QUESTION RO 1

Refer to the figure below to answer this question.

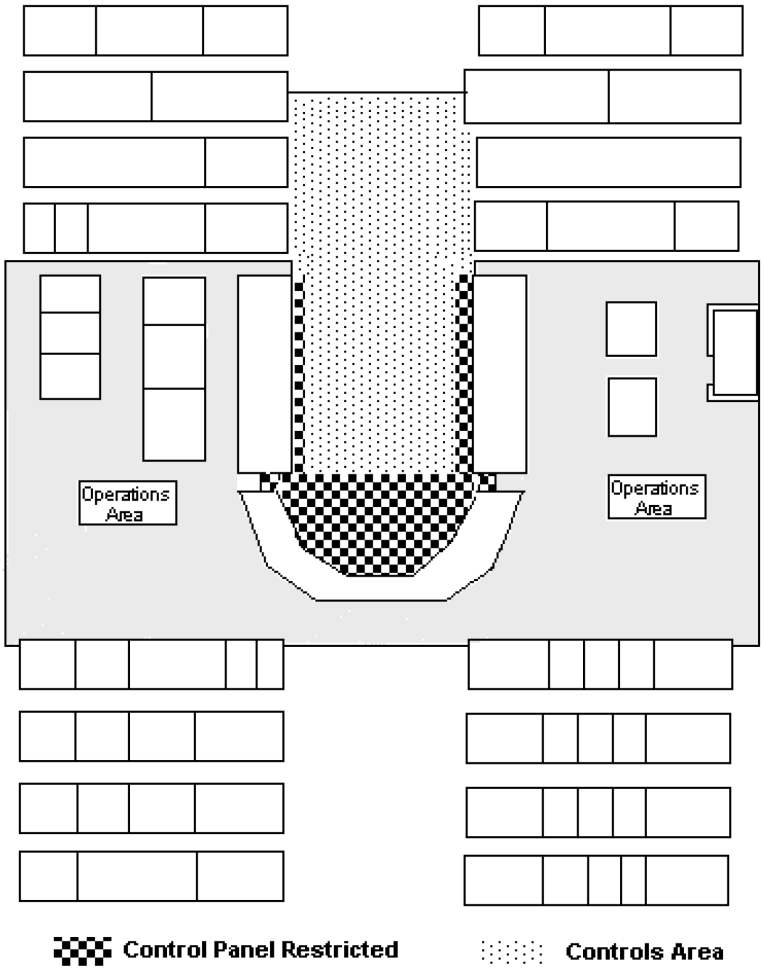
Per NOP-OP-1002, Conduct of Operations, who may authorize non-shift personnel to enter the Control Panel Restricted Access Area?

A. The Shift Manager only

B. The Unit Supervisor only

C. The RO-ATC or RO-BOP only

D. Any member of the on-duty control room staff



QUESTION RO 1

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.1.2
	Importance Rating	4.1	

K&A: Knowledge of operator responsibilities during all modes of operation.

Generic

Explanation: **Answer C –** Only the ATC or BOP can authorize non-shift personnel to access the Control Panel Restricted Access Area

A – Incorrect – Plausible since the SM can authorize non-shift individuals to enter the Control Room.

B – Incorrect – Plausible since the US can authorize non-shift individuals to enter the Control Room.

D – Incorrect – Plausible since any member of the on-duty Control Room staff can authorize non-shift individuals to enter the Controls Area

Technical Reference(s): NOP-OP-1002 Rev. 13	Reference Attached: NOP-OP-1002 pp. 42 & 97

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3039-01-G

Question Source:	Bank #	Perry 2015 # RO-02
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 2

IAW NOP-OP-1001, Clearance/Tagging Program, which of the following conditions would require double isolation protection?

Work on a ____.

A. fluid system with pressure greater than 60 psig

B. component powered from a 480-volt load center

C. fluid system with temperature greater than 200 °F

D. component interfacing with greater than 10” Hg vacuum

QUESTION RO 2

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.1.26
	Importance Rating	3.4	

K&A: Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen).

Generic

Explanation: **Answer C –** IAW NOP-OP-1001 fluid or gas systems with temperature > 200 °F would require double isolation.

A – Incorrect – Plausible since this is considered a 'hazardous energy condition' per NOP-OP-1001.

B – Incorrect – Plausible since this is considered a 'hazardous energy condition' per NOP-OP-1001.

D – Incorrect – Plausible since this is considered a 'hazardous energy condition' per NOP-OP-1001.

Technical Reference(s): NOP-OP-1001 Rev. 27	Reference Attached: NOP-OP-1001 pp. 7 & 163

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): GEN-TAGOVERVIEW_FEN-01

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 3

IAW NOP-OP-1004, Reactivity Management, when is a dedicated Reactivity Management SRO required?

A. During planned reactor shutdowns.

B. Performing SVI-C11-T1003-A, Control Rod Exercise (Part 1).

C. Lowering power from 100% to 85% using recirc flow in preparation for main turbine valve testing.

D. Raising power 3% per hour from 78% to 100% following a control rod sequence exchange using recirc flow.

QUESTION RO 3

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.1.37
	Importance Rating	4.3	

K&A: Knowledge of procedures, guidelines, or limitations associated with reactivity management.

Generic

Explanation: **Answer A –** IAW NOP-OP-1004, a dedicated Reactivity Management SRO is required for planned S/Us and S/Ds. However, A Reactivity Management SRO may be utilized for other reactivity management activities as determined by the Operations Manager.

B – Incorrect – Plausible as a Reactivity Management SRO may be utilized for this activity, but not required.

C – Incorrect – Plausible as a Reactivity Management SRO may be utilized for this activity, but not required.

D – Incorrect – Plausible as a Reactivity Management SRO may be utilized for this activity, but not required.

Technical Reference(s): NOP-OP-1004 Rev. 15	Reference Attached: NOP-OP-1004 pp. 10-11 & 16

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3039-01

Question Source:	Bank #	
	Modified Bank #	Grand Gulf 2012 # RO-41
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 4

You are performing the following procedure steps in the Control Room for startup of the "A" pump:

1.0 Throttle "A" discharge valve to 10% open.
2.0 Start "A" pump.
3.0 Pulley open "A" discharge valve.

You are required to ____.

A. stop the activity, verify equipment is in a safe condition then revise the procedure in accordance with NOP-SS-3001, Procedure Review and Approval

B. stop the activity, verify equipment is in a safe condition then perform a Limited Use Change in accordance with NOP-SS-3001, Procedure Review and Approval

C. stop the activity by stopping the "A" pump, closing the "A" discharge valve and verify equipment is in a safe condition then contact the Unit Supervisor for further direction

D. stop the activity, verify equipment is in a safe condition then contact the Authorizing Authority to clearly identify the typographical error by annotating the procedure and then continue with the activity

QUESTION RO 4

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.2.6
	Importance Rating	3.0	

K&A: Knowledge of process for making changes to procedures.

Generic

Explanation: **Answer D –** Step 3.0 in the stem contains a typo “Pulley”. IAW NOP-LP-2601, if the procedure challenge is limited to a typo, the Shift Manager (Authorizing Authority) can annotate the procedure and continue with the activity.

A – Incorrect – Plausible since this is one option required if it is more than a Procedure Enhancement or Typographical Error

B – Incorrect – Plausible since this is one option required if it is more than a Procedure Enhancement or Typographical Error

C – Incorrect – Plausible since the “A” is running with the discharge valve less than full open. However, discharge valves are throttled to the minimum flow position prior to starting the pump. Therefore, allowing the pump to continue running would be a safe condition.

Technical Reference(s): NOP-LP-2601 Rev. 6	Reference Attached: NOP-LP-2601 pp, 3, 5, 15-16

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3039-02

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 5

You are performing a housekeeping walk-down and observe only a red tie-wrap on valve P43-F523A, NCC A HX DRAIN.

P43-F523A is in the open position.

NCC A heat exchanger is in dry layup.

Based on this information, Plant procedures require you to ____.

A. close P43-F523A and remove the tie-wrap

B. print a new tag and reattach it to the valve

C. notify the Control Room to ensure personnel safety

D. review eSOMS to determine if P43-F523A has an active Danger tag

QUESTION RO 5

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.2.13
	Importance Rating	4.1	

K&A: Knowledge of tagging and clearance procedures.

Generic

Explanation: **Answer C –** IAW NOP-OP-1001 Clearance/Tagging Program, A component found with a red tie-wrap attached is to be treated as a red tagged component until proven otherwise. Prompt notification of the Control Room is necessary for personnel safety.

A – Incorrect – Plausible since most valves are Red Tagged closed. However, since the valve Is open and the component is to be treated as a Red Tagged Component, this would be a violation of the Tagging Program.

B – Incorrect – Plausible since this is the responsibility of the Clearance Authority.

D – Incorrect – Plausible since this is the responsibility of the Clearance Authority.

Technical Reference(s): NOP-OP-1001 Rev. 27	Reference Attached: NOP-OP-1001 p. 126

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): GEN-TAGOVERVIEW_FEN-01

Question Source:	Bank #	Perry 2013 # RO-05
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 6

The Reactor Mode Switch is in REFUEL.

No Reactor Mode Switch Interlock testing is in progress.

Reactor Coolant Temperature is 100 °F.

Which of the following describes the minimum additional condition(s) which will result in a MODE change from MODE 5, REFUELING to MODE 4, COLD SHUTDOWN, per Technical Specifications?

A. The Reactor Mode Switch is placed in SHUTDOWN and all head closure studs are fully tensioned.

B. The Reactor Mode Switch is placed in SHUTDOWN.

C. The first head closure stud is fully tensioned.

D. All head closure studs are fully tensioned.

QUESTION RO 6

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.2.35
	Importance Rating	3.6	

K&A: Ability to determine Technical Specification Mode of Operation.

Generic

Explanation: **Answer A –** IAW TS Table 1.1-1 transitioning from REFUELING to COLD SHUTDOWN requires all head studs to be fully tensioned and the Mode Switch in SHUTDOWN. With no Reactor Mode Switch Interlock testing is in progress, TS 3.10.2 is not applicable.

B – Incorrect – Plausible as this is part of the requirements for Mode 4.

C – Incorrect – Plausible since de-tensioning the first stud defines the change from Mode 4 to Mode 5.

D – Incorrect – Plausible as this is part of the requirements for Mode 4.

Technical Reference(s): TS Table 1.1-1 Rev. Amend. 69	Reference Attached: TS p. 1.0-7

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3037-02-B

Question Source:	Bank #	
	Modified Bank #	Perry 2017 # RO-01
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 7

A 19-year-old Non-licensed operator you supervise has a dose of 400 mrem as of November 30th. Her documented dose history is on file.

Without exceeding Perry Administrative Control Levels (ACL), how much more dose can she receive?

A. 100

B. 600

C. 1600

D. 2000

QUESTION RO 7

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.3.4
	Importance Rating	3.2	

K&A: Knowledge of radiation exposure limits under normal or emergency conditions.

Generic

Explanation: **Answer C –** The default ACL at Perry is 2000 mrem. Since the NLO has 400 mrem already for the year, she would be allowed to only receive 1600 mrem more without exceeding an ACL

A – Incorrect – Plausible as 500 mrem is the 10CFR20 limit for a minor. 400 mrem + 100 mrem = 500 mrem.

B – Incorrect – Plausible as 1000 mrem was the recent ACL limit. This was recently changed to 2000 mrem. 400 mrem + 600 mrem = 1000 mrem.

D – Incorrect – Plausible as this is the dose if the 400 mrem already received is not subtracted from the total.

Technical Reference(s): NOP-OP-4201 Rev. 4	Reference Attached: NOP-OP-4201 pp. 10, 14, & 20

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3039-03

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 8

You are required to make a Drywell Entry at 12% reactor power.

Since this is a considered a Very High Radiation Area, you must obtain ____.

1. RP Manager written approval
2. Operations Unit Supervisor approval
3. Operations Shift Manager approval
4. Director of Site Operations approval

A. 1, 2, & 3

B. 2, 3, & 4

C. 1, 2, & 4

D. 1, 3, & 4

QUESTION RO 8

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.3.12
	Importance Rating	3.2	

K&A: Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

Generic

Explanation: **Answer D –** IAW NOP-OP-4101, entry into a Very High Rad Area requires RPM written approval, Operations Shift Manager approval, & Director of Site Operations approval.

A – Incorrect – Unit Supervisor approval not required but Director of Site Operations approval is required.

B – Incorrect – Unit Supervisor approval not required but RP Manager written approval is required.

C – Incorrect – Unit Supervisor approval not required but Shift Manager approval is required.

Technical Reference(s): NOP-OP-4101 Rev. 16	Reference Attached: NOP-OP-4101 p 21

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3039-03-F

Question Source:	Bank #	Perry 2013 # RO-07
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 9

IAW Emergency Operating Procedures, a system can only be considered a REFLOOD SYSTEM if it has a flowrate of at least __(1)__ gpm and __(2)__ .

	1	2
A.	2100	is motor driven
B.	2100	injects outside the shroud
C.	6200	is motor driven
D.	6200	injects outside the shroud

QUESTION RO 9

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.4.17
	Importance Rating	3.9	

K&A: Knowledge of EOP terms and definitions.

Generic

Explanation: **Answer A –** IAW EOP Bases Definitions, a Reflood system is a High Capacity motor (or diesel) driven system that can inject into the RPV once it is depressurized at a rate greater than 2100 gpm.

B – Incorrect – Plausible as outside shroud injection is preferred in the EOPs. However, some Reflood Systems inject inside the shroud.

C – Incorrect – Plausible as 6200 gpm is the minimum required injection rate for steam cooling with injection from a spray system.

D – Incorrect – Plausible as 6200 gpm is the minimum required injection rate for steam cooling with injection from a spray system and outside shroud injection is preferred in the EOPs.

Technical Reference(s): EOP Bases Rev. 7	Reference Attached: EOP Bases p. 54

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-02

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 10

Overall command responsibility for a fire in the Water Treatment Building resides with (1) .

Overall command responsibility for a fire in the Owner Controlled Area that affects Plant safety resides with (2) .

	1	2
A.	Fire Brigade Leader	responding Off-Site Fire Department
B.	Fire Brigade Leader	Fire Brigade Leader
C.	responding Off-Site Fire Department	responding Off-Site Fire Department
D.	responding Off-Site Fire Department	Fire Brigade Leader

QUESTION RO 10

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.4.27
	Importance Rating	3.4	

K&A: Knowledge of "fire in the plant" procedures.

Generic

Explanation: **Answer B –** IAW ONI-P54, Fire, the Fire Brigade Leader maintains overall command responsibility for fires inside the protected area. The Water Treatment Building is inside the Protected Area. And if a situation develops where plant safety and/or operability could be affected, the Shift Manager may direct the fire brigade to respond. In this case, the Fire Brigade Leader assumes overall command responsibility.

A – Incorrect – 2nd part - plausible since the responding offsite fire department is responsible for fires in the OCA that do not affect plant safety or equipment Operability.

C – Incorrect – 1st part - plausible since the responding offsite fire department would be called in for a major fire to assist the Fire Brigade. 2nd part - plausible since the responding offsite fire department is responsible for fires in the OCA that do not affect plant safety or equipment Operability.

D – Incorrect – 1st part - plausible since the responding offsite fire department would be called in for a major fire to assist the Fire Brigade.

Technical Reference(s): ONI-P45 Rev. 25	Reference Attached: ONI-P54 pp. 26 & 41

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-05(LP)-A.9

Question Source:	Bank #	Perry 2013 # RO-29
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 11

The plant is at rated power when both Reactor Recirculation pumps trip.

How will RPV water level initially respond and what is the reason for this response?

Indicated RPV water level will ____.

A. increase due to rapid flow coast down.

B. decrease due to the runback of feedwater pumps to minimum speed.

C. increase due to the continued addition of feedwater at 100% rated feedwater flow.

D. decrease due to the lack of coolant velocity to sweep voids into the steam separator.

QUESTION RO 11

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295001	AK2.03
	Importance Rating	3.6	

K&A: Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following: Reactor water level.

Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4

Explanation: **Answer A –** Per USAR Chapter 15, Accident Analysis, a trip of both Rx Recirc pumps will cause Rx level to swell to the hi level setpoint (L8)

B – Incorrect – A Flow Control Valve runback will occur if a FW Pump trips not a FW runback.

C – Incorrect – Feedwater level control is level dominant therefore the RFPTs will start slowing as soon as RPV level goes above normal. FW will not continue at 100%.

