QUESTION RO 1

Annunciator H13-P970-01-F1, NCC SURGE TANK LEVEL LOW has alarmed.

Where would you dispatch an NLO to visually observe the NCC Surge Tank sight-glass?

A. CC-679'

B. IB-665'

C. IB-682'

D. TB-647'

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 1

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.1.8
	Importance Rating	3.4	

K&A: Ability to coordinate personnel activities outside the control room.

Generic

Explanation: **Answer C –** The NCC surge tank is located on IB-682'.

A – Incorrect – Plausible since the NCC pumps are located in the Control Complex building.

B – Incorrect – Plausible since the ECC surge tanks are located on this elevation.

D – Incorrect – Plausible since the TBCC surge tank is located in this building at this elevation.

Technical Reference(s): ARI-H13-P970-01 Rev 23 & PYRM-SITE-01 Rev 5	Reference Attached: ARI-H13-P970-01 p 71 & PYRM-SITE-01 p 38

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P43-E.2

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

The plant is operating in MODE 3 when the following events occur at Shift Turnover:

- At 06:00 the off-going Shift Manager is informed that only one of the three on-coming licensed Reactor Operators will be able to report for work.
- The off-going Shift Manager immediately starts taking action to call-in replacement licensed Reactor Operators.
- At 06:45 Shift Relief and Turnover is completed and the entire off-going shift leaves for home.
- At 08:30 two replacement licensed Reactor Operators reports to the Control Room.

Which of the following describes if the requirements of NOP-OP-1002, Conduct of Operations, were followed, including the reason for your decision?

A. All requirements were followed because the replacement licensed Reactor Operators arrived within 2 hours.

B. All requirements were followed because only one licensed Reactor Operator is required in MODE 3.

C. All requirements were not followed because three licensed Reactor Operators are required in MODE 3.

D. All requirements were not followed because one licensed Reactor Operator from the off-going shift should have been held over until a replacement licensed Reactor Operator arrived.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 2

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.1.4
	Importance Rating	3.3	

K&A: Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.

Generic

Explanation: **Answer D –** Per NOP-OP-1002, Section 4.1.13, "Shift crew composition may be one less than minimum manning requirements for a period of time not to exceed two hours in order to accommodate unexpected absence of on-duty crew members. This provision does not allow any shift crew position to be unmanned upon shift change due to an oncoming shift crew person being late or absent." Per Attachment 4, two (2) licensed Reactor Operators are required to be on-shift in Mode 3 for the Control Room.

A – Incorrect – All requirements of NOP-OP-1002, Section 4.1.13 were not followed even though the replacement did arrive within 2 hours.

B – Incorrect – Per NOP-OP-1002, Attachment 4, only 2 Reactor Operators are required in Mode 3. Note: the FBL does not have to be a licensed Reactor Operator. Note: Per Attachment 4, the Field Supervisor position is not required.

C – Incorrect – Per NOP-OP-1002, Attachment 4, only 2 Reactor Operators are required in Mode 3. Note: the FBL does not have to be a licensed Reactor Operator. Note: Per Attachment 4, the Field Supervisor position is not required.

Technical Reference(s): NOP-OP-1002 Rev 11	Reference Attached: NOP-OP-1002 pp 22 & 100

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	RQL-41989
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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

An I&C tech is performing a surveillance that inserts multiple ½ scram signals.

The I&C tech and the US discussed the expected ½ scram alarms.

Which of the following describes the alarm response expectations per NOP-OP-1002, Conduct of Operations?

The ATC ____.

A. is not required to announce expected ½ scram annunciators

B. communicates alarms to I&C tech without US involvement

C. informs the US each time a ½ scram annunciator is received

D. informs the BOP each time a ½ scram annunciator is received

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 3

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.1.17
	Importance Rating	3.9	

K&A: Ability to make accurate, clear, and concise verbal reports.

Generic

Explanation: **Answer C –** Per NOP-OP-1002, "The receipt of expected alarms shall be announced as such to the Command SRO"

A – Incorrect – Plausible since receipt of expected alarms with US concurrence are only verified to be expected with another RO or work group individual. However, for an alarm to be considered 'expected', it must be pre-discussed between the US and RO.

B – Incorrect – Plausible if this was pre-discussed between the US and RO.

D – Incorrect – Plausible if this was pre-discussed between the US and RO.

Technical Reference(s): NOP-OP-1002 Rev 11	Reference Attached: NOP-OP-1002 pp 55-56

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

MOV testing was performed on 1P45-F130A, ESW PUMP A DISCH VALVE.

The post maintenance test for 1P45-F130A specified stroke timing the valve IAW SVI-P45-T2001, ESW Pump A and Valve Operability Test.

What is the proper method for obtaining valve stroke time?

A. Simultaneously take the valve control switch to OPEN and start the stopwatch.
Stop the stopwatch when the GREEN light extinguishes.

B. Simultaneously take the valve control switch to OPEN and start the stopwatch.
Stop the stopwatch when valve movement has ceased as reported by field observation.

C. Take the valve control switch to OPEN.
Start the stopwatch when the RED indicating light illuminates.
Stop the stopwatch when the GREEN light extinguishes.

D. Take the valve control switch to OPEN.
Start the stopwatch when the RED indicating light illuminates.
Stop the stopwatch when valve movement has ceased as reported by field observation.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 4

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.2.21
	Importance Rating	2.9	

K&A: Knowledge of pre- and post-maintenance operability requirements.

Generic

Explanation: **Answer A –** Per SVI-P45-T2001 (and all valve stroke SVI's) stroke time is measured from initiation of control signal (take switch to OPEN) to receipt of desired position indication (RED light extinguishes.

B – Incorrect – Stroke timing is performed using control room indications. Plausible since some throttle valves are positioned based on field observation and may confuse with PI Verification.

C – Incorrect – The stopwatch is started at the same instant the control switch is manipulated. Plausible since the RED light illuminates when control switch taken to OPEN for solenoid valves.

D – Incorrect – The stopwatch is started at the same instant the control switch is manipulated and stroke timing is performed using control room indications.

Technical Reference(s): SVI-P45-T2001 Rev 30	Reference Attached: SVI-P45-T2001 p 3

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3303-01-29

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 5

Who is the individual assigned responsibility for issuing Clearances and keeping Control Room personnel informed of all plant configuration changes prior to establishing or removing a Clearance?

A. Clearance Holder

B. Clearance Authority

C. Work Group Supervisor

D. Operating Representative

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

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 B –** IAW NOP-OP-1001, the Clearance Authority is responsible for authorizing and issuing clearances and keeping the control room informed.

A – Incorrect – The Clearance Holder accepts the clearance.

C – Incorrect – The Work Group supervisor is responsible for reviewing the clearance, not approving it.

D – Incorrect – The Operating Representative performs clearance duties such as hanging/removing clearances.

Technical Reference(s): NOP-OP-1001 Rev 23	Reference Attached: NOP-OP-1001 p 6

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): TAGCLRAUTH_FEN-Clearance Authority

Question Source:	Bank #	Perry 2007-2 # RO-69
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2007-2
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

Which of the following is an acceptable method to alert the Operator of Control Room annunciators that have been removed from service?

A. Danger Tag

B. Information Tag

C. Temporary Modification Tag

D. Minor Deficiency Monitoring (MDM) Tag

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 6

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.2.43
	Importance Rating	3.0	

K&A: Knowledge of the process used to track inoperable alarms.

Generic

Explanation: **Answer B –** IAW PAP-1404, Info tags or Caution tags are to be used to identify Control Room annunciators that are removed from service.

A – Incorrect – Although the Caution Tags can be used to track annunciators removed from service, Danger Tags are not used. Plausible if operator not very familiar with tagging procedure.

C- Incorrect – Although the Temp Mod procedure controls annunciators removed from service, TM tags are not used. Additionally, Not-in-Service stickers are no longer allowed to be used to identify OOS annunciators in the Control Room. Plausible if operator not very familiar with TM procedure.

D – Incorrect - The MDM Process is for the management of maintenance deficiencies whose significance is so minor that it would not be prudent to remove the equipment from service to repair. Not tracking of annunciators. Plausible if operator confuses these tags with Repair Tags.

Technical Reference(s): PAP-1404 Rev 7 & NOP-OP-1014 Rev 4	Reference Attached: PAP-1404 p 4 & NOP-OP-1014 p 26

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	Perry 2015 # RO-06
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2015
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

The Reactor has been shutdown in order to replace a defective fuel bundle.

RPV Pressure is 100 psig with a cooldown in progress.

Radiation Protection tech reports that a Containment atmosphere air sample indicates iodine levels are at 0.5 DAC.

How should Containment Vessel and Drywell Purge System (M14) be operated?

A. in the Refuel Mode

B. in Containment Venting

C. in the Intermittent Mode

D. in Single Train Drywell Ventilation Operation

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 7

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.3.14
	Importance Rating	3.4	

K&A: Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

Generic

Explanation: **Answer C –** SOI-M14 P&L 2.5 CVDWP operation when iodine levels > 0.3 DAC. With the RPV pressure at 100 psig, the Rx is in Mode 3. CVDWP can only be operated in Intermittent Mode in Mode 3.

A – Incorrect – Refuel Mode not available in Mode 3.

B – Incorrect – Containment Venting shall not be used if Intermittent Mode is available.

D – Incorrect – Single Train Drywell Operation not available in Mode 3.

Technical Reference(s): SOI-M14 Rev 25	Reference Attached: SOI-M14 pp 4 & 64

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M14-H

Question Source:	Bank #	Perry 2007 # SRO-05
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2007
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

A transient has occurred that requires venting containment.

IAW EOP-02, Primary Containment Control, when should venting be performed?

Containment venting should only be performed if ____.

A. Primary Containment Limit will be exceeded

B. Pressure Suppression Pressure will be exceeded

C. Evacuation of affected areas has been completed

D. Containment Spray cannot control containment temperature

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 8

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.3.11
	Importance Rating	3.8	

K&A: Ability to control radiation releases.

Generic

Explanation: **Answer A –** IAW EOP-02, containment venting is performed prior to exceeding PCL.

B – Incorrect – PSP is 15 psig for Perry and preparation for containment venting occurs at this pressure. PCL is much higher. No venting is required for exceeding PSP.

C – Incorrect – While venting should be coordinated with evacuation, there is no requirement to have evacuation complete prior to venting.

D – Incorrect – Venting is done if containment sprays cannot maintain containment pressure, not containment temperature.

Technical Reference(s): EOP-2 Bases Rev 3	Reference Attached: EOP-2 Bases pp 68 - 70

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-09-B

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

What is the definition of Minimum Steam Cooling Pressure?

MSCP is the lowest RPV pressure at which ____.

A. the covered portion of the reactor core will generate sufficient steam to prevent fuel clad temperature in the uncovered portion of the core from exceeding 2200°F

B. the covered portion of the reactor core will generate sufficient steam to prevent fuel clad temperature in the uncovered portion of the core from exceeding 1500°F

C. steam flow through open SRVs is sufficient to preclude fuel clad temperature from exceeding 2200°F even if the core is not completely covered

D. steam flow through open SRVs is sufficient to preclude fuel clad temperature from exceeding 1500°F even if the core is not completely covered

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

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 D –** This is the definition per EOP Bases.

