: D

Technical Reference(s): Technical Specifications bases 3.5.H
AP 0173, Appendix I
(Attach if not previously provided)

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-308, objective SRO EO1 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____
- New X

Question History: Last NRC Exam No

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 2

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		
	K/A #	2.4.49	
	Importance Rating		4.4.

(K&A Statement) 2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Proposed Question: SRO 100

Power is being reduced to 80% RTP for a rod pattern adjustment. It is expected that full power operations will be restored in 12 hours. The current Feedwater and Condensate system lineups are as follows:

- A, B, and C Condensate pumps are operating
- A, B, and C Feedwater pumps are operating

With power at 87% RTP, an electrical fault has resulted in the trip of the "A" condensate pump. Immediately following the pump trip, the Feedwater and condensate system lineup is as follows:

- C and B Condensate pumps are operating
- A, B, and C Feedwater pumps are operating

Which ONE of the following identifies the immediate operator action and the procedural direction to be taken by the crew?

The crew will respond by immediately _____(1)_____.

The Control Room Supervisor will direct entry into _____(2)_____.

A. (1) confirming/initiating both recirculation pumps run back to 40% demand AND manually tripping the "B" Feedwater pump
(2) OT 3113, "Reactor Low Level" ONLY

B. (1) manually tripping the "B" Feedwater pump ONLY
(2) OT 3175, "Recirculation Pump Runback due to Condensate or Feed Pump Trip" ONLY

C. (1) confirming/initiating both recirculation pumps run back to 40% demand AND manually tripping the "A" Feedwater pump
(2) OT 3113, "Reactor Low Level" AND OT 3175, "Recirculation Pump Runback due to Condensate or Feed Pump Trip"

D. (1) manually tripping the "A" Feedwater pump ONLY
(2) OT 3113, "Reactor Low Level" AND ARS 6-F-1, "COND PUMP A TRIP"

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5

Proposed Answer: A

Technical Reference(s): OT 3175 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: LOT-00-602, objectives RO EO1, EO2, EO3, and EO 7 (As available)

Question Source:
Bank #
Modified Bank #
New X

Question History: Last NRC Exam No

Question Cognitive Level:
Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41
55.43 5

Comments:
After discussing with the NRC (11-16-10), changed verified in A/C to confirm/initiate since this action will require manual action.

U.S.N.R.C. Site-Specific RO/SRO Written Examination
Vermont Yankee IVJ BLS 12-17-16

1.	A	B	C	**D**
2.	A	B	**C**	D
3.	A	B	C	**D**
4.	**A**	B	C	D
5.	A	**B**	C	D
6.	**A**	B	C	D
7.	A	**B**	C	D
8.	A	B	**C**	D
9.	A	B	**C**	D
10.	A	**B**	C	D
11.	A	B	**C**	D
12.	A	**B**	C	D
13.	**A**	B	C	D
14.	**A**	B	C	D
15.	A	B	**C**	D
16.	**A**	B	C	D
17.	A	B	C	**D**
18.	A	B	**C**	D
19.	A	B	**C**	D
20.	A	**B**	C	D
21.	A	B	C	**D**
22.	A	**B**	C	D
23.	A	**B**	C	D
24.	A	**B**	C	D
25.	A	**B**	C	D

26.	**A**	B	C	D
27.	A	B	**C**	D
28.	**A**	B	C	D
29.	A	B	**C**	D
30.	A	**B**	C	D
31.	**A**	B	C	D
32.	A	**B**	C	D
33.	A	**B**	C	D
34.	A	B	C	**D**
35.	A	**B**	C	D
36.	A	B	C	**D**
37.	**A**	B	C	D
38.	**A**	B	C	D
39.	A	B	**C**	D
40.	A	B	**C**	D
41.	A	B	C	**D**
42.	**A**	B	C	D
43.	A	B	C	**D**
44.	A	B	C	**D**
45.	A	B	C	**D**
46.	**A**	B	C	D
47.	A	B	**C**	D
48.	A	B	**C**	D
49.	**A**	B	C	D
50.	A	B	**C**	D

U.S.N.R.C. Site-Specific RO/SRO Written Examination IV's BLS 12-17-10
Vermont Yankee

SRO Only

51.	A	**B**	C	D		76.	A	B	C	**D**
52.	**A**	B	C	D		77.	A	B	C	**D**
53.	A	**B**	C	D		78.	**A**	B	C	D
54.	A	B	**C**	D		79.	**A**	B	C	D
55.	A	**B**	C	D		80.	A	B	**C**	D
56.	A	B	**C**	D		81.	A	B	C	**D**
57.	**A**	B	C	D		82.	A	B	C	**D**
58.	A	**B**	C	D		83.	A	**B**	C	D
59.	A	B	C	**D**		84.	A	B	**C**	D
60.	A	B	**C**	D		85.	A	B	C	**D**
61.	**A**	B	C	D		86.	**A**	B	C	D
62.	A	B	**C**	D		87.	A	B	**C**	D
63.	A	B	C	**D**		88.	**A**	B	C	D
64.	**A**	B	C	D		89.	**A**	B	C	D
65.	**A**	B	C	D		90.	A	**B**	C	D
66.	A	**B**	C	D		91.	A	B	**C**	D
67.	A	B	C	**D**		92.	**A**	B	C	D
68.	A	B	**C**	D		93.	A	B	C	**D**
69.	A	B	**C**	D		94.	**A**	B	C	D
70.	A	B	C	**D**		95.	A	B	**C**	D
71.	A	**B**	C	D		96.	A	B	**C**	D
72.	A	B	C	**D**		97.	A	**B**	C	D
73.	A	B	C	**D**		98.	A	B	C	**D**
74.	A	B	**C**	D		99.	A	B	C	**D**
75.	A	B	**C**	D		100.	**A**	B	C	D