D – Incorrect – Water level inside the should will lower due to the increased voiding but indicated RPV level is measured in the downcomer.

Technical Reference(s): USAR Chapt. 15.3 Rev. 12 & USAR Figure 15.3-2 Rev. 12, & SDM-B33 Rev. 11	Reference Attached: USAR Chapt. 15.3 p 15.3-5. & USAR Figure 15.3-2 & SDM-B33 p. 27

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3401-07

Question Source:	Bank #	
	Modified Bank #	Perry 2001 # RO-48
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 12

The plant is at rated power.

The following conditions exist:

- CRDH Pump ‘A’ running
- NCC Pump ‘A’ running
- Bus EH11 is powered from the Preferred Source

Then a bus EH11 Preferred Source Breaker trips open.

Which of the following describes the expected response of associated circuit breakers?

Bus EH11 Stub Bus breaker ____.

A. opens and NCC Pump ‘A’ breaker opens.

B. opens and CRDH Pump ‘A’ breaker remains closed.

C. remains closed and CRDH Pump ‘A’ breaker opens.

D. remains closed and NCC Pump ‘A’ breaker remains closed

QUESTION RO 12

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295003	AK3.03
	Importance Rating	3.5	

K&A: Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Load shedding.

Partial or Complete Loss of AC Power / 6

Explanation: **Answer C –** When bus EH11 loses power, the Stub Bus feeder breaker will remain closed as it has no undervoltage trip and the NCC A pump and the CRD A pump breakers will trip on undervoltage.

A – Incorrect – The Stub Bus feeder breakers do not have undervoltage trips. The NCC pump breaker will trip on undervoltage.

B – Incorrect – The Stub Bus feeder breaker does not have an undervoltage trip and the CRD pump breaker will trip on undervoltage.

D – Incorrect – The NCC pump breakers will trip on undervoltage.

Technical Reference(s): SDM-R10 Rev. 14 and ARI-H13-P877-01 Rev. 15	Reference Attached: SDM-R10 pp. 38-39 and ARI-H13-P877-01 p. 73

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-07(SG)-C

Question Source:	Bank #	Perry 2001 # RO-01
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 13

The plant was operating at rated power with the following conditions:

- All DC Buses are powered from the Normal Chargers
- MCC F1B08 is on the Alternate Source
- MCC F1D08 is on the Normal Source
- Load Centers EF1A and EF1B are in the Normal lineup
- Load Center EF1C is cross tied to and fed from Load Center EF1D

Then an electrical transient occurred.

A short time later the following annunciator alarmed:

DC BUS ED-1-B UNDERVOLTAGE (H13-P877-0002-H1)

Loss of which transformer would cause the above annunciator to alarm?

A. EHF-1-B

B. EHF-1-D

C. LF-1-B

D. LF-1-D

QUESTION RO 13

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295004	AA2.01
	Importance Rating	3.2	

K&A: Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Cause of partial or complete loss of D.C. power.

Partial or Total Loss of DC Power / 6

Explanation: **Answer B –** Transformer EHF-1-D feeds Load Center EF-1-D which feeds the Normal Charger for DC Bus ED-1-B.

A – Incorrect – Transformer EHF-1-B feeds Load Center EF-1-B but this does not feed the DC Bus ED-1-B

C – Incorrect – Transformer LF-1-B feeds the LC that feeds MCC F-1-B-08. However, since F1B08 is on the alternate source, the charger fed from this MCC would not be affected by a loss of LF-1-B.

D – Incorrect – Transformer LF-1-D feeds the MCC that supplies power to the Normal Charger for DC Bus D-1-B. However, loss of D-1-B would not cause alarm DC BUS ED-1-B UNDERVOLTAGE

Technical Reference(s): Dwg. 206-027 Rev. DDDD, Dwg. 206-051 Rev. DDD, & ARI-H13-P877-02 Rev. 18	Reference Attached: Dwg. 206-027, Dwg. 206-051, & ARI-H13-P877-02 p. 77

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R42 (#11)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 14

The plant is operating at 10% power in MODE 2.

The main turbine is rolling at 1800 rpm.

A transient resulted in a reactor scram and a Main Turbine trip.

The operator observes the following after the scram announcement:

- Reactor Pressure is 1000 psig and lowering
- Reactor Level peaked at 220 inches and is lowering
- Condenser Vacuum is 21" HgA and degrading

The only operator action was placing the Mode Switch in SHUTDOWN.

Which of the following conditions caused the reactor scram in this Mode?

A. MSIV closure signal

B. main turbine trip signal

C. high reactor pressure signal

D. high reactor water level signal

QUESTION RO 14

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295005	AK1.01
	Importance Rating	4.0	

K&A: Knowledge of the operational implications of the following concepts as they apply to MAIN TURBINE GENERATOR TRIP: Pressure effects on reactor power.

Main Turbine Generator Trip / 3

Explanation: **Answer C –** Rx Press High scram signal is the only signal not bypassed under all these plant conditions.

A – Incorrect – With the plant in MODE 2, the Mode Switch is not in RUN. The MSIV closure scram signal is bypassed with the Mode Switch not in RUN.

B – Incorrect – The main turbine will trip when RPV level > L8 (219") or if condenser vacuum is < 8.1"Hg. However, with the plant <38%, the TSV closure scram signal is bypassed. Thus, the plant will not scram on a turbine trip

D – Incorrect – With the plant in MODE 2, the Mode Switch is not in RUN. The Rx water level High scram signal is bypassed with the Mode Switch not in RUN

Technical Reference(s): SOI-C71 Rev. 24, ARI-H13-P680-05 Rev. 16, SDM-C71 Rev. 12	Reference Attached: SOI-C71 p. 86, ARI-H13-P680-05 p. 19 SDM-C71 p. 63

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3036-01(LP)-A.1 & -09(LP)-C

Question Source:	Bank #	Perry 2007-2 # RO-05
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 15

The plant was operated at rated power when a reactor scram occurred.

Current conditions are as follows:

- One control rod failed to insert and is at position 48
- One control rod is at position 04
- All other control rods fully inserted

Based on this information, the Maximum Subcritical Bank Withdraw Limit __(1)__ being exceeded and the reactor __(2)__ considered shutdown under all conditions.

	1	2
A.	is	is
B.	is	is not
C.	is not	is
D.	is not	is not

QUESTION RO 15

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295006	AK1.02
	Importance Rating	3.4	

K&A: Knowledge of the operational implications of the following concepts as they apply to SCRAM: Shutdown margin.

Scram / 1

Explanation: **Answer B –** The Maximum Subcritical Bank Withdraw Limit at Perry is all control rods are fully inserted (position "00"). Also, in order for the Rx to be considered "shutdown under all conditions", only a single control rod is assumed to be fully withdrawn. Any additional control rods not inserted to "00" would not allow the control room staff to consider the Rx shutdown under all conditions.

A – Incorrect – 2nd part - With 2 rods not at "00" the Rx is not considered shutdown under all conditions.

C – Incorrect – 1st part - The Maximum Subcritical Bank Withdraw Limit is all rods at "00" and is being exceeded.

D – Incorrect – 1st part - The Maximum Subcritical Bank Withdraw Limit is all rods at "00" and is being exceeded.
2nd part - With 2 rods not at "00" the Rx is not considered shutdown under all conditions.

Technical Reference(s): TS 1.1 Rev. Amend. 171 & EOP Bases Rev. 7	Reference Attached: TS 1.1 p. 1.0-6 & EOP Bases p. 50

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-01-C.40

Question Source:	Bank #	
	Modified Bank #	Nine Mile-2 2014 # RO-39
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 16

The plant was operating at rated power when it was necessary to abandon the Control Room.

IOI-11, Shutdown From Outside Control Room, Attachment 20 - Control Room Isolation was directed.

Why is it necessary to perform this Attachment?

A. Defeat automatic operation of safe shutdown equipment.

B. Ensure interlocks associated with operation of safe shutdown equipment are defeated.

C. Ensure fire-induced circuit faults will not prevent operation of safe shutdown equipment.

D. Prevent inadvertent operation of controls by emergency personnel when Control Room is abandoned.

QUESTION RO 16

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295016	AK3.03
	Importance Rating	3.5	

K&A: Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT: Disabling control room controls.

Control Room Abandonment / 7

Explanation: **Answer C –** Att. 20 is only performed if the Control Room is abandoned due to a fire. This Attachment isolates controls for safe shutdown equipment to ensure a fire does not prevent operation of the equipment.

A – Incorrect – Plausible as transferring control to the RSD panel will defeat most interlocks for safety systems. However, this attachment is for Control Room Isolation only.

B – Incorrect – Plausible as transferring control to the RSD panel will defeat automatic operation of most systems. However, this attachment is for Control Room Isolation only.

D – Incorrect – Plausible as this is a side benefit although this is not the purpose.

Technical Reference(s): IOI-11 Rev. 38 and Lesson Plan OT-Combined-C61 Rev. 5	Reference Attached: IOI-11 pp. 9 & 119 and OT-Combined-C61 p 14

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-combined-C61-G.2

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 17

The plant is at rated power.

ECC Pump B was running for surveillance testing when it tripped due to a motor fault.

The US has declared ECC Pump B INOPERABLE.

What additional action will need to be performed?

A. ESW B Loop will be declared INOPERABLE

B. Control Complex Chiller B will be declared INOPERABLE

C. HPCS will be verified OPERABLE by administrative means

D. SVI-R10-T5227, Off-Site Power Availability Verification will be performed

QUESTION RO 17

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295018	2.2.37
	Importance Rating	3.6	

K&A: Ability to determine operability and/or availability of safety related equipment.

Partial or Complete Loss of CCW / 8

Explanation: **Answer B –** With the loss of ECC B pump, TS require that the associated systems or components be declared INOP immediately (<1-hour action). Control Complex Chiller B is served by ECC B pump.

A – Incorrect – Plausible as the Unit 2 ECC piping is connected to ESW B via isolated 2P42 valves. These valves are maintained isolated to ensure operability of ESW B. (TS Bases)

C – Incorrect – Plausible is this is a 1 hour Required Action for RCIC if ECC A were Inop.

D – Incorrect – Plausible as this is a 1 hour Required Action if the associated DG were to be declared Inop. However, ECC will not cause inoperability of ESW. But, inoperability of ESW will cause inoperability of ECC

Technical Reference(s): TS 3.7.10 Rev. Amend. 69 & SDM-P42 Rev. 12	Reference Attached: TS 3.7.10 p 3.7-19 and SDM-P42 pp. 2-3

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-P42 (#30)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 18

Unit 1 Service Air Compressor 1P51-C001 is running in Lead.

Then annunciator INSTRUMENT AIR HEADER PRESSURE LOW, H13-P870-02-B3 alarms.

The standby air compressor will auto start at a pressure of __(1)__ psig.

The 1P52-F050, SA/IA XCONN VALVE will automatically close based on low pressure in the Instrument Air __(2)__ .

	1	2
A.	107	Receiver
B.	107	Header
C.	90	Receiver
D.	90	Header

QUESTION RO 18

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295019	AK3.02
	Importance Rating	3.5	

K&A: Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Standby air compressor operation.

Partial or Complete Loss of Instrument Air / 8

Explanation: **Answer A –** The P52-F050 valve will close on a low air pressure (90 psig) signal from the Instrument Air receiver. The standby air compressor will auto start at 107 psig in respective compressor discharge line to the receiver.

B – Incorrect – Plausible since the annunciator is sensed on the header rather than the receiver.

C – Incorrect – Plausible since the cross connect valve will auto close at 90 psig.

D – Incorrect – Plausible since the cross connect valve will auto close at 90 psig and since the annunciator is sensed on the header rather than the receiver.

Technical Reference(s): SOI-P51/52 Rev. 32, ONI-P52 Rev. 18, ARI-H13-P870-02 Rev. 8, & D-302-241 Rev. DD	Reference Attached: SOI-P51/52 pp. 4 & 20, ONI-P52 p 16, ARI-H13-P870-02 p. 9, and D-302-241

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-P51_52 (#'s 12 & 18)

Question Source:	Bank #	
	Modified Bank #	Perry 2013 # RO-62
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 19

The plant scrammed from 50% power yesterday.

The following conditions exist:

- Recirc pumps have been shutdown to minimize seal wear IAW SOI-B33
- RWCU A pump is in Normal Recirculation Mode
- RHR B pump was tagged out for bearing replacement 2 days ago
- RHR A loop is in Shutdown Cooling
- Rx coolant temperature is being maintained in a 100 to 110 °F band

Then, an hour ago, due to an electrical problem, 1E12-F003A, RHR A HX'S OUTLET VALVE closed and cannot be reopened.

Based on these conditions, which of the following will provide the most accurate Rx coolant temperature in order to determine heat-up rate?

Refer to the attached pictures of recorders:
- 1B21-R643, REACTOR VESSEL TEMP MONITORING on H13-P614
- 1E12-R601 RHR TEMPERATURES on H13-P601

Attachments Provided
Reference Provided: IOI-11(Modified)

A. RHR INLET TO HX (point 1) on 1E12-R601

B. BOTTOM HEAD DRAIN (point 4) on 1B21-R643

C. VESSEL HEAD FLANGE (point 1) on 1B21-R643

D. RHR HX WATER DISCHARGE (point 5) on 1E12-R601

QUESTION RO 19

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295021	AA2.04
	Importance Rating	3.6	

K&A: Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING: Reactor water temperature.

Loss of Shutdown Cooling / 4

Explanation: **Answer D –** With the E12-F003B valve closed, the RHR HX WATER DISCHARGE temperature is the most accurate as RHR pump is circulating Rx coolant. Candidate must evaluate conditions in stem and compare with conditions in IOI-12.

A – Incorrect – This would be true if 1E12-F003B was open enough to cause HX Discharge temperature to be less than HX Inlet temperature.

B – Incorrect – This would provide an accurate reading if a Recirc pump is in operation. But since both recirc pumps OFF, the Bottom Head Drain provides good trending data, but not accurate RPV water temperature..

C – Incorrect – This will provide a trend to RPV temp but lags actual coolant temperature. Therefore, it is not the most accurate.

Technical Reference(s): IOI-12 Rev. 17	Reference Attached: IOI-12 pp. 8-11

Proposed references to be provided to applicants during examination: IOI-12 (modified – will not help on RO-19)

Learning Objective (As available): OT-COMBINED-E12-E.1 and OT-3046-01(LP)-A

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Pictures of recorders B21-R634 & E12-R601 provided.

QUESTION RO 20

The plant is operating at full power with the following conditions:

- Fuel shuffle is in progress in the Fuel Handling Building in preparation for the upcoming refueling outage
- FHB HVAC Supply Fan A (M40-C001A) is in operation
- FHB HVAC Exhaust Fans A and B (M40-C002A & B) are in operation

An event occurs that damages numerous Spent Fuel Bundles with the following results:

- All FHB Ventilation Exhaust Airborne Radiation Monitor Gas (D17-K716) module indications are offscale high.
- Spent Fuel Pool (D21-K332) and Fuel Prep Pool (D21-K322) Area Radiation Monitor indications are reading 12,000 mr/hr.
- The radiation release rate is at the ALERT Emergency Action Level

Based on the above information:
The Control Room Operator would __(1)__ .
Entry into EOP(s) __(2)__ is required.

	1	2
A.	verify FHB HVAC Supply Fan A is tripped	EOP-3, Secondary Containment Control <u>and</u> EOP-5, Radioactivity Release Control
B.	scram the Reactor and Emergency Depressurize	EOP-3, Secondary Containment Control <u>and</u> EOP-5, Radioactivity Release Control
C.	verify FHB HVAC Supply Fan A is tripped	EOP-3, Secondary Containment Control <u>only</u>
D.	scram the Reactor and Emergency Depressurize	EOP-3, Secondary Containment Control <u>only</u>

QUESTION RO 20

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295023	2.4.6
	Importance Rating	3.7	

K&A: Knowledge of EOP mitigation strategies.

Refueling Accidents / 8

Explanation: **Answer A –** The initial action of EOP-3 is to trip or verify tripped ventilation systems in the affected areas. Additionally, listed are entry conditions for both EOP-3 (area rad levels) and EOP-5 (off-site releasee at the Alert level)

B – Incorrect – Plausible since this is the action required if a primary system leak was the cause of the elevated rad levels.

C – Incorrect – Entry into EOP-5 is also required based on Off-site release rate at the Alert level.

D – Incorrect – Plausible since this is the action required if a primary system leak was the cause of the elevated rad levels. Also, entry into EOP-5 is also required based on Off-site release rate at the Alert level.