A – Incorrect – This is a combination of the definition of Minimum Zero Injection RPV Water Level and the General Design Criteria Peak Cladding Temperature.

B – Incorrect – This is the definition of Minimum Zero Injection RPV Water Level.

C – Incorrect – This is the wrong temperature for the MSCP.

Technical Reference(s): EOP Bases Rev 6	Reference Attached: EOP Bases p 43

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-01-C.27

Question Source:	Bank #	Columbia 2009 # RO-74
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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

A plant startup is in progress with the following conditions:

- Rx Power is at 18%.
- Main condenser vacuum at 4.5”HgA.
- Feedwater shift from MFP to RFPT B just commenced.

Chart recorder N21-R183, Main Condenser Shell Vacuum indicates vacuum is degrading at 0.5”HgA per minute.

With no operator action, what is the minimum time until SRV’s are required for pressure control?

A. 7 minutes

B. 14 minutes

C. 31 minutes

D. 34 minutes

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 10

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	3	
	Group #		
	K/A#	Generic	2.4.47
	Importance Rating	4.2	

K&A: Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.

Generic

Explanation: **Answer C –** This is the time that corresponds to Bypass Valve closure. At this point pressure control needs to be transferred to SRV's.

A – Incorrect – This is the time that corresponds to the Main Turbine trip. At 18% Rx power, Bypass valves will open and control RPV pressure.

B – Incorrect – This is the time that corresponds to a RFPT trip. Since a FW shift is in progress, the Motor Feed Pump will continue to run for level control.

D – Incorrect – This is the time that corresponds to MSIV closure. Pressure control will need to be on SRV's, but this is not the earliest time.

Technical Reference(s): ONI-N62 Rev 10	Reference Attached: ONI-N62 p 4

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-10(LP)-A.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 11

The plant was being restored to full power following a sequence exchange when the following occurred:

- Indications of failure of a jet pump riser in loop A were observed.

Using the attached Periodic Log, what is required per Tech Specs?

Attachment Provided: Periodic Log (modified)

A. Reduce Thermal Power to <2500 MWt within 1 hour.

B. Restore MCPR to within limits or reduce Thermal Power to <23.8%.

C. Restore LHGR to within limits or reduce Thermal Power to <23.8%.

D. Restore APLHGR to within limits or reduce Thermal Power to <23.8%.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 11

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295001	AK1.03
	Importance Rating	3.6	

K&A: Knowledge of the operational implications of the following concepts as they apply to Partial Or Complete Loss Of Forced Core Flow Circulation: Thermal limits

Partial or Complete Loss of Forced Core Flow Circulation

Explanation: **Answer B –** The attached Periodic log shows MFLCPR is > 1.0 at core location 19-30. With MFLCPR >1.0, MCPR would be exceeded. Per TS 3.2.2, with any MCPR not within limits, this is the correct action. The RO's are required to know actions for exceeding thermal limits even though the actions are > 1 hour.

A – Incorrect – This is the correct action for TS 3.4.1 for Single Loop.

C – Incorrect – Correct action for Exceeding LHGR. However, LHGR has not been exceeded as indicated by MFLPD < 1.0 in all locations.

D – Incorrect – Correct action for Exceeding ALHGR. However, ALHGR has not been exceeded as indicated by MAPRAT < 1.0 in all locations.

Technical Reference(s): TS 3.2.2, Lesson Plan OT-3302-09 Rev 4, & PRI-TSR Rev 36	Reference Attached: TS 3.2.2 p 3.2-2, OT-3302-09(LP) p 18, & PRI-TSR p 45

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3037-06-E

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Attach Modified Periodic Log to question.

QUESTION RO 12

The plant is operating at 90% rated power.
Interbus Transformer LH-1-B is tagged out for performance of a deluge test when the following occurs:

- Interbus Transformer LH-1-C trips on Neutral Ground Overcurrent.

With no operator action, which of the following describes the status of the plant one minute after LH-1-C trips?

A. The plant will scram. RPV level is controlled by HPCS and RCIC.

B. The plant will scram. RPV level is controlled by the Motor Feed Pump.

C. The plant will not scram. Rx power will remain the same and RFPT's will control RPV level.

D. The plant will not scram. However, Rx power will lower and RFPT B and the Motor Feed Pump will control RPV level.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 12

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295003	AA2.02
	Importance Rating	4.2	

K&A: Ability to determine and/or interpret the following as they apply to Partial Or Complete Loss Of A.C. Power: Reactor power / pressure / and level

Partial or Complete Loss of AC

Explanation: **Answer A –** With LH-1-B tagged out, all BOP loads will be on LH-1-C. When LH-1-C trips, the RFBP's trip resulting in a loss of RFPT's and the MFP. The loss of feed causes a reactor scram and the auto start of RCIC and HPCS on L2. (This occurs in about 35 seconds) This was run in the simulator on 4/29/16.

B – Incorrect – Plausible since the MFP is fed from a 13.8 KV bus. However, the loss of RFBP's cause a trip on the MFP.

C – Incorrect – Plausible if operator does not recall the Bus H11 is normally fed from LH-1-B and now transferred to LH-1-C.

C – Incorrect – Plausible since initially, the Recirc system runs back. However, the loss of feed will cause a Rx scram.

Technical Reference(s): ARI-H13-P870-01 Rev 15, PDB-H06 Rev 0, ONI-R22-2 Rev 10	Reference Attached:): ARI-H13-P870-01 p 47, PDB-H06 pp 3 & 4, ONI-R22-2 pp 4 & 6

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-10(LP)-A.3

Question Source:	Bank #	
	Modified Bank #	Limerick 2012 # RO-02
	New	
Question History:	Previous NRC Exam	
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

RHR B Pump is running on Minimum Flow.

What impact does losing ED-1-B have on RHR Pump B breaker?

A. Remote breaker tripping is prevented.
Local manual tripping capability remains.
Protective relaying is lost.

B. Remote breaker tripping is prevented.
Local manual tripping capability remains.
Protective relaying will function.

C. Remote and local breaker tripping is prevented.
Protective relaying will function.

D. Remote and local breaker tripping is prevented.
Protective relaying is lost.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 13

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295004	2.2.37
	Importance Rating	3.6	

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

Partial or Total Loss of DC Pwr

Explanation: **Answer A –** With the RHR B pump running, and a loss of ED-1-B, remote (control room) tripping capability is lost. Also, ED-1-B provides power to the protective relaying for this pump. The pump can be tripped by the manual trip pushbutton on the front of the breaker.

B – Incorrect – Plausible if operator thinks protective relaying is provided from safety related 120VAC. Some of the protective relaying has AC inputs, but is powered from DC.

C – Incorrect – Local tripping is still available. Plausible is operator does not know the opening springs are charged when the breaker is closed. And, protective relaying will not function.

D – Incorrect – Local tripping is still available. Plausible is operator does not know the opening springs are charged when the breaker is closed.

Technical Reference(s): ONI-R42-2 Rev 7 and SDM-R10 Rev 12	Reference Attached: ONI-R42-2 pp 5 & 8 and SDM-R10 p 57

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-05(LP)-A.2

Question Source:	Bank #	Nine Mile 2 2012 # RO-75
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 14

The plant was operating at 25% rated power with the following conditions:

- The Motor Feed Pump was tagged out for a lube oil leak.
- RFPT A is in AUTO
- RFPT B is shutdown

Then a main turbine trip occurred.

Two minutes later the following conditions exist:

- The Reactor Mode Switch is in SHUTDOWN
- RFPT A is in AUTO on Setpoint Setdown
- RPV Water Level is 185”
- RPV Pressure is at 900 psig

What is the status of RPV level control when RPV pressure lowers to 775 psig?

RFPT A is ____.

A. feeding the vessel with RFPT speed stable, and RPV level is rising

B. feeding the vessel with RFPT speed decreasing, and RPV level is rising

C. not feeding the vessel with RFPT speed stable, and RPV level is lowering

D. not feeding the vessel with RFPT speed decreasing, and RPV level is lowering

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 14

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295005	AK1.03
	Importance Rating	3.5	

K&A: Knowledge of the operational implications of the following concepts as they apply to Main Turbine Generator Trip: Pressure effects on reactor level

Main Turbine Generator Trip

Explanation: **Answer A –** With Setpoint Setdown activated and RPV level at 185" and RFPT in AUTO, it will not be feeding the RPV and the turbine speed will be ~3300 RPM with discharge pressure about 800 psig. Once RPV pressure lowers to <800 psig, the RFPT will start to feed, but speed will remain @ 3300 rpm. Since pressure is <940 psig, the bypass valves will be closed resulting in minimal inventory loss and RPV level rising. This response was verified in the simulator on 7/11/16 – RJT.

B – Incorrect – RFPT speed will remain the same.

C – Incorrect – RFPT will be feeding the RPV. Plausible that level is lowering if not feeding.

D – Incorrect – RFPT will be feeding the RPV and RFPT speed will remain the same. Plausible that level is lowering if not feeding.

Technical Reference(s): OAI-1703 Rev 27 and SOI-C34 Rev 35	Reference Attached: OAI-1703 p 40 and SOI-C34 p 35

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-N27-C.6 & OT-3035-01(LP)-A.1

Question Source:	Bank #	Perry 2009 # RO-15
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2009
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 is starting up with main generator synchronization in progress per IOI-3, Power Changes.

I&C is troubleshooting 1A MSR Drain Tank Normal and Alternate drain valves.
Both drain valves stick closed.
Then, annunciator MOISTURE SEPARATOR DRN TANK 1A LVL HIGH alarms.

What is the expected plant response if the 1A MSR Drain Tank drain valves cannot be reopened?

A. Reactor scram only

B. Main turbine trip only

C. Reactor scram and main turbine trip

D. No reactor scram or main turbine trip

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 15

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295006	AK2.04
	Importance Rating	3.6	

K&A: Knowledge of the interrelations between SCRAM and the following: Turbine trip logic

SCRAM

Explanation: **Answer B –** With gen synch in progress, Rx power is ~15-18%. A high level in any MSR level instrument will cause a turbine trip. However, since Rx power is within the capability of the bypass valves, the Rx does not scram.

A – Incorrect – Plausible is operator believes Rx will scram but no turbine trip will occur if generator not synchronized to grid.

C – Incorrect – No Rx scram will occur. Plausible if operator assumes a turbine trip at this power level will cause a Rx scram.

D – Incorrect – Plausible since most other logic trip systems are at least 1 out of 2, not single input.

Technical Reference(s): ARI-H13-P870-05 Rev 4 & ONI-N32 Rev 11, Dwg 302-111 Rev HH, SDM-N36 Rev 9	Reference Attached: ARI-H13-P870-05 p 3 & ONI-N32 p 4, Dwg 302-111, SDM-N36 pp 16-17 & 22

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-09(LP)-B.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 16

The quarterly RCIC pump and valve surveillance test was in progress with RCIC running in CST to CST mode.

Then ONI-C61, Evacuation Of The Control Room, was entered due to a toxic gas release.

Which of the following are Immediate Actions to be performed by the reactor operator?