Technical Reference(s): EOP-3 & EOP-5 Chart Rev. G and EOP-03 Bases Rev. 7	Reference Attached: EOP-3 & EOP-5 Chart and EOP-03 pp. 13-14, & 72

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-15-C1, -17-B, & 17-D1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 21

The plant was operating at rated power when a transient occurred resulting in a large leak in the drywell.

The resultant high drywell pressure causes drywell bypass leakage to increase.

If the situation continues to degrade, (1) will be the first limit in danger of being exceeded.
IAW EOP-2, Containment Control, Containment Spray is required to be initiated when containment pressure cannot be maintained less than (2) psig.

	1	2
A.	PCL	8
B.	PCL	15
C.	PSP	8
D.	PSP	15

QUESTION RO 21

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295024	EK3.08
	Importance Rating	3.7	

K&A: Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL PRESSURE: Containment spray: Plant-Specific.

High Drywell Pressure / 5

Explanation: **Answer C –** Per the EOP Bases, Containment Spray is initiated when Containment Pressure cannot be maintained < 8 psig to ensure PSP is not exceeded. At Perry a failure of the DW could result in challenging containment integrity by exceeding the Pressure Suppression Pressure (PSP).

A – Incorrect – Plausible since if PSP were to be exceeded, then PCL could be challenged if pressure were to continue to rise. However, Containment Spray is initiated to avoid exceeding PSP. Containment Venting is performed to avoid exceeding PCL.

B – Incorrect – Plausible since if PSP were to be exceeded, then PCL could be challenged if pressure were to continue to rise. However, Containment Spray is initiated to avoid exceeding PSP. Containment Venting is performed to avoid exceeding PCL. Fifteen psig is plausible since Containment Venting is done when containment pressure exceeds 15 psig.

D – Incorrect – Plausible since Containment Venting is done when containment pressure exceeds 15 psig.

Technical Reference(s): EOP-2 Bases Rev. 5	Reference Attached: EOP-2 pp. 64-65

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-09-C.1.C

Question Source:	Bank #	
	Modified Bank #	Perry 2019 # RO-21
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 22

The plant was operating at 40% power following a refuel outage.

A grid disturbance resulted in a Main Turbine trip and reactor scram.

Some Bypass Valves failed to operate after the Scram.

RPV pressure peaked at 1110 psig and lowered to a steady value of 940 psig.

Bypass Valve # 1 is currently 20% open.

Which of the following describes how many SRVs should have opened following the scram and currently remain open?

A. 1 SRV opened, 0 SRVs remain open

B. 1 SRV opened, 1 SRV remains open

C. 2 SRVs opened, 1 SRVs remain open

D. 2 SRVs opened, 2 SRVs remain open

QUESTION RO 22

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

K&A: Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: Safety/relief valves: Plant-Specific.

High Reactor Pressure / 3

Explanation: **Answer D –** When Rx pressure went > 1103 psig, B21-F051D opened and armed Lo-Lo-Set. When LLS armed it lowered the opening setpoint of B21-F051C to 1073 psig and it also opened. With BPV #1 20% open and Rx pressure stable at 940 psig, neither of the LLS SRVs reached the reset setpoints. Thus, both remain open.

A – Incorrect – Plausible if the LLS function were not armed. If so, the Relief Function closure setpoint of B21-F051D would continue to be 1103 psig.

B – Incorrect – Plausible since at a pressure of 1110 psig, one SRV will open. However, the LLS function is armed at 1103 psig causing 2 SRVs to open. Also, if incorrectly assumed that only 1 SRV opened, the SRV would stay open because Rx pressure is greater than the reclosure setpoint.

C – Incorrect – Plausible since 2 SRVs will open and the reclosure setpoint for 4 LLS SRVs is 946 psig. However, B21-F051C reclosure setpoint is 936 psig after LLS is initiated.

Technical Reference(s): ONI-B21-1 Rev. 11 & PDB-R01 Rev. 40	Reference Attached: ONI-B21-1 p. 12 & PDB-R01 p. 113

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21_N11-F & -N

Question Source:	Bank #	Perry 2001 # RO-46
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 23

The plant is operating at rated power.

A leaking SRV caused Suppression Pool temperature to rise.

RHR A loop was started in Suppression Pool Cooling mode IAW SOI-E12.

Suppression Pool temperature is rising very slowly and is currently 96 °F.

RHR Loop A flow indicates 7300 gpm with E12-F003A, RHR A HX'S OUTLET VALVE and E12-F048A, RHR A HX'S BYPASS VALVE throttled mid position.

The Unit Supervisor directs you to lower Suppression Pool temperature.

Which of the following actions are approved to lower Suppression Pool temperature?

A. First throttle open E12-F003A, then throttle closed E12-F048A

B. First throttle closed E12-F003A, then throttle open E12-F048A

C. First throttle open E12-F048A, then throttle closed E12-F003A

D. First throttle closed E12-F048A, then throttle open E12-F003A

QUESTION RO 23

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295026	EK2.01
	Importance Rating	3.9	

K&A: Knowledge of the interrelations between SUPPRESSION POOL HIGH WATER TEMPERATURE and the following: Suppression pool cooling.

Suppression Pool High Water Temperature / 5

Explanation: **Answer D –** With SP temp at 96 °F EOP-2 would have been entered. The SOI-E12 flow band for SP Cooling is 7100-7300 gpm. Since flow is at the top of the band, the operator must first throttle closed on E12-F048 (HX Bypass valve) to 7100 gpm then throttle open on E12-F003A (HX Outlet valve) to 7300 gpm. The operator would repeat these steps until SP temperature starts to lower.

A – Incorrect – Opening the E12-F003 valve first would raise RHR flow outside the approved flow band.

B – Incorrect – Closing E12-F003A and opening E12-F048A would cause SP temperature to rise.

C – Incorrect – Closing E12-F003A and opening E12-F048A would cause SP temperature to rise.

Technical Reference(s): SOI-E12 Rev. 75	Reference Attached: SOI-E12 pp. 88-90

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-06-C

Question Source:	Bank #	
	Modified Bank #	RQL-0073
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 24

A LOCA has occurred, the RPV level indications in the Control Room are as follows:

- Narrow Range 180 inches
- Shutdown Range 190 inches
- Upset Range 195 inches

Current Plant Parameters are:

- RPV Pressure 40 psig
- Drywell temperature 255 °F
- Containment temperature 290 °F

Which of the following lists the level instrument(s) that may be used, if any, to determine RPV level?

Reference Provided: EOP-SPI Supplement (partial-modified)

A. Upset range only

B. None can be used

C. Narrow range only

D. Narrow, Shutdown and Upset range

QUESTION RO 24

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295027	EK2.02
	Importance Rating	3.2	

K&A: Knowledge of the interrelations between HIGH CONTAINMENT TEMPERATURE (MARK III CONTAINMENT ONLY) and the following: Components internal to the containment: Mark-III.

High Containment Temperature (Mark III Containment Only) / 5

Explanation: **Answer B –** Per the steam tables, RPV sat temperature is 287 °F. Containment temperature is 290 °F and is greater than RPV Sat. temperature. Therefore, per the Level Caution in EOP-1 Bases, RPV level cannot be determined.

A – Incorrect – This is plausible if goes the wrong direction on EOP-SPI Supplement Figure 2c with Containment temperature and do not note the saturation temp.

C – Incorrect – Plausible if does not note the saturation temp.

D – Incorrect – Plausible if goes the wrong direction on EOP-SPI Supplement Figure 2c with Drywell temperature and Containment temperature and do not note the saturation temp.

Technical Reference(s): EOP-1 Rev. 8& EOP-SPI Supplement Rev. 8	Reference Attached: EOP-1 pp. 28-29 & EOP-SPI Supplement pp. 3-4 & 6

Proposed references to be provided to applicants during examination: EOP-SPI Supplement (partial-modified)

Learning Objective (As available): OT-3402-01-D

Question Source:	Bank #	RQL-1379
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 25

Conditions are as follows:

- Suppression Pool level has lowered to 16 feet due to a leak.
- The Reactor is Shutdown with all Control Rods inserted.

Which of the following would open the Suppression Pool Makeup (SPMU) valves?

A. Suppression Pool level remains at this level for > 30 minutes.

B. The SUPR POOL MAKE-UP A FULL FLOW TEST PERM switches are placed in TEST

C. The SUPR PL MAKE-UP MANUAL INITIATION pushbuttons are armed and Depressed

D. Each Suppression Pool Makeup Shutoff Valve is manually opened individually with the control switches

QUESTION RO 25

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295030	EA1.04
	Importance Rating	4.0	

K&A: Ability to operate and/or monitor the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Suppression pool make-up system: Mark-III.

Low Suppression Pool Water Level / 5

Explanation: **Answer B –** The Supr Pool Make-Up A Full Flow Test Perm switches simulate a LOCA signal. Therefore, with a SP level < 16.5 feet, turning the keylock switches will immediately initiate SPMU.

A – Incorrect – Plausible since the 30-minute timer is initiated following an RHR LOCA.

C – Incorrect – Plausible since this will work if an RHR LOCA signal is present and 30 minutes have not elapsed.

D – Incorrect – Plausible since the valves can be opened one at a time using the control switches. However, the valves are interlocked and both valves in a line cannot be opened with the control switches at the same time.

Technical Reference(s): SDM-G43 Rev. 6	Reference Attached: SDM-G43 p. 26

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-G43-G

Question Source:	Bank #	RQL-1239
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 26

The plant is in Cold Shutdown with the following conditions:

- Both Reactor Recirculation Pumps are shutdown
- RHR Loop 'A' is in the Shutdown Cooling Mode
- RPV water level band is 250 to 260 inches

Which of the following describes the importance of maintaining RPV water level in the assigned band if RHR 'A' loop of Shutdown Cooling is lost?

Maintaining reactor water level in the designated band will ____.

A. prevent a low reactor water level scram signal when a Reactor Recirculation Pump is started

B. prevent reactor coolant thermal stratification by ensuring natural circulation flow is maintained

C. provide an adequate margin to "time to boil" point while starting RHR 'B' loop of Shutdown Cooling

D. provide an adequate vessel inventory for alternate methods of decay heat removal that utilize feed and bleed evolutions

QUESTION RO 26

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295031	EK1.02
	Importance Rating	3.8	

K&A: Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL: Natural circulation: Plant-Specific.

Reactor Low Water Level / 2

Explanation: **Answer B –** Maintaining the vessel water level to >245" allows a natural circulation path between inside and outside the shroud.

A – Incorrect – Plausible since SOI-B33 P&L 2.1 warns against starting recirc pumps with reduced reactor water level which can cause a scram, however this is not the bases for this P&L.

C – Incorrect – Water levels >245" will ensure natural circulation is maintained. However, it will not ensure the "time to boil point" will not be exceeded.

D – Incorrect – Plausible since feed/bleed evolutions are used for alternate decay heat removal but this is not the reason for elevated water level for maintaining RPV water level >245".

Technical Reference(s): IOI-12 Rev. 17	Reference Attached: IOI-12 p. 4

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3046-01(LP)-A

Question Source:	Bank #	Perry 2007 # RO-09
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 27

The plant was operating at rated power when an ATWS occurred.

RPV level was being maintained in a level band of 50" to 100" with the MFP.

EOP-04-4, Emergency Depressurization has been entered and ED has been directed due to a containment problem.

The following conditions exist:

- ECCS and Feedwater were terminated per the Hardcards
- EOP-SPI 2.3, Bypass MSIVS And ECCS Interlocks was performed
- 8 SRVs open
- Reactor power 2%
- Level Band 50" to 100"

As RPV pressure lowers to 600 psig RPV level goes out of band low and the US is informed.

Which of the following actions may be performed to restore RPV level to the required band?

Commence feeding ____.

A. immediately with the MFP to restore level in band

B. with the RFBPs when RPV pressure decreases below 180 psig

C. with either RHR A or RHR B, outside the shroud, only after RPV pressure decreases below 160 psig

D. with either RHR A or RHR B, outside the shroud, as soon as RPV pressure decreases below RHR pump shutoff head

QUESTION RO 27

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295037	EA2.06
	Importance Rating	4.0	

K&A: Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Reactor pressure.

Scram Condition Present and Reactor Power Above APRM Downscale or Unknown / 1

Explanation: **Answer C –** Per EOP-1A Step LP/L-13, when RPV pressure is < MSCP for 8 SRV's open (160 psig) commence feeding using outside the shroud systems

A – Incorrect – Plausible as this is acceptable if initial Rx power was <4% when evaluating the Containment Override IWE. However, since the level band was 50-100 inches, this means Rx power was >4% when T&P was directed.

B – Incorrect – Plausible since the RFBP are used to feed when RPV pressure is < 180 psig. However, the operator must wait until MSCP is reached to commence feeding.

D – Incorrect – Plausible since RHR may be used at this point but feeding must wait for pressure to decrease below 160 psig. RHR shutoff head is 280 psig.

Technical Reference(s): EOP-01A Rev. 11	Reference Attached: EOP-01A pp. 70-73

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-11-D.1.A

Question Source:	Bank #	RQL-22866
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 28

The plant was operating at rated power when a steam leak developed on the main steam line header going to the #1 Bypass valve.

The Shift Manager has declared an ALERT and entered EOP-05, Radioactive Release Control due to the leak.

EOP-05 directs restarting the (1) system if it is shutdown.

The correct basis for this action is to provide a (2) .

	1	2
A.	Steam Tunnel Cooling	filtered release
B.	Steam Tunnel Cooling	monitored release
C.	Heater Bay Building HVAC	filtered release
D.	Heater Bay Building HVAC	monitored release

QUESTION RO 28

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295038	2.1.20
	Importance Rating	4.6	

K&A: Ability to interpret and execute procedure steps.

High Offsite Radioactivity Release Rate / 9

Explanation: **Answer D –** Per step RRC-1 of EOP-05 the Heater Bay Building HVAC is to be started if shutdown. The Bases for this EOP step states that this is to assure that radioactivity is discharged through a monitored release point.

A – Incorrect – Steam Tunnel cooling is plausible since a leak in steam tunnel could be aided by operation of this system. However, source of leak is not in steam tunnel, but just outside steam tunnel in Turbine Building. Also steam tunnel cooling system does not contain any filters for capturing radioactivity.

B – Incorrect – Steam Tunnel cooling is plausible since a leak in steam tunnel could be aided by operation of this system. However, source of leak is not in steam tunnel, but just outside steam tunnel in Turbine Building. Steam Tunnel cooling air is distributed into the Steam Tunnel and then discharges to either the Turbine Building or Auxiliary Building both of which are exhausted through monitored release points.

C – Incorrect – Plausible since step RRC-1 of EOP-05 requires the Heater Bay Building HVAC is to be started if shutdown. However, the Heater Bay Building HVAC system does not contain any filters for capturing radioactivity.

Technical Reference(s): EOP-03 Bases, Rev. 7, ODCM Rev 22	Reference Attached: EOP-03 Bases p 74, ODCM p 30

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-15

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 29

The plant is operating at 100% power with Control Room HVAC Train A in normal and Control Room HVAC Train B in standby.

The following then occurs:

- Annunciator CONT RM EMERG RCIRC A CHAR FLTR TEMP HIGH (H13-P904-01-A4) alarmed
- The Fire Control Monitoring Station (FCMS) reports smoke detected in duct of Control Room HVAC Train A
- CONT RM EMG RCIRC A CHAR FLTR TEMP, M26-R032A indicates 260 °F and increasing

Based on this information, the operator will ____.

A. manually initiate deluge by opening the local deluge supply isolation valve

B. confirm auto initiation of charcoal deluge system on smoke in HVAC Train A

C. confirm auto initiation of charcoal deluge system on high charcoal temperature

D. manually initiate deluge by arming and depressing the CONT RM EMG RCIRC A CHAR FLTR DELUGE switch on H13-P904

QUESTION RO 29

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	600000	AA1.05
	Importance Rating	3.0	

K&A: Ability to operate and/or monitor the following as they apply to PLANT FIRE ON SITE: Plant and control room ventilation systems.

Plant Fire On Site / 8

Explanation: **Answer A –** When indications of a fire in the HVAC charcoal filters exist, the deluge system must be manually lined up locally. All automatic features have been defeated.

B – Incorrect – Automatic initiation of charcoal deluge was eliminated. Initiation must be done manually.

C – Incorrect – Automatic initiation of charcoal deluge was eliminated. Initiation must be done manually.

D – Incorrect – The arm & depress switch will only trip the running fans and prevent a fan start. It will no longer initiate deluge.

Technical Reference(s): ARI-H13-P904-01 Rev. 12, SOI-P54(WTR) Rev 28, SDM-M25/26 Rev 7	Reference Attached: ARI-H13-P904-01 p. 11, SOI-P54(WTR) p 52, SDM-M25/26 p 27

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M25_26-C

Question Source:	Bank #	Perry 2015 # RO-29
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 30

Perry is operating with the following conditions:

- Main Generator Terminal Voltage 21.9 KV
- Main Generator Megawatts 1280 Mwe
- Main Generator VARs 100 MVARs lagging
- Main Generator Hydrogen Pressure 72 psig

A grid disturbance results in the following:

- Steadily increasing grid voltage
- The Main Generator voltage regulator shifts to MANUAL

With no operator action, this transient could result in ____.

Reference Provided: PDB C02

A. overheating the Main Generator stator windings

B. a Generator Lockout due to reverse power relay trip

C. a Generator Lockout due to field over-excitation relay trip

D. exceeding the Generator Underexcited Reactive Amp Limit

QUESTION RO 30

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	700000	AK1.03
	Importance Rating	3.3	

K&A: Knowledge of the operational implications of the following concepts as they apply to GENERATOR VOLTAGE AND GRID DISTURBANCES: Under-excitation

Generator Voltage and Electric Grid Disturbances / 6

Explanation: **Answer D –** If grid voltage rises, gen VARs will lower. If voltage mismatch is big enough, VARs can lower enough to cause the gen to operate in the LEAD area of the Generator Capability Curve, and possibly to the point at which the Under Excitation Limit (UEL) is exceeded.

A – Incorrect – Could happen if gen voltage was higher than grid voltage to point where picking up additional VARS would result in exceeding the capability curve (B-C) and hydrogen pressure of 60 psig.

B – Incorrect – Reverse power trip occurs when real load (MW) is reduced to the point where the grid supplies the generator. The given conditions would not result in lowering MW.

C – Incorrect – Field over-excitation results from field current too high, which can be caused by the voltage regulator raising generator output voltage (VAR too high).

Technical Reference(s): PDB-C002 Rev 6, SOI-N32/41 Rev 38, & LP OT-COMBINED-N41_51 Rev 3	Reference Attached: PDB-C002 p 4, SOI-N32/41 p 7, & LP OT-COMBINED-N41_51 p. 34

Proposed references to be provided to applicants during examination: PDB C02

Learning Objective (As available): OT-COMBINED-N41_N51-H & -O

Question Source:	Bank #	Perry 2015 # RO-30
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 31

The plant is operating at 80% power.

Two Circulating Water Pumps in service

Then annunciator LP CNDR VACUUM LO, ARI-H13-P680-0002-A1 alarms.

LP Condenser pressure indicates 5.3 inches HgA and degrading slowly.

Which of the following automatic actions is expected to occur first?

A. Main Turbine Trip

B. Main Steam Isolation Valves Close

C. Main Turbine Bypass Valve operation is prevented

D. Turbine Load Limit Setback and a Reactor Recirc Flow Control Valve runback

QUESTION RO 31

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295002	AK3.09
	Importance Rating	3.2	

K&A: Knowledge of the reasons for the following responses as they apply to LOSS OF MAIN CONDENSER VACUUM: Reactor power reduction.

Loss of Main Condenser Vacuum / 3

Explanation: **Answer D –** When vacuum degrades to >5.6 inches and <3 Circ Water Pumps are operating; a Flow Control Valve Runback and a Load Limit Setback will occur to prevent a turbine trip on low vacuum.

A – Incorrect – Plausible since a Main Turbine trip will occur at 8.1" HgA condenser pressure

B – Incorrect – Plausible since at 21.5 inches HgA, MSIVs will Close.

C – Incorrect – Plausible since at 20.0" HgA, Main Turbine Bypass Valve operation is prevented.

Technical Reference(s): ARI-H13-P680-08 Rev. 21	Reference Attached: ARI-H13-P680-08 p. 31

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-N62 (#11) and OT-3035-Day10(SG)-C

Question Source:	Bank #	
	Modified Bank #	Perry 2007 # RO-31
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 32

The plant is shut-down for a refueling outage.

RPV level is being raised to the RPV flange.

Then a loss of Shutdown Cooling has occurred.

At 0400 Reactor pressure was 40 psig.

At 0415 Reactor pressure is 60 psig.

What is the approximate heat up rate based on the above information?

Reference Provided: Steam Tables

A. 21 °F/hr.

B. 82 °F/hr.

C. 102 °F /hr.

D. 137 °F/hr.

QUESTION RO 32

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295008	AA2.04
	Importance Rating	3.1	

K&A: Ability to determine and/or interpret the following as they apply to HIGH REACTOR WATER LEVEL: Heatup rate: Plant-Specific.

High Reactor Water Level / 2

Explanation: **Answer B –** Per interpolation of the steam tables, (60 psig) 307.319 - (40 psig) 286.703 = 20.616° (ΔT) X 4 = 82.464 °F/hr.

A – Incorrect – This is the correct HU rate not multiplied by 4. Per interpolation of the steam tables, (60 psig) 307.319 - (40 psig) 286.703 = 20.616°F.

C – Incorrect – This is the value if didn't convert psig to psia. 292.695 °F - 267.224 °F = 25.471° (ΔT) x 4 = 101.884 °F/hr.

D – Incorrect – This is the value if convert psig to psia backward. 274.42 °F - 240.035 °F = 34.385° (ΔT) x4 = 137.54 °F/hr.

Technical Reference(s): Steam tables	Reference Attached: x

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective (As available): OT-3035-11(LP)-A

Question Source:	Bank #	INL-36836
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 33

The Plant is operating at 90% rated power.

Feedwater Heater 6B level switch, 1N25-N0263B, failed causing 6B Feedwater Heater to isolate.

The appropriate ONI's have been entered.

If no operator action is taken, Reactor Power will initially __(1)__ .

The __(2)__ side of the FW heater has isolated.

	1	2
A.	rise and stabilize at a higher value	water
B.	rise then return to the initial value	water
C.	rise and stabilize at a higher value	steam
D.	rise then return to the initial value	steam

QUESTION RO 33

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295014	AK1.06
	Importance Rating	3.8	

K&A: Knowledge of the operational implications of the following concepts as they apply to INADVERTENT REACTIVITY ADDITION: Abnormal reactivity additions.

Inadvertent Reactivity Addition / 1

Explanation: **Answer C –** Due to isolating Extraction Steam to the FW heater, Final Feedwater Temperature lowers and adds positive reactivity to the Rx. Therefore, Rx power will continue to rise until FW temperature stabilizes at a lower temperature.

A – Incorrect – 2nd part – plausible since the water side of FW Heaters 1 and 2 isolates on a Heater High Level signal.

B – Incorrect – 1st part – plausible as this is the phenomena seen on a HPCS inadvertent injection and 2nd part – the water side of FW Heaters 1 and 2 isolates on a Heater High Level signal.

D – Incorrect – 1st part – plausible as this is the phenomena seen on a HPCS inadvertent injection.

Technical Reference(s): ONI-N36 Rev. 18, ARI-H13-P870-05 Rev. 5, and LP OT-3302-05 (GFE) Rev. 4	Reference Attached: ONI-N36 p. 5, ARI-H13-P870-05 p. 31, and LP OT-3302-05 (GFE) pp. 27-28

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-N36_25_26-J.2

Question Source:	Bank #	
	Modified Bank #	Perry 2010 # RO-01
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 34

RPS Power Source Selector Switch is in NORM.

RPS MG Set B, 1C71-S001B Electrical Protection Assembly, 1C71-S003B, inadvertently tripped.

Based on this information, the CVCW OTBD RETURN MOV ISOL VLV, 1P50-F150 is __(1)__ and the CVCW INBD RETURN MOV ISOL VALVE, 1P50-F140 is __(2)__ .

	1	2
A.	open	closed
B.	open	open
C.	closed	closed
D.	closed	open

QUESTION RO 34

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295020	AA1.01
	Importance Rating	3.6	

K&A: Ability to operate and/or monitor the following as they apply to INADVERTENT CONTAINMENT ISOLATION: PCIS/NSSSS.

Inadvertent Containment Isolation / 5 & 7

Explanation: **Answer A –** Since the RPS Power Source Selector Switch is in NORM, a trip of the 1C71-S003B EPA will cause a loss of RPS Bus B. This will in turn cause the inboard containment isolation valves to close.

B – Incorrect – 2nd part - The inboard containment isolation valves will isolate a loss of RPS Bus B.

C – Incorrect – 1st part - The outboard containment isolation valves are not affected by a loss of RPS Bus B.

D – Incorrect – 1st part - The outboard containment isolation valves are not affected by a loss of RPS Bus B. 2nd part - The inboard containment isolation valves will isolate a loss of RPS Bus B.

Technical Reference(s): ONI-C71-2 Rev. 9 and SDM-C71 Rev. 12	Reference Attached: ONI-C71-2 pp. 9 & 11 and SDM-C71 pp. 12-13

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-11(LP)-A.1

Question Source:	Bank #	Perry 2013 # RO-44
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 35

The plant was operating at rated power.

HPCS was being operated in the CST to CST Mode for testing.

Then an SRV inadvertently opened.

Suppression Pool level rose to 18.5’ before the SRV was successfully reclosed.

Based on this information, HPCS ____.

A. operation will be unaffected

B. pumps the Suppression Pool to the CST

C. operates on minimum flow with suction on the CST

D. operates on minimum flow with suction on the Suppression Pool

QUESTION RO 35

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295029	EK2.03
	Importance Rating	3.3	

K&A: Knowledge of the interrelations between HIGH SUPPRESSION POOL WATER LEVEL and the following: HPCS: Plant-Specific.

High Suppression Pool Water Level / 5

Explanation: **Answer D –** Suppression Pool high level causes suction shift to the Suppression Pool. Both Test Valves Close. This loss of flow path causes the Minimum Flow Valve to open.

A – Incorrect – Plausible since this would be true if operating in Suppression Pool Test Mode (vice CST to CST test mode).

B – Incorrect – Plausible since this would true if Suppression Pool level was < 18.4'.

C – Incorrect – Plausible since this would true if Suppression Pool level was < 18.4'.

Technical Reference(s): ARI-H13-P601-016 Rev. 20 and SDM-E22A Rev. 8	Reference Attached: ARI-H13-P601-016 p. 83 and SDM-E22A pp.67-70

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-E22A (#34)

Question Source:	Bank #	Perry 2010 # RO-36
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 36

The IB Ventilation radiation monitor, D17-K736, has a HIGH alarm locked in.

The cause of the high radiation is due to a problem in the ____.

A. Hot Tool Crib (IB-574')

B. FPCC HX room (IB-599')

C. FPCC Filter/Demin room (IB-599')

D. Post-Accident Sample room (IB-574')

QUESTION RO 36

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295033	EA2.03
	Importance Rating	3.7	

K&A: Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS: Cause of high area radiation.

High Secondary Containment Area Radiation Levels / 9

Explanation: **Answer A –** This is exhausted by the IB Sub-exhaust fan since it has a filtered flow path and can remove airborne radiation.

B – Incorrect – Plausible since this area is supplied by the IB Ventilation system. However, this area exhausts to the FHB Ventilation system.

C – Incorrect – Plausible since this area is supplied by the IB Ventilation system. However, this area exhausts to the FHB Ventilation system.

D – Incorrect – Plausible since this area is supplied by the IB Ventilation system. However, this area exhausts to the FHB Ventilation system.

Technical Reference(s): EOP-3 chart Rev. G, ODCM Rev. 22 and SDM-M33 Rev. 6	Reference Attached: EOP-3 chart – partial, ODCM p. 30 and SDM-M33 pp. 1-2

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-17A and OT-Combined-M33 (#2 & #9)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 37

A LOCA has uncovered the core and caused core damage.

EOP-01A, Level/Power Control and SAMGs, RPV, Containment, and Radioactive Release Control have been entered.

Hydrogen concentrations in the Drywell and the Containment are both increasing.

Which of the following describes the highest Containment and Drywell H2 concentrations that will allow placing both the Hydrogen Recombiners and the Hydrogen Igniters in service?

	Recombiners	Igniters
A.	5%	5%
B.	8%	5%
C.	5%	10%
D.	8%	10%

QUESTION RO 37

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	500000	2.1.32
	Importance Rating	3.8	

K&A: Ability to explain and apply system limits and precautions.

High Containment Hydrogen Concentration / 5

Explanation: **Answer A –** Per SOI-M51_56, the Recombiners must be shutdown if H2 concentration is ≥6%. Also, Per the Hydrogen Igniter S/U hardcard, Hydrogen Igniters can only be placed in service if DW H2 is <9%.

B – Incorrect – 1st part - Plausible since H2 Igniters may be placed in service if Containment H2 concentration is < 6.6%.

C – Incorrect – 2nd part – the limit for starting H2 Igniters is a H2 concentration 9% in the DW but is variable in Containment.

D – Incorrect – 1st part - Plausible since H2 Igniters may be placed in service if Containment H2 concentration is < 6.6%. 2nd part – the limit for starting H2 Igniters is a H2 concentration 9% in the DW but is variable in Containment.

Technical Reference(s): SOI-M51/56 Rev. 27, EOP-01A Rev. 11, and OAI-1703 Rev. 38	Reference Attached: SOI-M51/56 p. 4, EOP-01A p. 60, and OAI-1703 p. 60

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-M51_M56-1.14

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 38

The plant is operating at rated power.

The blue indicating light above the LPCI Injection Valve, 1E12-F042A just extinguished.

Control Room Operators confirmed the blue light bulb was good.

Then a small break LOCA occurred and the following plant conditions exist:

- Drywell Pressure 1.8 psig and increasing
- Containment Pressure 1.0 psig and increasing
- Reactor Pressure 800 psig and lowering

Based on these conditions, the LPCI Injection Valve, 1E12-F042A is ____.

A. open since the pressure permissive is met

B. open since a LOCA signal bypasses the pressure permissive

C. closed but will automatically open when the pressure permissive is met

D. closed and must be manually opened when the pressure permissive is met

QUESTION RO 38

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	203000	A1.04
	Importance Rating	3.6	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) controls including: System pressure.

RHR/LPCI: Injection Mode

Explanation: **Answer C –** 1E12-F042A is allowed to open if the system pressure downstream of the Injection valve is < 530 psig in all conditions. This condition is identified by a blue pressure permissive light above the valve hand switch. Once the valve is shut and downstream pressure is <530 psig, a 15-minute timer starts and the valve can be reopened if pressure rises >530 psig within that 15-minute period. After 15 minutes the valve cannot be reopened if pressure is >530 psig. In the case of a LOCA, the valve will automatically open when pressure is <530 psig or can be manually opened if pressure is>530 psig.

A – Incorrect – With the blue light out, the pressure permissive is not met.

B – Incorrect – The LOCA signal allows the valve to opened by the control switch (manually).

D – Incorrect – The valve will automatically open when below 530 psig.

Technical Reference(s): SDM-E12 Rev. 3	Reference Attached: SDM-E12 pp. 22, 30, 41, & 100

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-E12-F

Question Source:	Bank #	
	Modified Bank #	Perry 2007-2 # RO-21
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 39

The plant scrammed yesterday following an extended run.

The following conditions exist:

- RHR "A" is operating in Shutdown Cooling
- RPV water level is 230 inches
- Reactor coolant temperature is 130 °F and stable
- Reactor Recirculation Pump B is operating

Subsequently, a loss of RPS Bus A occurs.

It is estimated that RPS Bus A can be recovered in two hours.

The effect on Shutdown Cooling is that __(1)__ isolation occurs?
In order to comply with Technical Specifications you will __(2)__ .

	1	2
A.	only a Division 1	monitor reactor coolant temperature and pressure once per hour
B.	only a Division 1	verify two alternate methods of decay heat removal are available within 1 hour
C.	both a Division 1 and 2	monitor reactor coolant temperature and pressure once per hour
D.	both a Division 1 and 2	verify two alternate methods of decay heat removal are available within 1 hour

QUESTION RO 39

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	205000	K5.03
	Importance Rating	2.8	

K&A: Knowledge of the operational implications of the following concepts as they apply to SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE): Heat removal mechanisms.

Shutdown Cooling

Explanation: **Answer D –** A loss of either RPS bus will cause both E12-F008 & E12-F009 to isolate. Since this is the common suction line, this will cause a loss of both RHR SDC subsystems. IAW TS 3.4.10 Condition A, one method of alternate decay heat removal is necessary for each INOP RHR system. With the common suction isolated, both loops of RHR are INOP.