1. Trip the RCIC turbine
2. Transfer Div 1 Diesel Generator to LOCAL
3. Scram the reactor
4. Trip the Main Turbine
5. Verify control rods are inserted
6 Initiate CO_2 for all three subfloor areas

A. 1, 2, and 3

B. 2, 3, and 4

C. 3, 4, and 5

D. 4, 5, and 6

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 16

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295016	AK3.02
	Importance Rating	3.7	

K&A: Knowledge of the reasons for the following responses as they apply to Control Room Abandonment: Turbine trip

Control Room Abandonment

Explanation: **Answer C –** These are some of the Immediate Actions required when ONI-C61 is entered.

A – Incorrect – Tripping the RCIC turbine is plausible since there is a P&L in the SVI that says to discontinue testing in event of initiation signal. Also, Div 3 DG is transferred to Local, not Div 1.

B – Incorrect – Plausible since Div 3 DG is transferred to Local, not Div 1.

D – Incorrect – Initiating CO2 is correct in the event of a fire. However, the control room was abandoned due to a toxic gas release.

Technical Reference(s): ONI-C61 Rev 9, SVI-E51-T2001 Rev 37	Reference Attached: ONI-C61 pp 3-4

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-13(LP)-A.5

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 17

The plant is operating at 100% power.

- TBCC HX OUTLET TEMP HIGH alarm is received on panel H13-P870
- ONI-P44, Loss of Turbine Building Closed Cooling, has been entered
- TBCC Heat Exchanger Outlet Temperature Control Valve, 1P41-F003, was confirmed to have failed in the 'close' position

Which of the following describes the plant response to the loss of TBCC if no operator actions are taken?

A. The running Service Air Compressor will trip when its lube oil temperature reaches 158 °F.

B. The Main Turbine will trip when the Main Lube Oil Cooler outlet temperature reaches 125 °F.

C. The Rx Feed Pump Turbines will trip when the RFPT lube oil cooler outlet temperature reaches 135 °F.

D. The running Isolated Phase Bus Cooling Fan will trip when the Isolated Phase Bus Duct temperature reaches 185 °F.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 17

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295018	AK2.01
	Importance Rating	3.3	

K&A: Knowledge of the interrelations between Partial Or Complete Loss Of Component Cooling Water and the following: System loads

Partial or Total Loss of CCW

Explanation: **Answer D** – The running IsoPhase Bus cooling fan will trip at 185°F in the bus duct.

A – Incorrect – Plausible since the Service Air compressor trips at 158°F LO temperature but is cooled by NCC not TBCC.

B – Incorrect – Plausible since Main Turbine LO alarms at 125°F, but it will not trip. The MT will trip on a stator water run back.

C – Incorrect – Plausible since RFPT's LO alarms at 135°F, but it will not trip.

Technical Reference(s): ONI-P44 Rev 11, ARI-H13-P680-07 Rev 26, ARI-H13-P870-08 Rev 7, & ARI-H13-P680-15 Rev 6	Reference Attached: ONI-P44 pp 3-4, ARI-H13-P680-07 p 115, ARI-H13-P870-08 p 7, & ARI-H13-P680-15 p 3

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P44-J.2 & OT-3035-02(LP)-A.1

Question Source:	Bank #	Perry 2001 # RO-20
	Modified Bank #	
	New	
Question History:	Previous NRC Exam Perry 2001	
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 18

With the plant operating at rated power, an air leak occurs resulting in the following:

- Unit 1 and Unit 2 Instrument Air receiver pressures are 85 psig and lowering
- Unit 1 and Unit 2 Service Air receiver pressures are 95 psig and lowering

Which of the following describes how the Service Air/Instrument Air Cross-Connect Valves, 1P52-F050 & 2P52-F050, respond to these conditions, including the bases for this response?

The Service Air/Instrument Air Cross-Connect Valves ____.

A. close to completely isolate the Service Air and Instrument Air headers

B. close to prevent a leak in the Service Air header from impacting the Instrument Air header

C. remain open. However, they will close if Service Air receiver pressure lowers to 90 psig in order to completely isolate the Service Air and Instrument Air headers

D. remain open. However, they will close if Instrument Air receiver pressure lowers to 80 psig in order to prevent a leak in the Service Air header from impacting the Instrument Air header

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 18

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295019	AK3.03
	Importance Rating	3.2	

K&A: Knowledge of the reasons for the following responses as they apply to Partial Or Complete Loss Of Instrument Air: Service air isolations

Partial or Total Loss of Inst. Air

Explanation: **Answer B –** The cross-connect valves will close when Instrument Air receiver pressure is <90 psig to protect the Instrument Air system from a leak in the Service Air system.

A – Incorrect – Check valves around the P52-F050 valves allow Service Air to continue to supply Instrument Air when the F050 valves are closed

C – Incorrect – P52-F050 valves are closed - Service air can still supply instrument air header. Therefore, they are not completely isolated from each other

D – Incorrect – P52-F050 valves are closed. Plausible, as some valves in various systems begin to reposition to their fail positions at 80 psig.

Technical Reference(s): SOI-P51/52 Rev 31 & Lesson Plan OT-COMBINED-P51_P52 Rev 4	Reference Attached: SOI-P51/52 p 4 & Lesson Plan OT-COMBINED-P51_P52 p 11

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P51_52 #17

Question Source:	Bank #	Perry 2010 # RO-17
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2010
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 19

The plant is cooling down for a maintenance outage with the following conditions:

- RHR Pump 'B' is operating in Shutdown Cooling Mode at 7000 gpm
- RPV level is 200 inches
- RPV pressure is 15 psig

Then, RPV level lowered to 175 inches.

Given these conditions, which of the following describes the impact, if any, to the RHR System?

NOTE - Valve Functional Locations are as follows:
- 1E12-F008, SHUTDOWN COOLING OUTBD SUCT ISOL VLV
- 1E12-F009, SHUTDOWN COOLING INBD SUCT ISOL VLV
- 1E12-F053B, RHR B TO FEEDWATER S/D COOLING RTRN VLV

A. Only 1E12-F009 closes

B. 1E12-F008 and 1E12-F009 close

C. RHR Pump 'B' continues to operate at 7000 gpm

D. 1E12-F053B closes; RHR Pump 'B' continues to runs on Min Flow

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 19

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295021	AA1.02
	Importance Rating	3.5	

K&A: Ability to operate and/or monitor the following as they apply to Loss Of Shutdown Cooling: RHR/shutdown cooling

Loss of Shutdown Cooling

Explanation: **Answer B –** When RPV level lowers to 178", a L3 SDC isolation occurs closing all SDC valves.

A – Incorrect – Plausible if the operator incorrectly believes that F009 (Div 2 valve) does not receive an auto closure signal with RHR Pump 'B' (Div 2 Pump) running.

C – Incorrect – Plausible if the examinee incorrectly believes that the low RPV water level isolation setpoint has not been exceeded and that RHR Pump 'B' is therefore unaffected by the conditions listed in the stem.

D – Incorrect – Plausible if the examinee incorrectly believes that the Min Flow Valve will open in a SDC lineup.

Technical Reference(s): ARI-H13-P680-05 Rev 15, ONI-E12-2 Rev 36, and SDM-E12 Rev 3	Reference Attached: ARI-H13-P680-05 p 27, ONI-E12-2 p 17, and SDM-E12 p 51

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): to-combined-E12-F & OT-3035-11(LP)-A.1

Question Source:	Bank #	Clinton 2013 # RO-12
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 20

The plant is shutdown for a refuel outage with the following conditions:

- Fuel movement is in progress in the Spent Fuel Pool.
- An irradiated fuel assembly has just been loaded on the Fuel Handling Bridge main hoist and raised to the Full Up position.

Then, a seismic event results in the following:

- The Fuel Handling Bridge main hoist cannot be moved.
- The common suction line from the Fuel Pool Cooling and Cleanup pumps completely ruptures.

Which of the following describes the Spent Fuel Pool water level response to this event and the availability of Spent Fuel Pool makeup?

The fuel assembly on the hoist will be __(1)__ .
Makeup water to the Spent Fuel Pool is available from __(2)__ .

	(1)	(2)
A.	fully submerged	Condensate Transfer System
B.	fully submerged	Fire Water System using hoses
C.	partially uncovered	Condensate Transfer System
D.	partially uncovered	Fire Water System using hoses

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 20

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295023	AA2.02
	Importance Rating	3.4	

K&A: Ability to determine and/or interpret the following as they apply to Refueling Accidents: Fuel pool level

Refueling Acc

Explanation: **Answer B –** With a rupture on the FPCC pump line, water in the Spent Fuel Pool will only lower a few inches to the siphon breakers. The main hoist will not raise the fuel higher than 8' 3" below the Fuel Handling Building Floor. With the FPCC pump line rupture, makeup will be from the Fire Water system as the Condensate transfer system puts water into the surge tanks.

A & C (2nd part) – Incorrect – CTS will fill the surge tanks, not the Fuel Pools without the FPCC pumps.

C & D (1st part) – Incorrect – The fuel will remain fully submerged. Plausible if the operator does not recall that the siphon breakers will limit pool level loss to a few inches.

RO level justification – At Perry, RO will supervise bridge movements in the Fuel Handling Building.

Technical Reference(s): ONI-E12-2 Rev 36, SOI-F11 Rev 18, SDM-G41 Rev 7, Dwg 302-654 Rev T & Dwg 302-655 Rev Z	Reference Attached: ONI-E12-2 pp58-59, SOI-F11 p 5, SDM-G41 pp 12-13, Dwgs 302-654 & 655

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-F11_F15-H, OT-COMBINED-G41-R, OT-3035-11(LP)-A.1

Question Source:	Bank #	
	Modified Bank #	Nine Mile 2013 # RO-10
	New	
Question History:	Previous NRC Exam	
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 following conditions exist:

- A small break Loss of Coolant Accident (LOCA) has occurred
- HCPS has automatically initiated
- Drywell pressure peaked at 3.0 psig
- RPV water level has lowered to -10 inches
- The operators are restoring plant parameters at this time

How would the HPCS Initiation logic be reset in order to place HPCS in Standby Readiness?

A. Manually after the low RPV level signal clears

B. Automatically upon RPV level reaching Level 8

C. Manually after the high DW pressure signal clears

D. Automatically after both high DW pressure and low RPV level signals clear

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 21

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295024	2.1.28
	Importance Rating	4.1	

K&A: Knowledge of the purpose and function of major system components and controls.

High Drywell Pressure

Explanation: **Answer A –** If level is >L2, HPCS initiation logic can be reset even if a High DW Pressure condition still exists. If HPCS is not needed for level control, it may be placed in Standby Readiness.

B – Incorrect – Plausible since HPCS will stop injecting at L8, but the Initiation Logic will not be reset. There is no automatic reset for the HPCS initiation logic.

C – Incorrect – RPV level must be > 129" to reset HPCS initiation logic. Plausible if operator doesn't recall HPCS can be reset only after RPV level recovers above L2 and not by lowering DW pressure..

D – Incorrect – There is no automatic reset for the HPCS initiation logic.

Technical Reference(s): Lesson Plan OT-COMBINED-E22 Rev 4, SOI-E22A Rev 36, & SDM-E22A Rev 8	Reference Attached: E22 Lesson Plan pp 11-12, SOI-E22A p 16, & SDM-E22A p 22

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-E22A-F.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

Following a 300 day run, a failure in the Steam Bypass and Pressure Regulating System caused a reactor scram due to high Rx pressure, last night.