A – Incorrect – 1st part - Both divisions isolate. 2nd part – Monitoring temperature and pressure is only required if Recirc Pump not running.

B – Incorrect – 1st part - Both divisions isolate.

C – Incorrect – 2nd part - Monitoring temperature and pressure is only required if Recirc Pump not running.

Technical Reference(s): TS 3.4.10 Rev. amend. 69 and ONI-C71-2 Rev. 9	Reference Attached: TS 3.4.10 and ONI-C71-2 pp. 5, & 8-9

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3037-08-B & OT-COMBINED-E12-F

Question Source:	Bank #	Perry 2013 # RO-35
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 40

RHR Loop A was placed in Shutdown Cooling IAW SOI-E12, RHR System, Section 4.7 Startup For RHR A for Shutdown Cooling.

SOI-E12, RHR - Section 7.40 - Protecting Shutdown Cooling Operation is <u>not</u> being performed.

While monitoring the following valve position indicator lights on H13-P601 you would expect to see:
1) 1E12-F008, SHUTDOWN COOLING OTBD SUCT ISOL
2) 1E12-F064A, RHR PUMP A MIN FLOW VALVE

	1	2
A.	one light energized	one light energized
B.	one light energized	both lights deenergized
C.	both lights deenergized	one light energized
D.	both lights deenergized	both lights deenergized

QUESTION RO 40

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	205000	A4.05
	Importance Rating	3.2	

K&A: Ability to manually operate and/or monitor in the control room: Minimum flow valves.

Shutdown Cooling

Explanation: **Answer B –** With RHR operating in SDC, the Min Flow Valve is de-energized to prevent draining the RPV to the suppression pool in the event of a pump trip. Since Protecting Shutdown Cooling Operation is not being performed, E12-F008 should have one (red) position indicator light on.

A – Incorrect – 2nd part - Plausible since all other modes of RHR maintain the Min Flow Valve energized.

C – Incorrect – 1st part – Plausible if Protecting Shutdown Cooling Operation was being performed, as this down-powers various RHR valves if certain activities in the plant could challenge SDC operation. Additionally, E12-F008 is always down-powered if not in SDC operations for Appendix R concerns. 2nd part - Plausible since all other modes of RHR maintain the Min Flow Valve energized.

D – Incorrect – 1st part – Plausible if Protecting Shutdown Cooling Operation was being performed, as this down-powers various RHR valves if certain activities in the plant could challenge SDC operation. Additionally, E12-F008 is always down-powered if not in SDC operations for Appendix R concerns.

Technical Reference(s): SOI-E12 Rev. 75	Reference Attached: SOI-E12 pp. 8, 10, 37, 39, 46, & 245

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-E12-H

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 41

The plant was operating at rated power with LPCS operating in Test Mode

Then, the Rx was scrammed due to a steam leak

The following conditions exist:

- Reactor pressure 530 psig.
- Reactor water level lowered to 30 inches and is now 45 inches and stable
- Drywell pressure increased to 1.4 psig and is now 1.2 psig and stable

Based on the above conditions, the LPCS Injection Valve, E21-F005 ____.

A. should be overridden CLOSED per ECCS Terminate & Prevent Hardcard to prevent injection

B. will automatically open when RPV pressure drops below the injection pressure permissive

C. can be manually opened to allow injection when RPV pressure lowers below pump shutoff head

D. has automatically opened and will allow injection when RPV pressure lowers below pump shutoff head

QUESTION RO 41

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	209001	A4.03
	Importance Rating	3.7	

K&A: Ability to manually operate and/or monitor in the control room: Injection valves.

Low-Pressure Core Spray

Explanation: **Answer C –** Since no automatic initiation signal has been received (16.5" or 1.68 psig), LPCS will continue to run in Test Mode. LPCS can be used for injection by opening E21-F005 and RPV pressure lowering to <~450 psig.

A – Incorrect – Plausible since this would be done if there was an ATWS in progress.

B – Incorrect – Plausible if the Blue pressure permissive light above the E21-F005 control switch was extinguished and an automatic initiation signal was present. However, RPV pressure is already < pressure permissive (600 psig)

D – Incorrect – Plausible since this would occur if an automatic initiation signal was present.

Technical Reference(s): SOI-E21 Rev. 33	Reference Attached: SOI-E21 pp. 10 & 13

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-E21-F

Question Source:	Bank #	River Bend 2012 # RO-30
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 42

The plant is operating at rated power with Bus EH13 energized from the Preferred Source.

HPCS is operating in Full Flow Test to CST.

Then, an inadvertent HPCS Initiation signal is received.

No operator actions have been performed yet.

Based on this information, how will HPCS respond?

A. Div. 3 DG starts
Bus EH13 Preferred Source breaker trips
Div. 3 DG ties to EH13
HPCS pump restarts immediately and injects into the RPV

B. HPCS pump breaker trips
Bus EH13 Preferred Source breaker trips
Div. 3 DG ties to EH13
HPCS pump immediately restarts and injects into the RPV

C. Div. 3 DG starts and runs unloaded
Bus EH13 remains energized from the Preferred source
HPCS pump breaker remains closed
HPCS injects into the RPV

D. Div. 3 DG starts
When Div. 3 DG speed and voltage in the proper band the EH13 Preferred Source breaker trips
Div. 3 DG ties to EH13
HPCS pump starts after a 10 second time delay and injects into the RPV

QUESTION RO 42

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	209002	K1.04
	Importance Rating	3.8	

K&A: Knowledge of the physical connections and/or cause effect relationships between HIGH PRESSURE CORE SPRAY SYSTEM (HPCS) and the following: HPCS diesel generator.

High-Pressure Core Spray

Explanation: **Answer C –** Since EH13 bus voltage only lowered to 3500 V for 5 seconds, no undervoltage actions occurred and Bus EH13 remains energized from the Preferred Source. However, the Inadvertent initiation signal did start the Div. 3 DG which will run unloaded until shutdown.

A – Incorrect – The Preferred Source breaker needs Bus EH13 voltage <3800 V for 12 seconds to trip. Div. 3 DG will not tie in.

B – Incorrect – There is no trip signal for the HPCS pump breaker. Also, the Preferred Source breaker needs Bus EH13 voltage <3800 V for 12 seconds to trip. Div. 3 DG will not tie in.

D – Incorrect – On a LOOP, there is no delay on tripping the Preferred Source breaker. Also, the DG will not tie on to the bus with the given conditions. The 10 second TD is used if all ECCS pumps get an initiation signal

Technical Reference(s): SOI-E22A Rev. 40, SDM-E22A Rev. 8, & SDM- R10 Rev. 14	Reference Attached: SOI-E22A p 13, SDM-E22A pp. 21-22, & SDM- R10 p. 40

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-E22B-F.1 & N.1 and OT-Combined-R10 (#32 & #34)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 43

HPCS is operating in Full Flow Test to CST.

If a loss of Bus ED-1-C occurs, how would HPCS respond to a LOCA initiation signal?

High Pressure Core Spray _____.

A. will continue to operate in Test Mode

B. Pump will trip and be unavailable for operation

C. will automatically realign to inject into the RPV

D. cannot be manually aligned to inject from the Control Room

QUESTION RO 43

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	209002	K2.03
	Importance Rating	2.8	

K&A: Knowledge of electrical power supplies to the following: Initiation logic.

High-Pressure Core Spray

Explanation: **Answer A –** With a loss of DC power, HPCS will not automatically realign. It will continue to operate in Test Mode. However, the Min flow Valve will open on loss of DC.

B – Incorrect – The HPCS pump will not trip as breaker control power comes from ED-1-C.

C – Incorrect – The HPCS initiation logic is powered from ED-1-C. Therefore, HPCS will not automatically realign for injection.

D – Incorrect – The CST valves and the Injection valve can be operated from the Control Room as the control power for these valves comes from AC. The valves can be manually repositioned from the Control Room for injection.

These conditions were verified in the simulator on 06/13/19.

Technical Reference(s): PDB-H003 Rev. 1, ONI-R42-3 Rev. 6, and Dwgs. 208-065 Sh. 8 Rev. P, Sh. 11 Rev. R, Sh. 14 Rev. R	Reference Attached: PDB-H003 pp. 1-3, ONI-R42-3 pp. 3 & 6, and Dwgs. 208-065 Sh. 8, Sh. 11, Sh. 14

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-E22A (#s 32, 33, & 34) OT-Combined-R42 (#s 15, 24 & 34)

Question Source:	Bank #	
	Modified Bank #	Perry 2017 # RO-40
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 44

An equipment failure resulted in the loss of some 120 VAC power.

- The SLC A OUT OF SERVICE alarm has annunciated
- The SQUIB CONTINUITY meter in H13-P632 for 1C41F004A indicates 0 milliamps

If an ATWS occurs that requires boron injection, how would the Standby Liquid Control 'A' subsystem respond when the Control Room Operator places the SLC PUMP A control switch to ON?

Squib Valve 'A' will __(1)__ .
SLC Pump Suction Valve 'A' will __(2)__ .

	1	2
A.	fire	open
B.	fire	not open
C.	not fire	open
D.	not fire	not open

QUESTION RO 44

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	211000	K2.02
	Importance Rating	3.1	

K&A: Knowledge of electrical power supplies to the following: Explosive valves.

Standby Liquid Control

Explanation: **Answer C –** With the squib continuity meter reading 0 ma, there is no power to the squib valve. Therefore, the squib will not fire. However, the SLC pump suction valve will still open since this is controlled from the SLC Pump keylock switch.

A – Incorrect – With the squib continuity meter reading 0 ma, there is no power to the squib valve – it will not fire.

B – Incorrect – With the squib continuity meter reading 0 ma, there is no power to the squib valve – it will not fire and the SLC pump suction valve will still open.

D – Incorrect – The SLC pump suction valve will still open since this is controlled from the SLC Pump keylock switch.

Technical Reference(s): ARI-H13-P601-19 Rev. 21, Dwgs. 208-030 Sh. 3 Rev. Y & Sh. 5 Rev. HH, & PDB-H022 Rev. 2	Reference Attached: ARI-H13-P601-19 p 63, Dwgs 208-030 sheets 3 & 5, & PDB-H022 p. 3

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C41-F.2 and F.3

Question Source:	Bank # Modified Bank # INL-36864 New
Question History:	Previous 2 NRC Exams No
Question Cognitive Level:	Memory or Fundamental Knowledge x Comprehension or Analysis
10 CFR Part 55 Content:	55.41 x 55.43

Comments: Level of Difficulty = x

QUESTION RO 45

The plant was operating at 100% reactor power when a grid disturbance caused a generator load rejection.

RPV pressure peaked at 1125 psig and numerous SRVs responded as designed.

Two minutes after the scram Rx power was 5%.

The primary RPS scram signal that provides protection from a generator load rejection event is (1) . In response to this event the ATC would independently (2) .

	1	2
A.	TCV Fast Closure	trip Reactor Recirculation pumps
B.	TCV Fast Closure	control feedwater in MANUAL
C.	Steam Dome Pressure High	trip Reactor Recirculation pumps
D.	Steam Dome Pressure High	control feedwater in MANUAL

QUESTION RO 45

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	212000	A2.15
	Importance Rating	3.7	

K&A: Ability to (a) predict the impacts of the following on the REACTOR PROTECTION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Load rejection.

Reactor Protection

Explanation: **Answer B –** Per SDM-C71, the TCV fast closure scram is the primary scram signal. Also, during a load reject event, RPV pressure will exceed 1083 psig. The Rx high pressure signal is sealed in after 20 msec. This along with Rx power >4% for 25 seconds will cause FW controllers to shift to Manual and Minimum. The operator will need to manually control FW to control RPV level.

A – Incorrect – 2nd part - Plausible since this would be an action directed by the SRO if the RR pumps were still running. However, when RPV pressure exceeded 1083 psig and Rx power was > 4% for 25 seconds, the RR pumps tripped to OFF.

C – Incorrect – 1st part – Plausible as this is an additional scram signal that will be received during a load reject event. However, it is not the primary signal. 2nd part - Plausible since this would be an action directed by the SRO if the RR pumps were still running. However, when RPV pressure exceeded 1083 psig and Rx power was > 4% for 25 seconds, the RR pumps tripped to OFF.

D – Incorrect – 1st part – Plausible as this is an additional scram signal that will be received during a load reject event. However, it is not the primary signal.

Technical Reference(s): SDM-C71 Rev. 12, SDM- C34 Rev. 3, and ARI-H13-P680-04 Rev. 26	Reference Attached: SDM-C71 p. 31, SDM- C34 pp. 26-27, ARI-H13-P680-04 p. 11

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-B33-F, OT-Combined-C22-K, OT-Combined-C71-1.5

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 46

A plant startup is in progress with reactor power indicating on the IRMs.

IRM 'G' is indicating 80 on Range 4 when it is inadvertently placed on Range 6.

Which of the following will result from this action?

A. Half-scram RPS 'A'

B. Half-scram RPS 'B'

C. Rod withdrawal block

D. DOWN pushbutton illuminates only

QUESTION RO 46

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215003	K4.04
	Importance Rating	2.9	

K&A: Knowledge of INTERMEDIATE RANGE MONITOR (IRM) SYSTEM design feature(s) and/or interlocks which provide for the following: Varying system sensitivity levels using range switches.

Intermediate-Range Monitor

Explanation: **Answer D –** since the IRM is reading 80/125 on Range 4, going 2 ranges up would result in an IRM reading of 8 (√10 per range). This would result in the illumination of the DOWN light only.

A – Incorrect – Plausible if the IRM had been ranged 'down'. This would cause an upscale on the IRM and result in a ½ on RPS channel A.

B – Incorrect – Plausible if the IRM had been ranged 'down' and the applicant confused the IRM to RPS channel assignment. This would cause an upscale on the IRM and result in a ½ on RPS channel A.

C – Incorrect – Plausible if the initial reading on the IRM was 50/125 or less. At 80/125, down ranging 2 ranges would result in a reading of 8/125.

Technical Reference(s): SDM-C51 (IRM) Rev. 8 and ARI-H13-P680-06 Rev. 9	Reference Attached: SDM-C51 (IRM) p. 40 and ARI-H13-P680-06 p. 51

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-C51_IRM-1.14

Question Source:	Bank #	Grand Gulf 2011 # RO-02
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 47

Reactor startup is in progress following a refuel outage.

- ALL IRMs are on Range 3 or 4
- SRM A is retracted and reading 0.5 cps
- SRMs B and C are reading 5.3 x 10^4 cps
- SRM D Mode Switch is in the STANDBY position

An SRM Rod Block signal was caused by SRM ____.

A. High Flux

B. Inoperable

C. Downscale

D. Detector Not Full-In

QUESTION RO 47

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215004	A1.04
	Importance Rating	3.5	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the SOURCE RANGE MONITOR (SRM) SYSTEM controls including: Control rod block status.

Source-Range Monitor

Explanation: **Answer B –** SRM Rod Block is caused by •SRM D Mode Switch being out of OPERATE (in the STANDBY position).

A – Incorrect – Plausible since an SRM reading of $1x10^5$ gives a high flux rod block. However, SRM B & C are less than this setpoint.

C – Incorrect – Plausible since SRM A is reading 0.5 cps. However, this signal is bypassed with IRMs on range 3 or above.

D – Incorrect – Plausible since SRM A is retracted. However, this signal is bypassed with IRMs on range 3 or above.

Technical Reference(s): SDM- C51 (SRM) Rev. 8	Reference Attached: SDM- C51 (SRM) p. 34

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-C51_SRM-1.6

Question Source:	Bank #	Browns Ferry 2012 # RO-37
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams No	
Question Cognitive Level:	Memory or Fundamental Knowledge x	
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41 x	
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 48

The plant is operating at rated power when the output of the Flow Channel Summer in APRM Channel B fails to zero.

What are the consequences and what is required to mitigate the plant response to this condition?

A. Only rod block - Bypass APRM B

B. Full Scram – Perform Immediate Actions of ONI-C71 Reactor Scram

C. Only half scram - Bypass APRM B and reset the half scram per SOI-C71 RPS Power Supply Distribution

D. Rod block and half scram - Bypass APRM B and reset the half scram per SOI-C71 RPS Power Supply Distribution

QUESTION RO 48

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215005	A2.07
	Importance Rating	3.2	

K&A: Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Recirculation flow channels flow mismatch.

Average Power Range Monitor/Local Power Range Monitor

Explanation: **Answer D –** The failure of the Flow Channel Summer Card is sensed as a mismatch between Recirc flow channels. The Flow biased thermal power upscale formula is >0.628W +60.9%. When the Flow Channel Summer fails to zero, "W" goes to zero and the trip setpoint goes to 60.9%. Since Rx power is 100%, a Rod Block and ½ scram would be generated. The operator would bypass the APRM and reset the ½ scram

A – Incorrect – Plausible since a Rod Block would be received. However, this is only partially correct – will also get ½ scram. (APRM upscale gives scram and no rod block)

B – Incorrect – Plausible since the arrangement of transmitters from Recirc System could result in a full scram if the right combination of transmitters failed. However, this is a failure of the flow card.

C – Incorrect – Plausible since a ½ scram would be received. However, this is only partially correct – will also get Rod Block.

Technical Reference(s): ARI-H13-P680-06 Rev. 9	Reference Attached: ARI-H13-P680-06 pp. 35-36 & 39-40

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-C51AP_OPRM-1.6, & 1.12

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 49

The plant is operating at rated power with the following conditions:

- SVI-E51-T2001, RCIC Pump and Valve Operability Test is in progress.
- SVI-D23-T1213, Suppression Pool Average Temperature is in progress
- The RCIC Turbine is in operation.
- Current time is 1050

Refer to the attached SVI-D23-T1213 Attachment 1 for recorded data.

Which is the maximum amount of time that the RCIC Turbine may continue to be operated without exceeding the Suppression Pool average temperature limit in accordance with Technical Specifications?

Attachment Provided: SVI-D23-T1213 Attachment 1

A. 50 minutes

B. 1 hrs. 40 minutes

C. 2 hrs. 5 minutes

D. 2 hrs. 55 minutes

QUESTION RO 49

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	217000	2.2.12
	Importance Rating	3.7	

K&A: Knowledge of surveillance procedures.

Reactor Core Isolation Cooling

Explanation: **Answer B –** The suppression pool heat-up rate is 1 °F/5 min. Since the current temperature is 85 °F, it will take 1 hour 40 minutes to reach 95 °F. IAW TS LCO 3.6.2.1, the limit is ≤105 °F when testing is being performed that adds heat to the pool.

A – Incorrect – Plausible as this is the time to reach 95 °F which is the TS LCO 3.6.2.1 limit if no testing is being performed.

C – Incorrect – Plausible as this is the time to reach 110 °F which, if greater, TS LCO 3.6.2.1 requires the Mode Switch be placed in Shutdown IMMEDIATELY.

D – Incorrect – Plausible as this is the time to reach 120 °F which is the upper limit of TS LCO 3.6.2.1 requiring the Mode Switch be placed in Shutdown.

Technical Reference(s): TS 3.6.2.1 Rev. amend. 69 and SVI-D23-T1213 Rev. 9	Reference Attached: TS 3.6.2.1 pp. 3.6-36 & -37 and SVI-D23-T1213 p. 9

Proposed references to be provided to applicants during examination: SVI-D23-T1213 Attachment 1

Learning Objective (As available): OT-3037-10-A

Question Source:	Bank #	
	Modified Bank #	INL-2192
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 50

The plant was operating at rated power when the following occurred:

- An ATWS occurred
- The Unit Supervisor directed ADS to be inhibited
- The RO placed ADS A and B Inhibit switches in INHIBIT
- ADS A INHIBIT light failed to illuminate
- Annunciator ADS A TIME DELAY LOGIC TIMER RUNNING is sealed in

This annunciator indicates __(1)__ .
To delay an undesired ADS actuation the Operator must depress __(2)__ .

	1	2
A.	RPV Level 3 and RPV Level 1 have been reached and RHR A or LPCS is running	both ADS A and B Logic Seal In Reset pushbutton
B.	RPV Level 3 and RPV Level 1 have been reached	both ADS A and B Logic Seal In Reset pushbutton
C.	RPV Level 3 and RPV Level 1 have been reached and RHR A or LPCS is running	only ADS A Logic Seal In Reset pushbutton
D.	RPV Level 3 and RPV Level 1 have been reached	only ADS A Logic Seal In Reset pushbutton

QUESTION RO 50

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	218000	A4.05
	Importance Rating	4.2	

K&A: Ability to manually operate and/or monitor in the control room: ADS timer reset.

Automatic Depressurization

Explanation: **Answer D –** Annunciator ADS A TIME DELAY LOGIC TIMER RUNNING indicates that both L3 & L1 have been reached and ADS will initiate after a 105 second time delay. Since the B inhibit was successful, only the ADS A Logic Seal In Reset pushbutton needs to be depressed.

A – Incorrect – 1st part - A low pressure ECCS pump is not required to be running for the timer to start and the annunciator to alarm. 2nd part - Since the B inhibit was successful, only the ADS A Logic Seal In Reset pushbutton needs to be depressed.

B – Incorrect – 2nd part - Since the B inhibit was successful, only the ADS A Logic Seal In Reset pushbutton needs to be depressed.

C – Incorrect – 1st part - A low pressure ECCS pump is not required to be running for the timer to start and the annunciator to alarm.

Technical Reference(s): ARI-H13-P601-19 Rev. 21 and ONI-E12-2 Rev 14	Reference Attached: ARI-H13-P601-19 p 71 and ONI-E12-2 p 6

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21C-F, I.1, & L.1

Question Source:	Bank #	Perry 2015 # RO-51
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 51

EOP-SPI 2.3, Bypass MSIVs And ECCS Interlocks has been directed.

Which MSIV interlock will be defeated?

A. RPV Water Level Low

B. Main Condenser Vacuum Low

C. Main Steam Line Pressure Low

D. Steam Tunnel Temperature High

QUESTION RO 51

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	223002	K4.08
	Importance Rating	3.3	

K&A: Knowledge of PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF design feature(s) and/or interlocks which provide for the following: Manual defeating of selected isolations during specified emergency conditions.

Primary Containment Isolation/Nuclear Steam Supply Shutoff

Explanation: **Answer A –** EOP-SPI 2.3 bypasses only the RPV low level (Level 1) MSIV closure interlock.

B – Incorrect – Plausible as this interlock is bypassed with keylock switches for other conditions, but not by this EOP-SPI.

C – Incorrect – Plausible as this isolation signal is bypassed with Mode Switch not in RUN.

D – Incorrect – Plausible as some Leak Detection high temperatures can be bypassed, but not the MSIV Steam Tunnel temperature.

Technical Reference(s): EOP-SPI 2.3 Rev. 5, Dwgs. 208-013 S. 06 Rev. X & Sh. 14 Rev. AA	Reference Attached: EOP-SPI 2.3 pp. 2 & 4, Dwgs. 208-013 Sh. 06 & Sh. 14

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-04B-D

Question Source:	Bank #	
	Modified Bank #	Columbia 2013 # RO-42
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 52

The plant is in Mode 4 with RHR B loop in Shutdown Cooling.

SVI-B21-T0034-B, RPV Level 3 and Level 8 RPS/RHR Shutdown Isolation Channel B Functional for 1B21-N680B, is in progress.

During performance of this SVI an RPV Level 3 trip signal is input.

Concurrently, 1B21-N680C, LVL 3 & 8 trip unit fails low.

Based on this information, ____.

A. only 1E12-F009, Shutdown Cooling INBD SUCT ISOL will close

B. only 1E12-F008, Shutdown Cooling OTBD SUCT ISOL will close

C. 1E12-F009, Shutdown Cooling INBD SUCT ISOL and 1E12-F053B, Shutdown Cooling B To FDW Shutoff will close

D. 1E12-F008, Shutdown Cooling OTBD SUCT ISOL and 1E12-F053B, Shutdown Cooling B To FDW Shutoff will close

QUESTION RO 52

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	223002	K6.04
	Importance Rating	3.3	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF: Nuclear boiler instrumentation.

Primary Containment Isolation/Nuclear Steam Supply Shutoff

Explanation: **Answer C –** Both 1E12-F009 & 1E12-F053B are receive an isolation signal when 1B21-N680B is dialed low and 1B21-N680C fails low.

A – Incorrect – 1E12-F0053B and 1E12-F037B also will close.

B – Incorrect – PCIS isolation logic is Inboard/Outboard. E12-F008 is not an inboard valve. Plausible since most 'C' instruments are Div. 1 instruments and E12-F008 is a Div. 1 powered valve.

D – Incorrect – 1E12-F008 will not close on this combination of trip unit signals.

Technical Reference(s): PDB-I5 Rev. 12	Reference Attached: PDB-I5 p. 42

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-E12-F

Question Source:	Bank #	Perry 2015 # RO-52
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 53

The plant is at rated power.

The following annunciators alarmed indicating an SRV inadvertently opened:

- SRV OPEN, H13-P601-19-A7
- SRV OPEN SIGNAL RECEIVED, H13-P601-19-B7
- FEED FLOW STEAM FLOW MISMATCH, H13-P680-03-B7

Which of the following is positive indication to that an SRV opened?

SRV tailpipe temperature will indicate approximately __(1)__ and __(2)__ of the SRV solenoid status lights will be illuminated.

Reference Provided: Steam Tables

	1	2
A.	300 °F	at least one
B.	300 °F	none
C.	548 °F	at least one
D.	548 °F	none

QUESTION RO 53

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	239002	A3.03
	Importance Rating	3.6	

K&A: Ability to monitor automatic operations of the RELIEF/SAFETY VALVES including: Tail pipe temperatures.

Safety Relief Valves

Explanation: **Answer A –** Using the Mollier Diagram, for 1100 psia, the resultant SRV tailpipe temperature is ~290 to 300 °F. Additionally, with the SRV OPEN SIGNAL RECEIVED annunciator received, at least one solenoid has been energized.

B – Incorrect – 2nd part – This would be true if only the SRV OPEN annunciator were received.

C – Incorrect – 1st part – This is the saturation temperature for normal operating pressure. However, the steam flow through an open SRV is a constant enthalpy and the temperature is lower than RPV saturation temperature.

D – Incorrect – 1st part – This is the saturation temperature for normal operating pressure. However, the steam flow through an open SRV is a constant enthalpy and the temperature is lower than RPV saturation temperature. 2nd part – This would be true if only the SRV OPEN annunciator were received.

Technical Reference(s): ARI-H13-P601-19 Rev. 21 and Steam Tables	Reference Attached: ARI-H13-P601-19 pp. 17 & 41 and Steam Tables

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective (As available): OT-Combined-B21_N11-F, -I, & -O

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 54

The plant is operating at 70% rated power with the following conditions:

- RFPT A & B are on DFWCS in 3-element (3E) Level Control
- Motor Feed Pump is in Standby with MFP Auto Xfer feature ENABLED

Then the following occurs:

- DFWCS RPV Level Channel A fails upscale
- DFWCS RPV Level Channel B fails downscale

The failure of these channels will cause the DFWCS to ____.

A. shift to Single Element Control

B. shift to the manual speed control dial

C. shift the feed pump flow controllers to manual

D. default to the Operator Rx Level Setpoint value

QUESTION RO 54

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	259002	K3.02
	Importance Rating	3.7	

K&A: Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on following: Reactor feedwater system.

Reactor Water Level Control

Explanation: **Answer C –** A loss of 2 level measurement channels (deviation of > 8" from median) will cause all feedwater pump controllers to shift to MANUAL.

A – Incorrect – Plausible since this occurs when either a Feedwater pump suction flow signal, recirc flow signal, or Steam flow signal is lost

B – Incorrect – Plausible since the Operator would perform this action manually if there was a problem with the DFWCS and RPV level was changing.

D – Incorrect – Plausible since DFWCS normally maintains RPV level at this setpoint.

Technical Reference(s): ARI-H13-P680-DFW Rev. 10	Reference Attached: ARI-H13-P680-DFW pp. 8-9

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-C43-1.14

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 55

The plant is operating at 100% power with AEGTS Train B in operation.

A loss of the 120 VAC power supply to the AEGTS Train B Exhaust and Recirculation Dampers occurs.

Which of the following describes the AEGTS Train B dampers fail positions based on this power loss?

	Recirculation Damper	Exhaust Damper
A.	Closed	Open
B.	Closed	Closed
C.	Open	Open
D.	Open	Closed

QUESTION RO 55

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	261000	K6.01
	Importance Rating	2.9	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the STANDBY GAS TREATMENT SYSTEM: A.C. electrical distribution.

Standby Gas Treatment

Explanation: **Answer A –** On a loss of the power supply to the AEGT dampers, the Exhaust fail Open and the Recirc fails closed to maintain annulus ΔP above the TS minimum value.

B – Incorrect – 2nd part – the Exhaust damper fails Open.

C – Incorrect – 1st part – the Recirc damper fails Closed

D – Incorrect – 1st part – the Recirc damper fails Closed and 2nd part – the Exhaust damper fails Open.

Technical Reference(s): SDM-M15 Rev. 8 and PDB-H23 Rev. 2	Reference Attached: SDM-M15 p. 26 and PDB-H23 p. 12

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-M15-F

Question Source:	Bank #	Perry 2007-1 # RO-52
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 56

Bus EH13 is being transferred from the Division 3 Emergency Diesel Generator (EDG) back to the grid.

The SYNC SEL SWITCH is in the TH1 position.

The following indications are observed on panel H13-P601-22:

- BUS EH13 VOLTS RUNNING, 1R22-R022C 4200 VAC
- BUS EH13 VOLTS INCOMING, 1R22R021C 4100 VAC
- Synchroscope is rotating slowly is the SLOW direction

Before the Preferred Source Breaker, EH1303 can be closed, you must adjust the:

DIESEL GEN VOLTAGE REGTR in the __(1)__ direction to match BUS EH13 RUNNING and INCOMING VOLTS.
And
DIESEL GEN GOVERNOR in the __(2)__ direction until the Synchroscope is moving slowly in the FAST direction.

	1	2
A.	RAISE	LOWER
B.	RAISE	RAISE
C.	LOWER	LOWER
D.	LOWER	RAISE

QUESTION RO 56

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	262001	K1.03
	Importance Rating	3.4	

K&A: Knowledge of the physical connections and/or cause-effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: Off-site power sources.

AC Electrical Distribution

Explanation: **Answer B –** Need to raise Incoming Volts to match Running Volts and need to raise governor to cause Synchroscope to start rotating slowly in the FAST direction.

A – Incorrect – 2nd part – This will cause the synchroscope to rotate faster in the SLOW direction.

C – Incorrect – 1st part – This would cause a larger deviation between Incoming and Running voltages. 2nd part – This will cause the synchroscope to rotate faster in the SLOW direction.

D – Incorrect – 1st part – This would cause a larger deviation between Incoming and Running voltages.

Technical Reference(s): SOI-E22B Rev. 34	Reference Attached: SOI-E22B pp. 54-55

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-E22B-H.2 OT-Combined-R43_48-G.2

Question Source:	Bank #	Perry 2015 # RO-57
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 57

A reactor startup is in progress with the following conditions:

- Reactor power approximately 16%
- Turbine generator ready to synchronize to the grid

Vital inverter DB-1-A experienced a failure. Additionally, the static transfer switch failed to shift to the Alternate Source resulting in a loss of power to Bus V-1-A.

Based on these conditions, other than scramming, control rods can ____.

A. not be inserted or withdrawn

B. be inserted using In-Timer-Skip

C. only be inserted or withdrawn by single notch

D. only be withdrawn using the Continuous Withdraw

QUESTION RO 57

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	262002	K3.14
	Importance Rating	2.8	

K&A: Knowledge of the effect that a loss or malfunction of the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) will have on the following: Rx power: Plant-Specific.

Uninterruptable Power Supply (AC/DC)

Explanation: **Answer A –** With the loss of the vital inverter and the failure of the static transfer switch, the vital bus V-1-A is lost. V-1-A, breaker 21 supplies power to the rod position indication in the branch junction modules. This will cause RC&IS to 'lock-up'. Rx power can only be changed by Rx scram.

B – Incorrect – Since RC&IS is 'locked up', In-Timer-Skip will not work.

C – Incorrect – Since RC&IS is 'locked up', normal rod insert/withdrawal will not work.

D – Incorrect – Since RC&IS is 'locked up', Continuous Withdraw will not work.