Current conditions are as follows:

- RHR A is running in Shutdown Cooling
- RPV level is 250" stable
- RPV temperature is 135°F stable
- MSIVs are shut
- No Rx Recirc pumps are running

Based on expected decay heat load, which of the following describes the response if 1E12-F003A, RHR A HX OUTLET VALVE is throttled closed for 5 seconds?

Bulk reactor water temperature will ____.

A. lower until equal with ESW A Loop temperature

B. lower until equal with ambient drywell temperature

C. rise until boiling occurs and Rx pressure stabilizes at atmospheric pressure

D. rise until boiling occurs causing Rx pressure to rise above atmospheric pressure

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 22

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295025	EK1.04
	Importance Rating	3.6	

K&A: Knowledge of the operational implications of the following concepts as they apply to High Reactor Pressure: Decay heat generation

High Reactor Pressure

Explanation: **Answer D –** With RPV temperature stable, closing the E12-F003 for 5 seconds will significantly reduce amount of cooling provided by RHR. Decay heat generation <1 day after shutdown is between 70-80 MBTU's/Hr. Therefore, temperature will rise and with MSIV's shut, RPV pressure will rise above atmospheric pressure.

A – Incorrect – Plausible if operator believes closing the F003 valve will provide more cooling (i.e. confusing with the F048, Bypass Valve)

B – Incorrect – Plausible if operator assumes decay heat load is low enough (at < 1 day) to be handled by ambient loss.

C – Incorrect - RPV pressure will rise above atmospheric pressure. Plausible if operator assumes head vent will be sufficient to prevent pressure rise.

Technical Reference(s): PDB-A16 Rev 15 & ONI-E12-2 Rev 36	Reference Attached: PDB-A16 p 4 & ONI-E12-2 p 83

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	Peach Bottom 2013 # RO-13
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 US has entered ONI-B21-1, SRV INADVERTENT OPENING / STUCK OPEN.

Refer to the attached SUPR POOL TEMP VALIDATION SPDS screen printout.

What does this indicate concerning average suppression pool temperature?

Average Suppression Pool Temperature ____.

Attachment provided: Screen print of SPDS

A. has exceeded the SPDS Alarm High setpoint

B. is approaching an EOP Entry value

C. is NOT VALIDATED on SPDS

D. is VALIDATED on SPDS

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 23

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295026	EK2.04
	Importance Rating	2.5	

K&A: Knowledge of the interrelations between Suppression Pool High Water Temperature and the following: SPDS/ERIS/CRIDS/GDS

Suppression Pool High Water Temp.

Explanation: **Answer C –** SP Temp is one of eleven 'control parameters' in SPDS. The SP Temp reading on the Validation screen is the AVERAGE SP Temp. If an SPDS 'control parameter' reading has an invalid input, the box displaying the value turns from cyan to yellow. This indicates that the reading is no longer validated.

A – Incorrect – Plausible since some selected values change color when approaching an EOP setpoint.

B – Incorrect – Plausible, as EOP entry condition values change color (RED) when exceeded

D – Incorrect – Plausible if the operator does not recall that a yellow box indicates the reading is not valid.

Technical Reference(s): OT-COMBINED-C91 Lesson Plan Rev 1 & SPDS Users Manual Appendix H Rev G	Reference Attached: OT-COMBINED-C91 Lesson Plan p 14 & SPDS Users Manual Appendix H pp 33, 39, 178

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C91-I & O

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 24

In accordance with EOP Bases, why is Emergency Depressurization required to be performed prior to reaching the Containment Design Temperature?

A. To preclude containment failure following initiation of containment sprays.

B. The environmental qualification temperature limit of SRV solenoids may be exceeded.

C. The environmental qualification temperature for safety related electrical equipment may be exceeded.

D. The Pressure Suppression function may no longer be able to absorb the energy from a loss of coolant accident.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 24

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295027	EK3.01
	Importance Rating	3.7	

K&A: Knowledge of the reasons for the following responses as they apply to High Containment Temperature (Mark III Containment Only): Emergency depressurization: Mark-III

High Containment Temperature

Explanation: **Answer C –** The containment design temperature limit of 185°F is based on not exceeding the environmental qualifications of safety related electrical equipment. Emergency depressurizing prior to reaching 185°F will maintain equipment operability for as long as possible.

A – Incorrect – This is the bases for initiating containment spray in the SAFE region of the CSIL graph.

B – Incorrect – This is the bases for the Drywell temperature limit.

D – Incorrect – The Pressure suppression function is based on suppression pool temperature and level.

Technical Reference(s): EOP Bases Rev 6 & EOP-2 Bases Rev 3	Reference Attached: EOP Bases p 66 & EOP-2 Bases pp 77-78

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-07-C

Question Source:	Bank #	INL-0778
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 25

The following conditions exist:

- The reactor was scrammed from 25% rated power
- A low power ATWS is in progress
- Emergency Depressurization was required
- All SRV's failed to open
- RCIC suction is on the suppression pool
- RCIC is providing RPV level and pressure control
- Suppression Pool level is lowering 1 inch per minute
- Current suppression pool level is 15 feet 2 inches

Per EOP Bases, the earliest that continued operation of RCIC will be threatened due to possible RCIC equipment damage is in ____ minutes.

A. 11

B. 35

C. 95

D. 113

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 25

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295030	EA1.02
	Importance Rating	3.4	

K&A: Ability to operate and/or monitor the following as they apply to Low Suppression Pool Water Level: RCIC

Low Suppression Pool Wtr Lvl

Explanation: **Answer C –** With suppression pool level lowering at 1"/minute, it will take 95 minutes to reach 7.25'. At this level, pump damage from operation below the vortex limit becomes a concern.

A – Incorrect – This is the time to the Suppression Pool ED level limit

B – Incorrect – This is the time to uncover the horizontal vents

D – Incorrect – This is the time when damage to RHR and LPCS may occur

Technical Reference(s): EOP Bases Rev 6	Reference Attached: EOP Bases pp 60-61

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-01-B.2

Question Source:	Bank #	Perry 2010 # RO-25
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2010
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 26

The plant was operating at rated power when a total loss of Feedwater occurred.

The only operator action taken was to place the Mode Switch in Shutdown.

No control rod motion occurred.

Given these conditions, which of the following describes Redundant Reactivity Control System response to lower reactor power?

When RPV level reaches ____.

A. Level 3, the Rx Recirc Pumps will always trip to OFF

B. Level 2, the Rx Recirc Pumps will always trip to OFF

C. Level 3, the Rx Recirc Pumps will trip to OFF if APRM's are not down scale in 25 seconds

D. Level 2, the Rx Recirc Pumps will trip to OFF if APRM's are not down scale in 25 seconds

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 26

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295031	EA2.02
	Importance Rating	4.0	

K&A: Ability to determine and/or interpret the following as they apply to Reactor Low Water Level: Reactor power

Reactor Low Water Level

Explanation: **Answer B –** When RPV level lowers to 2, RRCS causes Recirc Pumps to trip to OFF.

A – Incorrect – At RPV L3, RRCS causes pumps to down shift to slow speed.

C – Incorrect – Plausible if operator mistakes L2 actions for L3 actions.

D – Incorrect – This is the correct action for a Hi Rx Pressure signal, not low Rx water level.

Technical Reference(s): ARI-H13-P680-05 Rev 15	Reference Attached: ARI-H13-P680-05 pp 5 & 7

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C22-F

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 with the High Pressure Core Spray Pump out of service for a motor replacement.

Then a loss of offsite power occurred.

Immediate operator actions for a Reactor Scram were completed.

Five minutes after the loss of power the following conditions exist:

- Division 3 Diesel Generator is the only DG operating
- RCIC auto started and is injecting
- RPV pressure is cycling between approximately 930 psig and 1080 psig
- SRV B21-F051C is cycling open and close
- SRV B21-F051D opened and remains open

Which of the following abnormal and/or emergency procedures/charts should have been/will be entered based on the conditions above?

1. ONI-R10-1, Loss of AC Power
2 ONI-R10-2, Station Blackout
3. ONI-B21-1, SRV Inadvertent Opening/Stuck Open
4. EOP-01, RPV Control
5. EOP-1A, Level Power Control

A. 1 and 3

B. 2 and 3

C. 2, 3, and 4

D. 2, 4, and 5

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 27

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	295037	2.4.4
	Importance Rating	4.5	

K&A: Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

SCRAM Condition Present and Power Above APRM Downscale or Unknown

Explanation: **Answer D –** With a loss of off-site power, and the HPCS DG the only DG running, but the pump is unavailable, then ONI-R10 TLAC is entered. Since RCIC auto started, RPV level lowered to <L2 then EOP-1 is also entered. And, since one SRV is open and one SRV is cycling, the reactor is still producing power and above 4% (1 SRV≅5%) EOP-1A is also entered.

A – Incorrect – Plausible since the Div 3 DG is running. But, without the HPCS pump, TLAC is entered. Also since 1 SRV is open and 1 is cycling, ONI-B21-1 is also plausible.

B – Incorrect – Plausible since 1 SRV is open and 1 is cycling. But, this indicates the Rx is still making power.

C – Incorrect – Plausible since 1 SRV is open and 1 is cycling. But, this indicates the Rx is still making power.

Technical Reference(s): ONI-B21-1 Rev 11, ONI-R10 Rev 13, EOP-1 Bases Rev 6, EOP-1A Bases Rev 8, PYBP-POS-30 Rev 3	Reference Attached: ONI-B21-1 p 12, ONI-R10 pp 3, 8 & 14, EOP-1 Bases p 8 , EOP-1A Bases p 8 , PYBP-POS-30 p 9

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-18(LP)-A.4, OT-3035-07(LP)-E, OT-3402-02-B & F

Question Source:	Bank #	
	Modified Bank #	River Bend 2003 # SRO-76
	New	
Question History:	Previous NRC Exam	
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

What is the EOP Bases for restarting Heater Bay Building ventilation when operating in EOP-5, Radioactivity Release Control?

A. Ensures that Turbine Building air is filtered prior to releasing to the environment.

B. Ensures that Turbine Building air is monitored prior to releasing to the environment.

C. Allows for continued access to the Turbine Building Steam Tunnel without exceeding the maximum safe operating radiation level.

D. Allows for continued access to the Turbine Building Steam Tunnel without exceeding the maximum safe operating temperature level.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 28

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

K&A: Knowledge of the operational implications of the following concepts as they apply to High Off-Site Release Rate: Protection of the general public

High Off-site Release Rate

Explanation: **Answer B –** Per the EOP-5 Bases, HB Ventilation is restarted to ensure that radioactivity released in the turbine building is discharged through a monitored release point.

A – Incorrect – Heater Bay ventilation does not contain a charcoal filter. Plausible since the ventilation systems on EOP-3 contain charcoal filters.

C – Incorrect – The Max Safe Operating Conditions are monitored in EOP-3, not EOP-5. Plausible since both the Steam Tunnel and the Heater Bay are connected to the turbine building, but the ventilation systems are not connected. Plausible since the HB Exhaust takes a suction on the TB & HB.