Technical Reference(s): ONI-R25-2 Rev. 13, ARI-H13-P680-05 Rev. 16, & Dwg. 208-020 Sh. 1 Rev. EE	Reference Attached: ONI-R25-2 p. 10, ARI-H13-P680-05 p. 75-76, & Dwg. 208-020 Sh. 1

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C11_RC&IS-1.3 & 1.14

Question Source:	Bank #	Perry 2013 # RO-58
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 58

The Plant was operating at rated power when a Loss of Offsite Power occurred.

The following condition now exist:

- The Reactor is shutdown
- All Emergency Diesel Generators started and tied to their respective Buses
- Reactor pressure is cycling with automatic relief valve actuation
- RCIC has isolated
- HPCS has tripped on overcurrent
- All Low Pressure ECCS pumps are in Standby
- Reactor water level is 185.0 inches and lowering at 10 inches/min
- Drywell pressure is 1.50 psig and rising at 0.25 psig/min

With no operator intervention, the Automatic Depressurization System (ADS) will automatically initiate in ____.

A. 2 minutes and 29 seconds

B. 7 minutes and 16 seconds

C. 16 minutes and 51 seconds

D. 18 minutes and 36 seconds

QUESTION RO 58

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	218000	K5.01
	Importance Rating	3.8	

K&A: Knowledge of the operational implications of the following concepts as they apply to AUTOMATIC DEPRESSURIZATION SYSTEM: ADS logic operation

Automatic Depressurization

Explanation: **Answer D –** With RPV level at 185" and lowering at 10"/min, Level 1 (16.5") will be reached in 16 minutes and 51 seconds. When DW pressure exceeds 1.68 psig in less than one minute the low pressure ECCS pumps will automatically start. Therefore, when RPV level hits L1 the 105 second ADS timer will start and ADS will actuate in 18 minutes and 36 seconds.

A – Incorrect – Plausible since this is the time to hit Level 3 (177.7") plus 105 seconds (ADS timer).

B – Incorrect – Plausible since this is the time to hit Level 2 (129.8") plus 105 seconds (ADS timer).

C – Incorrect – Plausible since this is the time to hit Level 1 (16.5") without the 105 second ADS timer.

Technical Reference(s): ARI-H13-P601-19 Rev. 21	Reference Attached: ARI-H13-P601-0019 p. 19

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21C-F and L.2

Question Source:	Bank #	Perry 2007-2 # RO-38
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 59

Annunciator DIV 2 BATTERY DC SYSTEM TROUBLE alarmed on H13-P877.

Use the attached picture of observed readings on H13-P877.

An NLO reported the following indications from EFD-1-B 125VDC Battery Charger:

- Charger DC Voltage is 123 VDC
- Charger DC Current is 400 Amps
- FLOAT/EQUALIZE switch mis-positioned to EQUALIZE
- Red DC VOLTS LOW light is lit
- White AC ON light is lit

With no operator action, which of the following describes the expected Bus ED-1-B voltage trend and the reason for that trend?

Bus ED-1-B voltage will ____.

Attachment Provided: Panel H13-P877 Meters picture

A. lower because the float voltage is low out of band

B. rise because the bus load is less than the charger capacity

C. lower because AC power is not being supplied to the charger

D. lower because the bus load is greater than the charger capacity

QUESTION RO 59

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	263000	2.4.31
	Importance Rating	4.2	

K&A: Knowledge of annunciator alarms, indications, or response procedures.

DC Electrical Distribution

Explanation: **Answer D –** The charger capacity is 400 amps but the ED1-1B bus current is indicated at ~50 amps as shown by the ammeter on P870 in the DISCHARGE region. The total current draw is ~ 450 amps. This will cause ED-1-B voltage to lower.

A – Incorrect – Charger DC Voltage is low, but with the battery charger in EQUALIZE the voltage should be higher.

B – Incorrect – This would be true if load current did not exceed charger capacity.

C – Incorrect – This is the opposite, but plausible if the meter indications are misunderstood.

Technical Reference(s): ARI-H13-P877-02 Rev 18, SOI-R42 (Div 2) Rev 15, SDM-R42 Rev 10	Reference Attached: ARI-H13-P877-02 p 79, SOI-R42 (Div 2) p 50, SDM-R42 pp 7-8

Proposed references to be provided to applicants during examination: Panel H13-P877 Meters picture

Learning Objective (As available): OT-COMBINED-R42-(#33 & #34)

Question Source:	Bank #	Perry 2017 # RO-59
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	Yes – Perry 2017
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 60

The Div. 2 Diesel Generator right air bank relief valve failed open resulting in a complete loss of pressure in the Right Bank air receiver tank.

Then the Div. 2 DG received an automatic start signal in response to a LOCA.

Five seconds later Starting Air system pressure has decreased to 150 psig, and DG speed is 100 rpm.

Based on these conditions, the Div. 2 DG starting air valves are _____.

A. closed because of the low Right Bank air receiver tank pressure

B. closed because Starting Air system pressure has decreased to 150 psig

C. open and the Div. 2 DG will continue to roll until its speed reaches 200 rpm

D. open and the Div. 2 DG will continue to roll for another 5 seconds or until its speed reaches 200 rpm

QUESTION RO 60

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	264000	K6.01
	Importance Rating	3.8	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the EMERGENCY GENERATORS (DIESEL/JET): Starting air.

Emergency Generators (Diesel/Jet) EDG

Explanation: **Answer B –** With the Starting Air system pressure at 150 psig, the starting air solenoids deenergize and the starting air valves close.

A – Incorrect – Plausible since for the Div.3 DG, both receivers must be charged and available for the Div. 3 DG to start in the required time.

C – Incorrect – Plausible since this would be true if Starting Air system pressure was > 150 psig.

D – Incorrect – Plausible since this would be true for a MANUAL start.

Technical Reference(s): ARI-H13-P877-02 Rev.18	Reference Attached: ARI-H13-P877-02 p.57

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R43_48-B.1

Question Source:	Bank # Modified Bank # Perry 2001 # RO-09 New
Question History:	Previous 2 NRC Exams No
Question Cognitive Level:	Memory or Fundamental Knowledge Comprehension or Analysis x
10 CFR Part 55 Content:	55.41 x 55.43

Comments: Level of Difficulty = x

QUESTION RO 61

The Div. 1 Diesel Generator is operating in parallel with the grid for surveillance testing.

A Loss of Offsite Power occurs.

The following plant conditions exist:

- All Diesel Generators are carrying the respective EH buses
- Reactor Scram - All Rods In
- Reactor Level is lowering rapidly
- HPCS and RCIC failed to automatically start
- Reactor Pressure being controlled on SRVs

Then annunciator DG TRIP* CRANKCASE PRESS HIGH, H13-P877-01-C2 alarms

An NLO reports that crankcase pressure is high.

Based on this information, Div. 1 DG Crankcase fans are ____?

A. operating and the operator shall shutdown the DG

B. not operating and the operator shall shutdown the DG

C. operating and the operator shall not shutdown the DG

D. not operating and the operator shall not shutdown the DG

QUESTION RO 61

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	264000	2.4.50
	Importance Rating	4.2	

K&A: Ability to verify alarm setpoints and operate controls identified in the alarm response manual.

Emergency Generators (Diesel/Jet) EDG

Explanation: **Answer D –** During a LOOP, crankcase fans lose power. Under emergency conditions, (i.e. adequate core cooling) the DG is not to be shutdown. Since RPV level is lowering, the DG should not be S/D until ACC can be assured.

A – Incorrect – Having the fans running is plausible since the Div. 2 fans are powered from a diesel backed bus. However, the Div. 1 fans do not have power during a LOOP and the Operator would shutdown the DG if it were not needed for ACC or other emergency use.

B – Incorrect – The Operator cannot shutdown the DG since it is needed for Adequate Core Cooling.

C – Incorrect – Having the fans running is plausible since the Div. 2 fans are powered from a diesel backed bus. However, the Div. 1 fans do not have power during a LOOP.

Technical Reference(s): SOI-R43 Rev. 48 and ARI-H13-P877-01 Rev. 15	Reference Attached: SOI-R43 p. 6 and ARI-H13-P877-01 p. 29

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R43_48-H.1

Question Source:	Bank #	
	Modified Bank #	Perry 2007-2 # RO-49
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 62

Safety Related Instrument Air System Air Receiver Tank 3, 1P57-A003A was completely depressurized for maintenance.

When restoring 1P57-A003A, the (1) Air System can be used to (2) re-pressurize the tank.

	1	2
A.	Instrument	fully
B.	Service	fully
C.	Instrument	only partially
D.	Service	only partially

QUESTION RO 62

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	300000	K4.02
	Importance Rating	3.0	

K&A: Knowledge of (INSTRUMENT AIR SYSTEM) design feature(s) and or interlocks which provide for the following: Cross-over to other air systems.

Instrument Air

Explanation: **Answer C –** The Instrument Air System is used to recharge the Safety Related Instrument Air System. Since the IA system pressure is 120-125 psig and the SRIA system pressure is 160-170 psig, the IA system will only partially recharge the tank.

A – Incorrect – 2nd part – The IA system pressure is not sufficient to fully recharge the SRIA tanks.

B – Incorrect – 1st part – The air quality requirements for the P57 System cannot be met by the Service air system. Therefore, the SA system is not used to recharge the SRIA tanks. 2nd part – the IA system pressure is not sufficient to fully recharge the SRIA tanks.

D – Incorrect – 1st part – The air quality requirements for the P57 System cannot be met by the Service air system. Therefore, the SA system is not used to recharge the SRIA tanks.

Technical Reference(s): SOI-P57 Rev. 18 and SOI-P51/52 Rev. 32	Reference Attached: SOI-P57 pp. 7 & 15 and SOI-P51/52 p. 24

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-P57 (#6)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 63

The plant is operating at rated power with the following conditions:

- Lake water temperature is 55°F
- TBCC Temperature Control Valve, 1P44-F300 is at midposition

Then the lake rolls over causing lake water temperature to go to 63 °F.

The rise in lake water temperature causes the temperature control valve to ____.

A. raise the TBCC flow through the heat exchanger

B. lower the TBCC flow through the heat exchanger

C. raise the Service Water flow through the heat exchanger

D. lower the Service Water flow through the heat exchanger

QUESTION RO 63

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	400000	A3.01
	Importance Rating	3.0	

K&A: Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS.

Component Cooling Water

Explanation: **Answer A –** the TBCC temperature control valve splits the TBCC flow through the HX and bypassing the HX. As the lake temperature rises, SW temperature rises. This causes the TCV to bypass less TBCC flow around the HX to maintain TBCC outlet temperature constant.

B – Incorrect – Plausible as this is true if lake water temperature lowers vs. raises.

C – Incorrect – Plausible since Service Water flow can be throttled However, this is a manual operation and not a function of the TBCC TCV valve.

D – Incorrect – Plausible since Service Water flow can be throttled However, this is a manual operation and not a function of the TBCC TCV valve. This would also be true if lake water temperature lowers vs. raises.

Technical Reference(s): SDM-P44 Rev. 10	Reference Attached: SDM-P44 pp. 3-4 & 11-12

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P44-F

Question Source:	Bank #	Perry 2010 # RO-63
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams No	
Question Cognitive Level:	Memory or Fundamental Knowledge x	
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41 x	
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 64

The plant was operating at 85% power and 100% loadline when following occurred:

- APRM 'A' failed upscale
- AFDL in Control alarm (ARI-H13-P680-004-E9) was received
- The Immediate Actions for AFDL in Control were completed

The plant is currently stable with the following conditions:

- JP LOOP TOT FLOW (Loop A) B33-R612A reading 26 Mlb/hr.
- JP LOOP TOT FLOW (Loop B) B33-R612B reading 38 Mlb/hr.
- TOTAL JP FLOW B33-R613(R) reading 64 Mlb/hr.

Based on this information:

Specification LCO __(1)__ is no longer being met.
The Operator would __(2)__ .

	1	2
A.	3.4.1, Recirculation Loops Operating	insert CRAM Rods
B.	3.4.1, Recirculation Loops Operating	scram the Rx if power oscillations occur
C.	3.4.2, Flow Control Valves	insert CRAM Rods
D.	3.4.2, Flow Control Valves	scram the Rx if power oscillations occur

QUESTION RO 64

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	202001	A2.08
	Importance Rating	3.1	

K&A: Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Recirculation flow mismatch: Plant-Specific.

Recirculation

Explanation: **Answer B –** T.S. 3.4.1 requires recirculation flow mismatch to be ≤ 10% of rated core flow when operating at <70% of rated core flow. Per IOI-3 step 2.4 rated flow is 109.2 Mlb/hr. Therefore, 70% of rated core flow is 76.44 Mlb/hr. and 10% of rated core flow is 10.92 Mlb/hr. Since the mismatch is >10% (12 Mlb/hr.) TS 3.4.1 Conditions apply. This power change was unplanned. Therefore, entry into ONI-C51 is required. One of the actions of ONI-C51 is to scram the plant if power oscillations are observed.

A – Incorrect – 2nd part - Plausible since this is a required action if flow is <42 Mlb/hr. with OPRMs Operable.

C – Incorrect – 1st part - Plausible if the operator thinks FCVs are not operable when they are locked up. However, this is not a requirement for Operability. 2nd part - Plausible since this is a required action if flow is <42 Mlb/hr. with OPRMs Operable.

D – Incorrect – 1st part - Plausible if the operator thinks FCVs are not operable when they are locked up. However, this is not a requirement for Operability.

Technical Reference(s): TS 3.4.1 Rev. amend. 134, ONI-C51 Chart Rev. N	Reference Attached: TS 3.4.1 pp. 3.4-1 & -4 and ONI-C51 Chart

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-B33-K.1, OT-3035-04(LP)-A.1 & -A.2, and OT-3037-08-B

Question Source:	Bank # Modified Bank # Perry 2013 # RO-04 New
Question History:	Previous 2 NRC Exams No
Question Cognitive Level:	Memory or Fundamental Knowledge x Comprehension or Analysis
10 CFR Part 55 Content:	55.41 x 55.43

Comments: Level of Difficulty = x

QUESTION RO 65

Attempting to withdraw any control rod past position 48 in accordance with FTI-B0002, Control Rod Movements, is performed to ____.

A. ensure the control rod is coupled to its drive mechanism by observing that the ROD OVERTRAVEL annunciator does not alarm

B. test the condition of the control rod drive mechanism seals by observing the value of Drive Water Header Flow

C. purge air from the control rod mechanism hydraulic seals by observing the value of Drive Water Header Flow

D. ensure the FULL OUT red LED on the Rod Interface System Display Mode (RDM) extinguishes

QUESTION RO 65

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	201003	K4.02
	Importance Rating	3.8	

K&A: Knowledge of CONTROL ROD AND DRIVE MECHANISM design feature(s) and/or interlocks which provide for the following: Detection of an uncoupled rod

Control Rod and Drive Mechanism

Explanation: **Answer A –** > When a control rod is withdrawn to position 48, a coupling check is always performed. A Continuous Withdraw signal is applied as a coupling check, to verify the Drive Mechanism spud is coupled to the Control Rod Blade.

B – Incorrect – Plausible since this is the reason for Stall Flow Testing. However, Stall Flow Testing is not required by FTI-B02.

C – Incorrect – Plausible since this is the reason for Rod Exercising and Rod Venting. However, Rod Exercising and Rod Venting is not required by FTI-B02.

D – Incorrect – The FULL OUT red LED is verified to be on for a successful coupling check, not extinguished. Plausible since the FULL OUT red LED will extinguish if the rod is uncoupled.

Technical Reference(s): FTI-B02 Rev. 16	Reference Attached: FTI-B02 pp. 4 & 19

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-C11_RC&IS-1.4 & 1.10

Question Source:	Bank #	Perry 2007-1 # RO-65
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 66

Control Room was evacuated due to a fire.

Control has been established at the Remote Shutdown Panel.

Then distribution panel EK-1-A1 feeder breaker tripped.

How does this affect Division 1 Remote Shutdown Panel operations?

A. Cannot cycle SRVs

B. Unable to adjust RCIC pump flow

C. Cannot close RHR A Pump breaker

D. Unable to monitor RPV Level and Pressure

QUESTION RO 66

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	216000	K6.01
	Importance Rating	3.1	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the NUCLEAR BOILER INSTRUMENTATION: A.C. electrical distribution.

Nuclear Boiler Instrumentation

Explanation: **Answer D –** With "control established at the Div. 1 RSD Panel, the RSD control power switches have all been transferred out of the Control Room positions. This action establishes alternate power feeds for most equipment that is controlled from the RSD panel. Panel EK-1-A1 feeds the Remote Shutdown Panel RPV Level/Pressure Recorder as well as the RPV Pressure meter. Therefore, on a loss of AC power to EK-1-A1, the ability to monitor RPV level/pressure is lost.

A – Incorrect – Plausible since this panel provides power to the SRV position indication in the Control Room on H13-P601. However, the ability to cycle the SRVs remains available.

B – Incorrect – Plausible since this panel provides power for indication for various RCIC valves. However, the ability to adjust RCIC flow with the flow controller remains available.

C – Incorrect – Plausible since this panel provides control power to various RHR valves. However, the ability to cycle the RHR A pump breaker remains intact.

Technical Reference(s): PDB-H0021 Rev. 6	Reference Attached: PDB-H0021 p. 7

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-B21(INST)-1.2 & OT-COMBINED-C61-F.3

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 67

The plant was operating at rated power when a Loss of Coolant Accident (LOCA) occurred.

The following conditions exist:

- All rods are inserted
- HPCS and RCIC automatically started and recovered RPV level
- Drywell pressure is 0.4 psig
- Containment pressure is 0.2 psig

Based on this information, the Containment Vacuum Relief Isolation Valves on H13-P800 will indicate ____.

A. OPEN and will remain open if containment pressure is negative

B. OPEN but can be manually closed if containment pressure is positive

C. CLOSED but will automatically open if containment pressure is negative

D. CLOSED and cannot be manually opened if containment pressure is negative

QUESTION RO 67

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	223001	A4.01
	Importance Rating	3.5	

K&A: Ability to manually operate and/or monitor in the control room: Containment relief valves: Mark-III.

Primary Containment and Auxiliaries

Explanation: **Answer C –** When RPV level lowered to L2, HPCS & RCIC auto started. This also initiated a BOP isolation signal which shuts the M17 MOVs. If containment Δp is ≥ 0.1 psid (negative) the MOVs will automatically open.

A – Incorrect – With containment pressure at 0.2 psig, the MOVs will be open. If the containment pressure were negative concurrent with a BOP isolation signal, the MOVs would remain open.

B – Incorrect – With containment pressure at 0.2 psig, the MOVs will be open. However, if there were no BOP isolation signal, the MOVs could be closed.

D – Incorrect – With a BOP isolation signal present, the MOV should automatically open if pressure becomes negative. However, if it doesn't automatically open, it can be manually opened as the control switch contact is in parallel with the vacuum contact,

Technical Reference(s): DWG. 208-111 Sh. 2 Rev. J, SDM- M17 Rev. 3 and SOI-M17 Rev. 7	Reference Attached: DWG. 208-111 Sh. 2, SDM-M17 pp. 6-7 and SOI-M17 p. 7

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M17-F

Question Source:	Bank #	
	Modified Bank #	Perry 2001 # RO-75
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 68

A DBA LOCA occurred 30 minutes ago.

All RHR loops automatically initiated in LPCI mode.

If a Containment Spray Initiation signal is now received RHR A and B will __(1)__ for Containment Spray.

In order to lower containment pressure, __(2)__ of Containment Spray is/are required to be operating.

	1	2
A.	automatically realign	1 loop
B.	need to be manually realigned	1 loop
C.	automatically realign	2 loops
D.	need to be manually realigned	2 loops

QUESTION RO 68

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	226001	K4.02
	Importance Rating	2.8	

K&A: Knowledge of RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE design feature(s) and/or interlocks which provide for the following: Redundancy.

RHR/LPCI: Containment Spray Mode

Explanation: **Answer A –** With a DBA LOCA occurring 30 minutes ago, RHR will automatically realign to the Containment Spray mode. Per the USAR, the design bases of Containment Spray (CS) is to have 2 redundant means to spray into containment to lower containment pressure below design limits.

B – Incorrect – 1st part – Plausible as this would be true of the LPCI initiation signal was received less than 10 minutes ago.

C – Incorrect – 2nd part - One loop of CS is sufficient to lower containment pressure below the containment design limit for pressure.

D – Incorrect – 1st part – Plausible as this would be true of the LPCI initiation signal was received less than 10 minutes ago. 2nd part - One loop of CS is sufficient to lower containment pressure below the containment design limit for pressure.

Technical Reference(s): SDM-E12 Rev. 3 and USAR C-5 & C-6 Rev. 12	Reference Attached: SDM-E12 p. 96 and USAR C-5 & C-6 pp. 5.4-41 & 6.5-9-10

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combine-E12-B, -D, & -F

Question Source:	Bank #	
	Modified Bank #	Perry 2017 # RO-68
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 69

A refuel outage is in progress with fuel transfer operations between the Refuel Floor and the Fuel Handling Building.

The following conditions exist for the Inclined Fuel Transfer System (IFTS):

- Interlock Override Operation in progress
- Carriage is at the "AT CB" position
- The Upper Upender is Vertical
- The Lower Upender is Inclined
- Neither bridge is in the IFTS Area

Which of the following describes how Fuel Handling Equipment will be affected?

A. IFTS touch screen functions are disabled

B. IFTS carriage can traverse at Normal speed

C. The Refueling Platform can enter the IFTS Area

D. The Fuel Handling Bridge cannot enter the IFTS Area

QUESTION RO 69

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	234000	K1.07
	Importance Rating	3.0	

K&A: Knowledge of the physical connections and/or cause-effect relationships between FUEL HANDLING EQUIPMENT and the following: Fuel transfer tube system: Mark-III.

Fuel-Handling Equipment

Explanation: **Answer C –** With the conditions listed, the Refueling Platform can enter the IFTS area since the Transfer Tube interlock conditions are not met.

A – Incorrect – When operating in Interlock Override, the touch screen functions remain available as a convenience for the Operator.

B – Incorrect – When operating in Interlock Override, the carriage speed is reduced to 10 ft/min. from the Normal speed of 60 ft/min.

D – Incorrect – The Fuel Handling Bridge can enter the IFTS area since the Transfer Tube interlock conditions are not met.

Technical Reference(s): SOI-F42 Rev. 32, SOI-F11 Rev. 22, and SOI-F15 Rev. 24	Reference Attached: SOI-F42 pp. 85 & 115, SOI-F11 p. 117, and SOI-F15 p. 132

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-F42 (#5)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 70

The plant is operating at 50% power when RPS Bus "A" is lost.

What is the position of the MSIVs ten seconds later?

	Inboard MSIVs	Outboard MSIVs
A.	Open	Open
B.	Open	Closed
C.	Closed	Open
D.	Closed	Closed

QUESTION RO 70

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	239001	K2.01
	Importance Rating	3.2	

K&A: Knowledge of electrical power supplies to the following: Main steam isolation valve solenoids.

Main and Reheat Steam

Explanation: **Answer A –** With a loss of power to RPS Bus A, the outboard MSIVs solenoid valves deenergized and the valves lost position indication. However, the MSIVs did not close because RPS B was still supplying power to the B solenoids. Both MSIV solenoids need to deenergize to shut the MSIVs.

B – Incorrect – 2nd part - RPS A supplies power to the outboard MSIV position indications. However, both MSIV solenoids need to be deenergized to shut the MSIV.

C – Incorrect – 1st part – Plausible since RPS A supplies power to the A solenoids on the Inboard MSIVs. This alone would not cause inboard MSIVs to close.

D – Incorrect – 1st part – Plausible since RPS A supplies power to the A solenoids on the Inboard MSIVs. This alone would not cause inboard MSIVs to close. 2nd part - RPS A supplies power to the outboard MSIV position indications. However, both MSIV solenoids need to be deenergized to shut the MSIV.

Technical Reference(s): SOI-C71 Rev. 24 and SDM-B21/N11 Rev. 12	Reference Attached: SOI-C71 pp. 107-108 and SDM- B21/N11 pp. 26-27

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-B21_N11-C & -L.1

Question Source:	Bank #	
	Modified Bank #	Nine Mile-1 2008 # RO-28
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 71

Plant startup is in progress with the following conditions:

- Rx power is 20%
- Turbine is synchronized to the grid
- RFPT A is in service
- Load Limit Set potentiometer is set at 9.45
- The Max Combined Flow Limit is set at 30% - (potentiometer is fully counterclockwise)

If startup to full power continues, what will be the first indication that power ascension could be affected?

The ____ light illuminates.

A. REGULATOR ERROR

B. LOAD LIMIT LIMITING

C. MAX COMB FL LMT IN CONT

D. Bypass Valve JACK IN CONTROL

QUESTION RO 71

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	241000	A1.15
	Importance Rating	3.1	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls including: Maximum combined flow limit.

Reactor/Turbine Pressure Regulating

Explanation: **Answer C –** The max comb flow limit pot range is 30% to 130% of steam flow and is normally set at 130% (100 on the dial – fully CW). Since turbine throttle pressure increases as Rx power increases, the MCFL will become the limiting signal with the MCFL pot set at 30%. The Pressure Regulator applies a proportionality constant (gain) to the pressure error signal (3.33%/1 psi). The output signal of the Pressure Regulator represents the total flow demand signal. As Rx power and turbine throttle pressure increase, the MAX COMB FL LMT IN CONT light will comes on when Rx power exceeds the total flow demand signal. (This was run in the simulator on 7/19/19 – RHT)

A – Incorrect – The REGULATOR ERROR light should only illuminate if there is a disagreement between the A & B pressure regulators.

B – Incorrect – The Load Limit potentiometer was set at the normal position. Therefore, the LOAD LIMIT LIMITING light will be off.

D – Incorrect – The JACK IN CONTROL light is normally on and is on whenever there is <u>not</u> a bypass valve demand signal.

Technical Reference(s): SDM-N32/C85 Rev. 6 and SOI-N32/39/41/51 Rev. 38	Reference Attached: SDM-N32/C85 pp. 10-11, 17, 19, 37, 92, 98, 151, & 159 and SOI-N32/39/41/51 p. 25

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-N32_C85-M

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 72

The plant is operating at rated power.

Then annunciator HOTWELL STORAGE LEVEL LO, H13-P680-02-D3 alarmed.

The Hotwell Normal Level Controller, 1N21-R208 malfunctioned causing the Normal Dump Valve N21-F010B to be slightly open.

If Hotwell level continues to lower, the Hotwell __(1)__ will open to restore Hotwell level and the makeup flow will be directed to the __(2)__ .

	1	2
A.	Normal and Emergency Makeup Valves	High Pressure Condenser
B.	Normal and Emergency Makeup Valves	Hotwell Storage Tank
C.	Emergency Makeup Valve only	High Pressure Condenser
D.	Emergency Makeup Valve only	Hotwell Storage Tank

QUESTION RO 72

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	256000	A3.06
	Importance Rating	3.0	

K&A: Ability to monitor automatic operations of the REACTOR CONDENSATE SYSTEM including: Hotwell level.

Condensate

Explanation: **Answer D –** The Normal HW Level controller, 1N21-R208 controls both the Normal M/U and Normal Dump valves. Both valves are electrically prevented from being opened simultaneously. Since the controller is calling for the Normal Dump valve to be slightly open, the Normal M/U valve will not open. Since only the Emergency M/U valve will operate, the M/U flow will be directed to the Hotwell Storage tank.

A – Incorrect – 1st part - Plausible since under most conditions, both the Normal and Emergency valves could be open simultaneously. However, since the controller is calling for the Normal Dump valve to be slightly open, the Normal M/U valve will be shut. 2nd part – Plausible since the Normal M/U is directed to the HP Condenser.

B – Incorrect – 1st part - Plausible since under most conditions, both the Normal and Emergency valves could be open simultaneously. However, since the controller is calling for the Normal Dump valve to be slightly open, the Normal M/U valve will be shut.

C – Incorrect – 2nd part – Plausible since the Normal M/U is directed to the HP Condenser.

Technical Reference(s): ARI-H13-P680-02 Rev. 12 and SDM-N21/N61 Rev. 11	Reference Attached: ARI-H13-P680-02 p. 41 and SDM-N21/N61 pp. 18-19

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-N21_N61 (#26 & #8)

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 73

The Mechanical Vacuum Pumps are designed to operate up to 5% __(1)__ .

At rated power, a properly functioning in-service Offgas Catalytic Recombiner outlet temperature will be approximately __(2)__ .

	1	2
A.	reactor power	350 °F
B.	reactor power	610 °F
C.	hydrogen concentration	350 °F
D.	hydrogen concentration	610 °F

QUESTION RO 73

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	271000	2.1.28
	Importance Rating	4.1	

K&A: Knowledge of the purpose and function of major system components and controls.

Offgas

Explanation: **Answer B –** The mechanical vacuum pumps are limited to operation up to 5% reactor power. Above 5% reactor power, hydrogen concentration can increase above the flammable limit of 4%. Additionally, the on service recombiner will be ~610°F due to the recombination process. (610°F was validated in Plant on 8/19/14 at 100% power)

A – Incorrect – 2nd part - 350°F is the temperature for the off-service (standby) recombiner and the temperature where recombination starts.

C – Incorrect – 1st part - The mechanical vacuum pump operation is limited to 5% reactor power. 2nd part - 350°F is the temperature for the off-service (standby) recombiner and the temperature where recombination starts.

D – Incorrect – 1st part - The mechanical vacuum pump operation is limited to 5% reactor power.

Technical Reference(s): SOI-N64/62 Rev. 43, LP OT-Combined-N62 Rev. 5, LP OT-Combined-N64 Rev. 2, & SDM-N64 Rev. 0	Reference Attached: SOI-N64/62 pp. 5 & 12, LP OT-Combined-N62 p. 8, LP OT-Combined-N64 slide 36, & SDM-N64 p. 2

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-N64-C & H and OT-Combined-N62 (#3, #9, & #12)

Question Source:	Bank #	Perry 2015 # RO-73
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 74

The plant is operating at rated power.

Control Room HVAC And Emergency Recirculating System Train B is tagged out.

IAW the Control Room Envelope Habitability Program, Control Room habitability may not be maintained if which of the following components fail to operate during a design bases accident conditions?

1. M25-C002A, CONT RM HVAC RETURN FAN A
2. M26-C001A, CONT RM EMERG RCIRC FAN A
3. M25-C001A, CONT RM HVAC SUPP FAN A
4. M25-F010A, CONT RM HVAC A OTBD SUPP DMPR

A. 1, 2, and 3 only

B. 1, 2, and 4 only

C. 1, 3, and 4 only

D. 2, 3, and 4 only

QUESTION RO 74

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	290003	K3.01
	Importance Rating	3.5	

K&A: Knowledge of the effect that a loss or malfunction of the CONTROL ROOM HVAC will have on following: Control room habitability.

Control Room Ventilation

Explanation: **Answer D –** The M26-C001A fan must start, the M25-C001A fan must continue to operate (at a lower flow) and the M25-F010A damper must reposition to the Closed position to ensure control room habitability. All these components function as part of the Control Room ventilation Emergency Recirculation System

A – Incorrect – The M25-C002A does not operate when Control Room ventilation is operating in Emergency Recirculation.

B – Incorrect – The M25-C002A does not operate when Control Room ventilation is operating in Emergency Recirculation.

C – Incorrect – The M25-C002A does not operate when Control Room ventilation is operating in Emergency Recirculation.

Technical Reference(s): TS 5.5.14 Rev. Amend. 148 and SOI-M25/26 Rev. 27	Reference Attached: TS 5.5.14 pp. 5.0-15b-c and SOI-M25/26 p. 59

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-Combined-M25_M26-K.2 & O

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x

QUESTION RO 75

The implication of inadvertently cooling the Reactor Coolant System below 70 °F is that the probability of ____ increases?

A. ductile failure

B. brittle fracture

C. fretting corrosion damage

D. intergranular stress corrosion cracking

QUESTION RO 75

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	290002	K5.05
	Importance Rating	3.1	

K&A: Knowledge of the operational implications of the following concepts as they apply to REACTOR VESSEL INTERNALS: Brittle fracture.

Reactor Vessel Internals

Explanation: **Answer B –** The probability of brittle fracture increases at low temperatures.

A – Incorrect – Ductile Fracture is a concern at high temperatures.

C – Incorrect – Fretting corrosion damage is caused by large flow imbalances between the Recirculation loops causing Jet Pump vibration as the direction of flow through the Jet Pumps rapidly reverses.

D – Incorrect – IGSCC is a concern above 200 °F, not below 70 °F.

Technical Reference(s): LP OT-3302-004-10 Rev. 4	Reference Attached: LP OT-3302-004-10 p. 23

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3302-10-6

Question Source:	Bank #	Perry 2003 # RO-76
	Modified Bank #	
	New	
Question History:	Previous 2 NRC Exams	No
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Level of Difficulty = x