D – Incorrect – The Max Safe Operating Conditions are monitored in EOP-3, not EOP-5. Plausible since both the Steam Tunnel and the Heater Bay are connected to the turbine building, but the ventilation systems are not connected. Plausible since the HB Exhaust takes a suction on the TB & HB.

Technical Reference(s): EOP-3 Bases (EOP-5) Rev 5	Reference Attached: EOP-3 Bases (EOP-5) p 72

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	RQL-41692
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 29

A fire has been detected in the Lube Oil Storage/Purifier Room.

In order to automatically initiate the installed CO_2 fire suppression system, how many detectors must activate and how long is the discharge delayed for?

One detector in __(1)__ must activate.
The discharge is delayed by __(2)__ seconds.

	(1)	(2)
A.	2 zones	60
B.	2 zones	20
C.	1 zone	60
D.	1 zone	20

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 29

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	600000	AK2.01
	Importance Rating	2.6	

K&A: Knowledge of the interrelations between Plant Fire On Site and the following: Sensors / detectors and valves

Plant Fire On Site

Explanation: **Answer A –** The MTLO CO_2 system requires 1 detector in each zone and is delayed by 60 seconds to allow personnel to evacuate the area.

B – Incorrect – Plausible since Halon system discharge is delayed by 20 seconds.

C – Incorrect – Requires 2 detectors to go into alarm. Plausible since the first detector causes a panel alarm.

D – Incorrect – Plausible since Halon system discharge is delayed by 20 seconds. And, requires 2 detectors to go into alarm. Plausible since the first detector causes a panel alarm.

Technical Reference(s): SOI-P54(GAS) Rev 8	Reference Attached: SOI-P54(GAS) p 16

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P54(CO_2)-F

Question Source:	Bank #	
	Modified Bank #	Perry 2015 # RO-74
	New	
Question History:	Previous NRC Exam	
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

The plant is operating at rated power with Division 1 Diesel Generator is running in parallel with the grid.

Then, SCC informs the control room that a Degraded Grid Condition exists.

This condition will require entry into __(1)__ .
And if Bus EH11 frequency is __(2)__ hertz, the Normal Preferred and/or Alternate Preferred breakers will automatically trip.

	(1)	(2)
A.	ONI-P56-4, Grid Threat	≤ 59
B.	ONI-P56-4, Grid Threat	≥ 61
C.	ONI-S11, Hi/Low Voltage	≤ 59
D.	ONI-S11, Hi/Low Voltage	≥ 61

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 30

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	1	
	K/A#	700000	AK3.02
	Importance Rating	3.6	

K&A: Knowledge of the reasons for the following responses as they apply to Generator Voltage And Electric Grid Disturbances: Actions contained in abnormal operating procedure for voltage and grid disturbances

Generator Voltage and Electric Grid Disturbances

Explanation: **Answer C –** Notification by SCC that a Degraded Grid Condition exists is an entry condition for ONI-S11. One of the Automatic Actions listed in ONI-S11 is the Pref. and Alt Pref. breakers will trip if bus frequency drops to ≤ 59 Hz. This UF trip will only happen if Bus EH11 is in parallel with the grid.

A – Incorrect – Plausible since the name of the ONI implies this could be correct.

B – Incorrect – Plausible since the name of the ONI implies this could be correct. The over freq is plausible if operator believes there is an over frequency trip.

D – Incorrect – The over frequency is plausible if operator believes there is an over frequency trip.

Technical Reference(s): ONI-S11 Rev 10, Dwg 208-206 Sh 27, Rev EE, Sh 46, Rev Z, Sh 66, Rev P	Reference Attached: ONI-S11 p 3-4, , Dwg 208-206 Sh 27, Sh 46, & Sh 66,

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-18(LP)-A.2

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 31

With the plant operating at rated power, which of the following alarms would result in a decrease in flow downstream of the steam jet air ejectors?

A. BYPASS VLV SHUT OG POST-TREAT PRCS RAD A/B HI

B. OG ISOL OG POST-TREAT PRCS RAD MON A/B 3XHI

C. MAIN STEAM LINE RADIATION HI HI/INOP

D. OG PRE-TREAT PRCS RAD MON RAD HIGH

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 31

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295002	AK3.06
	Importance Rating	2.9	

K&A: Knowledge of the reasons for the following responses as they apply to Loss Of Main Condenser Vacuum: Air ejector flow

Loss of Main Condenser Vac

Explanation: **Answer B –** Flow from the SJAE's is directed to the Offgas system. Receipt of a OG Post-Treat Prcs Rad Mon A/B 3XHI alarm will isolate Offgas. When Offgas is isolated, flow from the SJAE's is isolated and air and non-condensable gases will buildup in the main condenser causing a loss of main condenser vacuum.

A – Incorrect – Plausible since this alarm is an early indication of a potential fuel problem and this causes the absorber bypass valve to shut.

C – Incorrect – Plausible since this alarm is an early indication of a potential fuel problem and a MSL rad high will cause a trip of the hoggers if running.

D – Incorrect – Plausible since this alarm is an early indication of a potential fuel problem. However, no automatic isolations occur.

Technical Reference(s): ARI-H13-P604-01 Rev 6, ARI-H13-P601-19 Rev 19, SDM-N64 Rev 0	Reference Attached: ARI-H13-P604-01 pp 3, 7, & 13, ARI-H13-P601-19 p 25, SDM-N64 pp 5 & 41

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-D17A-I.1

Question Source:	Bank #	Grand Gulf 2014 # RO-12
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 32

The plant is at rated power with the following conditions:

- SVI-M51-T2003A Combustible Gas Mixing System A Operability Test is in progress with the A CGMC running
- The Containment Vessel And Drywell Purge System is running in Intermittent Mode
- Backup Drywell purge valves M51-F090 COMB GAS DW PURGE INBD ISOL and M51-F110 COMB GAS DW PURGE OTBD ISOL are open

Then the following alarms are received simultaneously on H13-P680:

- DW PRESS HI/LO
- AIRBORNE RAD P804

The BOP operator reports Drywell Gas Rad Monitor, D17-K676 has a HIGH alarm flashing

What automatic actions will occur?

A. Comb Gas Mix Sys A DW Isol Valve M51-F010A will close and the Combustible Gas Mixing Compressor will trip

B. All DW RAD MON INBD & OTBD SUCT & DISCH ISOL valves (D17-F071A/B and D17-F079A/B) will close

C. The Containment Vessel And Drywell Purge System dampers will close and fans will trip

D. The Backup Drywell purge valves M51-F090 & M51-F110 will close

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 32

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295010	AA1.05
	Importance Rating	3.1	

K&A: Ability to operate and/or monitor the following as they apply to High Drywell Pressure: Drywell/suppression vent and purge

High Drywell Pressure

Explanation: **Answer D –** A HIGH alarm on the DW Rad Monitor Gas channel will cause the B/U DW Purge valves to isolate.

A – Incorrect – Plausible since a BOP LOCA occurs at 1.68 psig in DW and will cause the M51-F010A to close and the compressor to trip. However, the DW PRESS HI/LO alarm comes in at 1.5 psig but can be confused with the RPS DW Press HI alarm at 1.68 psig.

B – Incorrect – Plausible since a BOP LOCA occurs at 1.68 psig in DW and will cause the rad monitor DW isolation valves to close. However, the DW PRESS HI/LO alarm comes in at 1.5 psig but can be confused with the RPS DW Press HI alarm at 1.68 psig.

C – Incorrect – Plausible since a BOP LOCA occurs at 1.68 psig in DW and will cause the CV&DWP dampers to close and the fans to trip. However, the DW PRESS HI/LO alarm comes in at 1.5 psig but can be confused with the RPS DW Press HI alarm at 1.68 psig.

Technical Reference(s): ARI-H13-P680-05 Rev 15 & ARI-H13-P680-07 Rev 26	Reference Attached: ARI-H13-P680-05 p 55 & ARI-H13-P680-07 pp 12 & 13

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M51_M56-1.7

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 was operating at rated power with the following conditions:

- An SRV inadvertently opened
- All appropriate ONI and ARI actions were completed
- SUPR POOL TEMP A/B HIGH annunciators in alarm on H13-P601
- RHR loop A was placed in Suppression Pool Cooling
- SPDS is not available

How would you monitor suppression pool temperature to evaluate the effectiveness of Suppression Pool Cooling?

Use the Post Accident Monitoring System (PAMS) ____.

A. Recorders on H13-P883 since they display the average Suppression Pool Temperature

B. Meters on H13-P601 since they display the average Suppression Pool Temperature

C. Meters on H13-P601 since they automatically display the highest Suppression Pool Temperature

D. Recorders on H13-P883 or PAMS Meters H13-P601 since they both display average Suppression Pool Temperature

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 33

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295013	AA1.01
	Importance Rating	3.9	

K&A: Ability to operate and/or monitor the following as they apply to High Suppression Pool Temperature: Suppression pool cooling

High Suppression Pool Temp.

Explanation: **Answer A –** The PAMS recorders display eight individual SP temperatures on channels 1-8 and the SP Average temperature on channel 9.

B – Incorrect – The PAMS meters on P601 display is controlled by selector switches manually positioned and located on P883 and can only display the selected channel. It cannot select channel 9.

C – Incorrect – The PAMS meters on P601 display is controlled by selector switches manually positioned and located on P883 and can only display the selected channel. If will not automatically switch to the highest channel.

D – Incorrect – The PAMS meter on P601 cannot display the 'average' SP temperature.

Technical Reference(s): ARI-H13-P601-17 Rev 15, SDM-D23 Rev 3, SVI-D23-T1213 Rev 8	Reference Attached: ARI-H13-P601-17 p 31, SDM-D23 pp 4, 9 & 17, SVI-D23-T1213 pp 10-11, Pic of P883(part)

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-D23-F

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 34

The plant was operating at rated power when an automatic scram occurred.

The SCRAM VALVES pushbutton on P680 is backlit red.

Upon depressing the SCRAM VALVES pushbutton all control rods have green LEDs illuminated on the full core display except for control rod 30-19.

Based on the above information, what is the correct status of the scram valves?

A. Control rod 30-19 is the only rod that has both scram valves open.

B. Control rod 30-19 is the only rod that does not have both scram valves open.

C. All scram valves are open since the SCRAM VALVE pushbutton is backlit red.

D. Control rod 30-19 has one scram valve open while all other control rod scram valves are closed.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 34

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

K&A: Ability to determine and/or interpret the following as they apply to Incomplete Scram: Control rod position

Incomplete SCRAM

Explanation: **Answer B –** IAW SOI-C11(RC&IS) Section 7.9.5, if SCRAM VALVES is backlit RED, it indicates that not all scram valves are in the same position (i.e. not all open or not all closed). All control rods with both scram valves open will be indicated by the green LED lit on the full core display. The lack of a green LED with the SCRAM VALVES pushbutton depressed indicates one or both of the scram valves are closed.

A – Incorrect – This is the opposite and is based on the misconception that a lack of lights has both scram valves open.

C – Incorrect – Red backlight means that not all scram valves are in the same position, it does not mean they are open.

D – Incorrect – Green is typically used for valve closed indications, except for scram valves.

Technical Reference(s): SOI-C11(RC&IS) Rev 29 & SDM-C11(RC&IS) Rev 9	Reference Attached: SOI-C11(RC&IS) p 35 & SDM-C11(RC&IS) p 36

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C11-RC&IS-1.16

Question Source:	Bank #	Perry 2007-1 #RO-34
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2007-1
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 100% power with Annulus Exhaust Gas Treatment System Fan A in operation.

The following conditions are present:

- A steam leak in the annulus
- ALERT and HIGH alarms on ANNULUS EHAUST GAS TREATMENT RADIATION Monitor A
- ALERT alarm on appropriate PLANT VENT GAS Radiation Monitor

Based on these conditions, what is the status of the associated (D19) Post Accident Radiation Monitor and what ONI IMMEDIATE ACTIONS is/are required?

The associated Post Accident Radiation Monitor __(1)__ running and require __(2)__ .

	(1)	(2)
A.	is	evacuation of the affected area and a reactor scram
B.	is	evacuation of the affected area only
C.	is not	evacuation of the affected area and a reactor scram
D.	is not	evacuation of the affected area only

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 35

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295017	2.2.44
	Importance Rating	4.2	

K&A: Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.

High Off-site Release Rate

Explanation: **Answer D –** The associated D19 rad monitor will start upon the receipt of a High alarm on the Plant Vent rad monitor. Also this requires entry into ONI-D17. Only an evacuation of the affected area is required.

A – Incorrect – The D19 rad monitor will not start on an ALERT on the Plant Vent D17. Plausible if operator thinks a HIGH on the AEGT D17 will start the D19. Also, Rx scram only required for a steam leak in the Offgas system, not the annulus

B – Incorrect – The D19 rad monitor will not start on an ALERT on the Plant Vent D17. Plausible if operator thinks a HIGH on the AEGT D17 will start the D19.

C – Incorrect – Plausible since a Rx scram is required for a steam leak in the Offgas system.

Technical Reference(s): ONI-D17 Rev 18, ARI-H13-P680-07 Rev 26	Reference Attached: ONI-D17 pp 3-5, ARI-H13-P680-07 pp 11-13

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-D17-O, OT-3035-17(LP)-A.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 plant is operating in EOP-02, Primary Containment Control.

Suppression Pool water level is approaching the SRV Tail Pipe Level Limit (SRVTPLL).

Which of the following actions would improve the margin to the SRVTPLL?

A. Operate RHR in the Suppression Pool Cooling mode.

B. Initiate the Suppression Pool Makeup System.

C. Lower Suppression Pool water level.

D. Raise RPV pressure.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 36

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	295029	EK1.01
	Importance Rating	3.4	

K&A: Knowledge of the operational implications of the following concepts as they apply to High Suppression Pool Water Level: Containment integrity

High Suppression Pool Wtr Lvl

Explanation: **Answer C –** Lowering Suppression Pool water level improves the margin to SRVTPLL, which is necessary to preserve containment integrity.

A – Incorrect – Lowering SP water temperature has no effect on SRVTPLL. Plausible since this action would improve margin to HCL.

B – Incorrect – Dumping SPMU would further raise SP water level and decrease the margin to SRVTPLL. Plausible since this action would improve margin to HCL.

D – Incorrect – RPV pressure needs to be lowered to improve margin to SRVTPLL. Plausible if operator does not correctly recall relationship between RPV pressure and SRVTPLL

Technical Reference(s): EOP-2 Bases Rev 3 & EOP-SPI Supplement Rev 6	Reference Attached: EOP-2 Bases p 48 & EOP-SPI Supplement p 10

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-04A-G

Question Source:	Bank #	Perry 2003 #RO-29
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2003
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 37

The plant has experienced a LOCA and the following plant conditions exist:

- Reactor Level - 25”
- Time Reactor Level below TAF 20 minutes
- Containment Pressure 10 psig
- Containment Hydrogen Concentration 7.5%
- Drywell Hydrogen Concentration 8.5%

You have been directed to energize the Hydrogen Igniters per the Hardcard.

Should the Hydrogen Igniters be energized?

Reference Provided: Modified EOP-SPI Supplement Figure #7 HDOL

A. yes, because Drywell HDOL has been exceeded

B. no, because Containment HDOL is in the UNSAFE region

C. no, because RPV level has been below TAF for > 15 minutes

D. yes, because RPV level has been below TAF for < 30 minutes

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 37

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	1	
	Group #	2	
	K/A#	500000	EK2.03
	Importance Rating	3.3	

K&A: Knowledge of the interrelations between High Containment Hydrogen Concentrations the following: Containment Atmosphere Control System

High CTMT Hydrogen Conc.

Explanation: **Answer D –** In accordance with EOP Bases, if water level has been <TAF for <30 minutes, significant H_2 cannot have built up in DW or containment. Per H_2 Igniter S/U Hardcard, if RPV level has been <TAF for <30 minutes, then the H_2 igniters can be started.

A – Incorrect – DW HDOL is a constant 9% and has not been exceeded. This info has been eliminated on the provided reference.

B – Incorrect – Containment HDOL has not been exceeded but must be determined by using the provided reference.

C – Incorrect – Perry License Commitments allow 30 minutes to start H_2 Igniters. This can be confused with the validation time for the H_2 analyzers.

Technical Reference(s): EOP-1 Bases Rev 6, EOP-Supplement Rev 6, & OAI-1703 Rev 27	Reference Attached: EOP-1 Bases p 50, EOP-Supplement p 12, & OAI-1703 p 52

Proposed references to be provided to applicants during examination: Modified EOP-SPI Supplement Figure #7 HDOL

Learning Objective (As available): OT-COMBINED-M51_M56-1.8 & 1.15

Question Source:	Bank #	Perry 2009 # RO-69
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2009
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 38

The plant was operating at rated power when a transient occurred.
All ECCS pumps auto started.
Emergency Depressurization was performed

These are the current conditions:

- RCIC was tagged out for oil replacement
- HPCS pump tripped and cannot be restarted
- LPCS pump tripped and cannot be restarted
- RHR A, B, & C are injecting
- RPV level is 10" and rising

Then, annunciator RHR B SUCTION PRESSURE LOW alarms.
RHR B pump discharge flow and discharge pressure are lower than normal and fluctuating.

Which of the following actions is required?

A. Obtain US concurrence then trip RHR B pump.

B. Notify the Shift Manager then trip RHR B pump.

C. Immediately trip RHR B pump then update the crew.

D. Maintain RHR B pump running as it is needed for adequate core cooling.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 38

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	203000	2.4.8
	Importance Rating	3.8	

K&A: Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

RHR/LPCI: Injection Mode

Explanation: **Answer A –** EOP-1 and EOP-1A would require injection from all RHR pumps. However, since RHR B shows signs of 'misoperation in automatic' as evidenced by the alarm and fluctuating flow and pressure, the RO can stop the pump only after obtaining permission from the Unit Supervisor.

B – Incorrect - Notification to the SM is not required, only the US

C – Incorrect – Immediately tripping an ECCS pump without first obtaining concurrence from the US is only allowed if approved in the EOP's. Non ECCS pumps can be immediately tripped without US concurrence.

D – Incorrect – With RPV level at 10", ACC is achieved, at least for now. IAW PAP-0205, the US is responsible for the decision to override a system that may jeopardize ACC.

Technical Reference(s): ARI-H13-P601-17 Rev 15, ONI-E12-1 Rev 11, PAP-0205 Rev 21, & EOP Bases Rev 6	Reference Attached: ARI-H13-P601-17 p 69, ONI-E12-1 p 5, , PAP-0205 p 12, & EOP Bases p 28

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 is shutdown for a refueling outage.
RHR A & B are operating in Refuel Mode of shutdown cooling.

Then RPS Bus B loses power.
RPS A Bus remains energized.

What is the consequence, if any, of losing RPS Bus B?

A. Both RHR A & B pumps trip

B. RHR A & B pumps continue to run

C. Only E12-F037B UPPER POOL COOLING ISOL closes.

D. Only the RHR B pump trips and E12- F037B UPPER POOL COOLING ISOL closes.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 39

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	205000	K1.06
	Importance Rating	3.2	

K&A: Knowledge of the physical connections and/or cause-effect relationships between Shutdown Cooling System (RHR Shutdown Cooling Mode) and the following: A.C. electrical power

Shutdown Cooling

Explanation: **Answer A –** RPS logic is arranged such that a loss of either RPS bus will result in loss of both loops of SDC based on Rx High Pressure (135 psig). This will cause INBD/OTBD SDC Suction isolation valves to shut and both RHR pumps to trip on a loss of suction path. This also causes the F037 valves to isolate,

B – Incorrect – Plausible if operator fails to recall that RPS powers the isolation logic for SDC.

C – Incorrect – All of the RHR SDC valves will isolate on a loss of RPS.

D – Incorrect – All of the RHR SDC valves will isolate and both pumps trip on a loss of either RPS bus.

Technical Reference(s): SDM-E12 Rev 3, SDM-B21(NS^4) Rev 7, & ONI-C71-2 Rev 9	Reference Attached: SDM-E12 pp 50-51, SDM-B21(NS^4) p 58, & ONI-C71-2 pp 9 & 12

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21(NS4)-F.4 OT-3035-03(LP)-A.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

Low Pressure Core Spray (LPCS) is running in Test Mode at 3000 gpm.

What would result if a loss of Bus ED-1-A occurs?

Low Pressure Core Spray _____.

A. can be manually aligned to inject from the Control Room

B. Pump will trip and be unavailable for operation

C. will automatically realign on a LOCA signal

D. will continue to operate in Test Mode

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 40

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	209001	K2.03
	Importance Rating	2.9	

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

LPCS

Explanation: **Answer D –** Loss of initiation logic power causes the system to fail as-is.

A – Incorrect – A loss of ED-1-A prevents opening the injection valve from the control room.

B – Incorrect – ED-1-A supplies control power to the LPCS pump breaker. The breaker cannot trip.

C – Incorrect – A loss of ED-1-A prevents initiation.

Technical Reference(s): PDB-H1 Rev 2 & Dwgs. 208-060 series	Reference Attached: PDB-H1 pp 18, 52 & 53 & Dwgs. 208-060 Sh 4 & Sh 11

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-E21-F OT-3035-05(LP)-A.1

Question Source:	Bank #	Perry 2009 # RO-41
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2009
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 is in Mode 1. The following conditions exist:

- An inadvertent initiation of High Pressure Core Spray (HPCS) occurs.
- However, the HPCS Inj Check Vlv, 1E12-F005 fails to open.

If an ATWS occurs, what can be expected regarding Standby Liquid Control (SLC) and Alternate Boron Injection System (ABI)?

If initiated, SLC __(1)__ be able to inject.
If required, the ABI System will be __(2)__ for injection.

	(1)	(2)
A.	will	available
B.	will not	available
C.	will	unavailable
D.	will not	unavailable

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 41

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	209002	K3.02
	Importance Rating	3.3	

K&A: Knowledge of the effect that a loss or malfunction of the High Pressure Core Spray System (HPCS) will have on following: Standby liquid control system

HPCS

Explanation: **Answer C –** SLC will inject as it connects downstream of the manual shutoff valve, E22-F036 and ABI is not available as it connects upstream of the injection valve E22-F004.

A – Incorrect – ABI will not be available as it connects upstream of the Injection Check Valve.

B – Incorrect – SLC connects in downstream of the Injection Check Valve, so it will inject and ABI will not be available as it connects upstream of the Injection Check Valve.

D – Incorrect – SLC connects in downstream of the Injection Check Valve, so it will inject.

Technical Reference(s): Dwg 302-701 Rev KK	Reference Attached: Dwg 302-701

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C41-B.1 & C41-L-1.5

Question Source:	Bank #	
	Modified Bank #	Perry 2009 # RO-43
	New	
Question History:	Previous NRC Exam	
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 42

How is the Standby Liquid Control (SLC) pump protected from over-pressurization?

A SLC pump is protected from over-pressurization by a relief valve that discharges ____.

A. to the SLC Test Tank, C41-A002

B. to the SLC Storage Tank, C41-A001

C. to the pump suction line, C41-C001A(B)

D. downstream of the Squib Valve, C41-F004A(B)

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 42

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	211000	K4.10
	Importance Rating	2.8	

K&A: Knowledge of Standby Liquid Control System design feature(s) and/or interlocks which provide for the following: Over pressure protection

SLC

Explanation: **Answer C –** The SLC relief valve C41-F029 relieves back to the suction of its respective pump.

A – Incorrect – Plausible, as the SLC Test Tank is used for the quarterly SLC surveillance.

B – Incorrect – Plausible since this is the suction source for the SLC pumps.

D – Incorrect – Plausible if operator believes over-pressure protection is for squib valve failure.

Technical Reference(s): Dwg 302-691 Rev Z & SDM-C41 Rev 9	Reference Attached: Dwg 302-691 & SDM-C41 p 8

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C41-O.2

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 43

A plant startup is in progress per IOI-1, Cold Startup.

- APRM DOWNSCALE lights on panel P680 have just extinguished
- IRM / APRM overlap checks are in progress
- Main Turbine Shell warm-up is in progress
- Turbine first stage pressure is 180 psig and slowly increasing

Which scram signal is active based on current plant conditions?

A. RPV Level 8

B. MSIV Closure

C. IRM Neutron Flux High

D. Turbine Control Valve Fast Closure

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 43

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

K&A: Knowledge of the operational implications of the following concepts as they apply to Reactor Protection System: Specific logic arrangements

RPS

Explanation: **Answer C –** For the conditions given, the plant is in Mode 2 with the Mode Switch in STARTUP/STANDBY. In this condition, IRM Neutron Flux would be the only active scram signal.

A – Incorrect – This signal is bypassed with the Mode Switch not in RUN.

B – Incorrect – This signal is bypassed with the Mode Switch not in RUN.

D – Incorrect – This signal is not active with turbine 1st stage pressure <212 psig (equivalent to ~ 38% RTP) when Stop Valves are closed.

Technical Reference(s): PDB-I05 Rev 10	Reference Attached: PDB-I05 p 1

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C71-1.7

Question Source:	Bank #	INL-235083
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 44

The plant is in Mode 2 with all IRM's on range 3.

What would be the effect if the High Voltage Power Supply input to the IRM D detector went to 60 VDC?

In this plant condition, a High Voltage input of 60 VDC to IRM D detector would cause ____.

A. an INOP Trip on IRM D only

B. IRM D to indicate Downscale only

C. IRM D to indicate Downscale and generate a Rod Block signal only

D. an INOP Trip on IRM D and generate Rod Block & ½ Scram signals

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 44

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215003	K6.04
	Importance Rating	3.0	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the Intermediate Range Monitor (IRM) System: Detectors

IRM

Explanation: **Answer D –** When an IRM detector's output voltage fails low, it will cause an IRM INOP condition in the IRM system. This then outputs to the RPS and RC&IS systems to cause a ½ SCRAM and a Rod Block.

A – Incorrect – An INOP Trip will occur, but this is not the only result of low output from the HV power supply.

B – Incorrect – A Downscale will come in, but this is not the only result of low output from the HV power supply.

C – Incorrect – Both conditions are true, but these are not the only results of low output from the HV power supply.

Technical Reference(s): SDM-C51(IRM) Rev 8 & ARI-H13-P680-06 Rev 9	Reference Attached: SDM-C51(IRM) pp 11, 17, & 45 & ARI-H13-P680-06 p 71

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C51_IRM-1.9

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

A plant startup is in progress with all IRM's on ranges 1 and 2.

Refer to the attached picture to answer the following.

What is indicated by the status of the RETRACT PERMIT lights and the PERIOD light on the Source Range Monitor controls?

The RETRACT PERMIT lights indicate __(1)__ .
The PERIOD light indicates that a Short Period condition __(2)__ .

Attachment Provided: Picture of SRM's on H13-P680

	(1)	(2)
A.	Control Rods cannot be withdrawn	is currently active
B.	Control Rods cannot be withdrawn	was previously active, but may now be clear
C.	SRM's A & B cannot be withdrawn	is currently active
D.	SRM's A & B cannot be withdrawn	was previously active, but may now be clear

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 45

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215004	A1.06
	Importance Rating	3.1	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the Source Range Monitor (SRM) System controls including: Lights and alarms

Source Range Monitor

Explanation: **Answer A –** The Retract Permit lights off indicates that the associated SRM's are <100 CPS. This will insert a Rod Block and not allow control rod withdrawal. The Period light indicates that a short period condition currently exists.

B – Incorrect – The Period Light indicates that a short period condition currently exists. Plausible since the back-panel Period Light locks in until the RESET switch is turned.

C – Incorrect – SRM's can be withdrawn at any time. However, if IRM's are not on Rang 3 or greater, the Retract Permit will generate a Rob Block signal.

D – Incorrect – SRM's can be withdrawn at any time. The Period Light indicates that a short period condition currently exists. Plausible since the back-panel Period Light locks in until the RESET switch is turned.

Technical Reference(s): SDM-C51(SRM) Rev 8	Reference Attached: SDM-C51(SRM) pp 15,17-18, 25, & 30

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C51(SRM)-1.5 & 1.14

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Attach Picture of SRM's on H13-P680 to question

QUESTION RO 46

A plant startup is in progress.
The Reactor Operator is adjusting control rods to control reactor period.
All IRM's are on range 8.

What is the effect if SRM A fails high?

A. The reactor Scrams

B. Control rod adjustment may continue

C. Half scram signal is generated on RPS A

D. Control rod insertion/withdrawal is blocked

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 46

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215004	K1.01
	Importance Rating	3.6	

K&A: Knowledge of the physical connections and/or cause-effect relationships between Source Range Monitor (SRM) System and the following: Reactor protection system

Source Range Monitor

Explanation: **Answer B –** Shorting links for the RPS Scram are installed (normal configuration) preventing a scram and with the IRM's on range 8, the Rod Block is also bypassed.

A – Incorrect – Plausible if shorting links are removed as this would be a non-coincident scram.

C – Incorrect – Plausible since this would be true if any IRM were to fail.

D – Incorrect – Plausible if the IRM's were < Range 8

Technical Reference(s): SDM-C51(SRM) Rev 8 & ARI-H13-P680-06 Rev 9	Reference Attached: SDM-C51(SRM) p 2 & ARI-H13-P680-06 p 29

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C51(SRM)-1.6

Question Source:	Bank #	Fermi 2013 # RO-38
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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

A reactor startup is in progress with the REACTOR MODE SWITCH in STARTUP/STANDBY.

The following is the present status of the APRM versus LPRM inputs, and the indicated power.

APRM:	A	B	C	D	E	F	G	H
LPRMs:								
D Level Inputs:	4	5	3	4	4	4	6	6
C Level Inputs:	4	3	4	3	6	2	4	4
B Level Inputs:	3	4	4	3	4	4	6	4
A Level Inputs:	3	3	4	3	6	4	1	2
Indicated Power:	11%	10%	11%	11%	10%	10%	11%	10%

What will be the consequences and what is required to mitigate the plant response to the conditions above?

A. Full Scram - Enter ONI-C71 Reactor Scram

B. Only rod block - Bypass appropriate APRM

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

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

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 47

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215005	A2.03
	Importance Rating	3.6	

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: Inoperative Trip (all causes)

APRM / LPRM / OPRM

Explanation: **Answer D –** APRM D will cause ½ scram and rod block (<14 LPRM inputs).

A – Incorrect – Plausible misconception that < 2 LPRM (APRM G) inputs will cause ½ scram – this is an administrative INOP condition not scram signal.

C – Incorrect – Plausible since this is partially correct – will also get ½ scram.

D – Incorrect – Plausible since this is partially correct – will also get a rod block.

Technical Reference(s): ARI-H13-P680-06 Rev 9, ONI-C11-1 Rev 16	Reference Attached: ARI-H13-P680-06 pp 75-76, ONI-C11-1 p 15

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C51(AP_OPRM)-1.11

Question Source:	Bank #	Perry 2009 # RO-50
	Modified Bank #	
	New	
Question History:	Previous NRC Exam Perry 2009	
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 48

The following conditions exist:

- Both Recirculation Pumps were just upshifted to Fast speed
- Total Core Flow is 44 MLbs/Hr

Then a failure in the flow card for APRM A caused the following annunciators to alarm:
- APRM A/E UPSC INOP/TRIP OPRM A/E TRIP
- 1/2 SCRAM RPS A/C

What would be the lowest Upscale Thermal Power Trip value rounded to the nearest % to cause this alarm?

Reference Provided: PDB-A0012, Recirc Drive Flow vs. Total Core Flow

A. 100%

B. 105%

C. 108%

D. 111%

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 48

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	215005	K3.02
	Importance Rating	3.5	

K&A: Knowledge of the effect that a loss or malfunction of the Average Power Range Monitor/Local Power Range Monitor System will have on following: Reactor recirculation system: BWR-5,6

APRM / LPRM / OPRM

Explanation: **Answer B –** The APRM Upscale Trip alarm caused by an Upscale Thermal Power Trip is found using the formula 0.628*W + 60.9%, where W is Total Drive Flow. Total drive flow is ascertained using PDB-A12. At 44 MLbM/Hr core flow, total drive flow is 33.25 Kgpm or 70.72%. (PDB-A12 has formulas) Therefore, the Trip would come in at 105.3%

A – Incorrect – This is the value for the Rod Block, not the Upscale Trip.

C – Incorrect – This is the clamped value for the APRM Upscale Thermal Power Alarm setpoint

D – Incorrect –This is the value for the clamped setpoint.

Technical Reference(s): SDM-C51 (PRM & OPRM) Rev 12, ARI-H13-P680-05 Rev 15, ARI-H13-P680-06 Rev 9 and PDB A12 Rev 16	Reference Attached: SDM-C51 (PRM & OPRM) pp 19-20, ARI-H13-P680-05 p 21, ARI-H13-P680-06 p 25 and PDB A12

Proposed references to be provided to applicants during examination: PDB-A0012, Recirc Drive Flow vs. Total Core Flow

Learning Objective (As available): OT-COMBINED-C51-AP_OPRM-1.12

Question Source:	Bank #	
	Modified Bank #	Perry 2010 # RO-48
	New	
Question History:	Previous NRC Exam	
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

Reactor Core Isolation Cooling automatically initiated.

Several minutes later, the following indication was received on H13-P601.

Which of the following valves will remain <u>open</u> based on this indication?

A. 1E51-F013, RCIC INJECTION VLV

B. 1E51-F019, RCIC MIN FLOW VALVE

C. 1E51-F045, RCIC STEAM SHUTOFF

D. 1E51-F510, RCIC TURBINE TRIP THRT V LATCH

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 49

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	217000	A3.01
	Importance Rating	3.5	

K&A: Ability to monitor automatic operations of the Reactor Core Isolation Cooling System (RCIC) including: Valve operation

RCIC

Explanation: **Answer C –** The light indicates that a Div 2 isolation signal is active. All the valves close on a RCIC isolation except for 1E51-F045. This valve only closes in response to a L8 or if E51-F068 is not open.

A – Incorrect – E51-F013 closes in response to the closing of E51-F510, which gets a close signal on any divisional isolation.

B – Incorrect – E51-F019 closes in response to the discharge pressure decay following the turbine trip.

D – Incorrect – E51-F510 closes in response to any isolation signal.

Technical Reference(s): SDM-E51 Rev 13 & ARI-H13-P601-21 Rev 15	Reference Attached: SDM-E51 pp 19-20 & 25-26 & ARI-H13-P601-21 p 53

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-E51-F.2

Question Source:	Bank #	INL-0863
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 a scram occurred.
RPV water level is lowering.

Which of the following alarms would allow for Manual Initiation of RCIC?

1 RCIC ISOL DIAPHRAGM RUPTURED, (H13-P601-0021-B1)
2 STEAM TUNNEL LD AMB TEMP P632, (H13-P601-0019-G4)
3 RCIC TURBINE OIL COOLER OUT TEMP HIGH, (H13-P601-0021-C4)
4 RCIC SUPR POOL SUCT VLV OPEN SUPR PL LVL HI, (H13-P601-0021-G5)

A. 1, 2, & 3

B. 2, 3, & 4

C. 1, 3, & 4

D. 1, 2, & 4

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 50

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	217000	K4.06
	Importance Rating	3.5	

K&A: Knowledge of reactor core isolation cooling system (RCIC) design feature(s) and/or interlocks which provide for the following: Manual initiation

RCIC

Explanation: **Answer B –** Only combination that does not contain RCIC ISOL DIAPHRAGM RUPTURED. This annunciator will cause a trip of the RCIC turbine trip throttle valve and a RCIC isolation. STEAM TUNNEL LD AMB TEMP P632 has a 29 minute time delay. Hi LO temp does not cause an isolation. RCIC can still be initiated with a high SP water level.

A – Incorrect – Contains RCIC ISOL DIAPHRAGM RUPTURED.

C – Incorrect – Contains RCIC ISOL DIAPHRAGM RUPTURED.

D – Incorrect – Contains RCIC ISOL DIAPHRAGM RUPTURED

Technical Reference(s): ARI-H13-P601-021 Rev 15, ARI-H13-P601-19 Rev 19, & SOI-E31 Rev 8	Reference Attached: ARI-H13-P601-021 pp 19, 39, & 89, ARI-H13-P601-19 p 111, & SOI-E31 p19

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-E51-I

Question Source:	Bank #	
	Modified Bank #	Perry 2015 # RO-49
	New	
Question History:	Previous NRC Exam	
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

The plant is operating at rated power when the following annunciators on H13-P601 alarm:

- LPCS AUTO START RECEIVED
- LPCS & LPCI A DW PRESS HIGH
- LPCI A AUTO START RECEIVED
- ADS A PERMISSIVE LPCS / RHR A RUN
- ADS A TIME DELAY LOGIC TIMER RUNNING
- ADS A TIMER 90 SEC & RUNNING

The ATC reports "Multiple unexpected alarms. Power, Pressure, & Level are stable and unchanged"

In accordance with ONI-E12-1, INADVERTENT INITIATION OR ECCS/RCIC, which of the following IMMEDIATE ACTIONS is/are required?

A. Only place ADS A LOGIC INHIBIT Keylock Switch in INHIBIT

B. Place ADS A and B LOGIC INHIBIT Keylock Switches in INHIBIT

C. Depress the ADS A and B LOGIC SEAL IN RESET pushbuttons and only place ADS A LOGIC INHIBIT Keylock Switch in INHIBIT

D. Depress the ADS A and B LOGIC SEAL IN RESET pushbuttons and place both ADS A and B LOGIC INHIBIT Keylock Switches in INHIBIT

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 51

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	218000	A4.12
	Importance Rating	4.2	

K&A: Ability to manually operate and/or monitor in the control room: Reactor vessel water level

ADS

Explanation: **Answer C –** With RPV level pressure normal, this is an inadvertent initiation of ADS. IAW ONI-E12-1, permissives for ADS A are met. Therefore, the ADS A and B Logic Seal In Reset PB are depressed and with the logic met for initiation, A Logic Inhibit Keylock switch must be placed in Inhibit.

A – Incorrect – This is not the only Immediate Action required by ONI-E12-1. The Seal-in Reset pushbuttons must also be depressed.

B – Incorrect – The permissives for ADS B are not satisfied.

D – Incorrect – ONI-E12-1 directs operator to inhibit only the channel associated with the inadvertent initiation.

Technical Reference(s): ONI-E12-1 Rev 11, ARI-H13-P601-19 Rev 19	Reference Attached: ONI-E12-1 p 5-6, ARI-H13-P601-19 pp 71 & 103

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21C-F, I.1, & J.2

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 52

The plant is in power ascension following a refuel outage.

Engineering reports that incorrect spring tensions were set on multiple Containment Isolation MOV's that may render them unable to close under accident conditions.

Which of the following pairs of valves, if inoperable, would require Tech Spec Actions to isolate the penetrations within one hour?

A. P50-F140, CVCW INBD RETURN MOV ISOL VALVE and P50-F150, CVCW OTBD RETURN MOV ISOL VALVE

B. P43-F055, NCC CNTMT SUPPLY OTBD ISOL and P43-F215, NCC CNTMT RETURN INBD ISOL

C. E12-F064C, RHR PUMP C MIN FLOW and E12-F105, RHR C SUPP POOL SUCTION VALVE

D. P52-F200, IA CNTMT ISOL VLV and P52-F646, INST AIR DRYWELL SHUTOFF

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 52

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	223002	2.2.40
	Importance Rating	3.4	

K&A: Ability to apply Technical Specifications for a system.

PCIS/Nuclear Steam Supply Shutoff

Explanation: **Answer A –** IAW TS 3.6.1.3, Condition B states, "One or more penetration flow paths with two PCIV's inoperable except due to leakage", requires isolation of the penetration flow path within I hour. P50-F140 and P50-F150 are INBD and OTBD valves on the same penetration.

B – Incorrect – Plausible since one valve is INBD and one is OTBD, but not on the penetration. One is supply and one is return.

C – Incorrect – Plausible since both valves are on RHR C and do not have an INBD isolation. However, both valve lines terminate below suppression pool surface.

D – Incorrect – Plausible since one valve is OTBD of containment and one is INBD of containment. However, P52-F646 is a DW isolation valve.

Technical Reference(s): TS 3.6.1.3 PDB-G01 Rev 4, Dwgs 913-08 Rev S, & 302-244 Rev M	Reference Attached: TS 3.6.1.3 pp 3.6-9 & 11, PDB-G01 pp 6 & 9, Dwgs 913-08, & 302-244

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21(NS4)-K.1 OT-3037-10-A

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 operating in EOP-1A, Level Power Control, with the following conditions:

- RHR A pump is operating in Suppression Pool Cooling
- RHR B & C pumps have tripped and cannot be restarted
- The US determined Emergency Depressurization is required

Based on this information, loss of which Bus would prevent performing Emergency Depressurization from H13-P601?

A. ED-1-A

B. ED-1-B

C. EV-1-A

D. EV-1-B

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 53

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	239002	K2.01
	Importance Rating	2.8	

K&A: Knowledge of electrical power supplies to the following: SRV solenoids

SRVs

Explanation: **Answer A –** Bus ED-1-A powers the SRV A solenoids and the ADS A logic. With neither RHR B nor C pumps running, the ADS B logic is not satisfied. Therefore, ED must be performed from the back panel H13-P631 to energize the ADS B solenoids.

B – Incorrect – Plausible since the ADS B logic is still energized, but no RHR pumps are running to satisfy the logic.

C – Incorrect – Plausible since this is a Division 1 Vital power supply.

D – Incorrect – Plausible if power supplies to the SRV solenoids is recalled incorrectly.

Technical Reference(s): ELI-R42 Rev 8, Dwgs 208-011 Sh 4 Rev M. Sheet 5 Rev J	Reference Attached: ELI-R42 pp 3-4, Dwgs 208-011 Sheets 4 & 5

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21C-C OT-3035-05(LP)-A.1

Question Source:	Bank #	
	Modified Bank #	Perry 2013 # RO-13
	New	
Question History:	Previous NRC Exam	
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 at 25% power following a refueling outage with the following conditions:

- RFPT A is in AUTO on DFWCS
- RFPT B is at 1100 RPM
- Main Generator output is 300 MW

What would be the consequence if Level transmitters 1C34-N004A, RX LEVEL A and 1C34-N004C, RX LEVEL C failed high?

A. Only Main Turbine trip

B. Only Main Turbine and RFPT A trip

C. Only Main Turbine and both RFPT's trip

D. Main Turbine and both RFPT's trip and Rx Scram on Level 8

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 54

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	259002	K3.06
	Importance Rating	2.8	

K&A: Knowledge of the effect that a loss or malfunction of the Reactor Water Level Control System will have on following: Main turbine

Reactor Water Level Control

Explanation: **Answer C –** If 2 out of 3 of the C34 RPV level instruments fail high, the trip logic for the main turbine and Feedwater pumps is satisfied.

A – Incorrect – Both RFPT's also trip.

B – Incorrect – RFPT B also trips.

D – Incorrect – The RPV Level 8 comes from different transmitters. The Rx will scram, but on Level 3.

Technical Reference(s): ARI-H13-P680-03 Rev 15 & PDB-I05 Rev 10	Reference Attached: ARI-H13-P680-03 p 23 & PDB-I05 p 51

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C34-1.14 OT-3035-04(LP)-A.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 55

In the Annulus Gas Exhaust Treatment System, which component is designed to remove particulate and which component is designed to remove iodine?

Particulates are removed by __(1)__ .
And iodine is removed by __(2)__ .

	(1)	(2)
A.	Demister	HEPA Filter
B.	Roughing Filter	HEPA Filter
C.	Charcoal Adsorber	Roughing Filter
D.	Demister	Charcoal Adsorber

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 55

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	261000	K4.04
	Importance Rating	2.7	

K&A: Knowledge of Standby Gas Treatment System design feature(s) and/or interlocks which provide for the following: Radioactive particulate filtration

SGTS (AEGTS)

Explanation: **Answer D –** The Demister, Roughing Filter, and the HEPA Filter all remove particulate. The Charcoal Adsorber removes iodine.

A – Incorrect – The HEPA filter does not remove iodine.

B – Incorrect – The HEPA filter does not remove iodine.

C – Incorrect – The Roughing Filter does not remove iodine.

Technical Reference(s): SDM-M15 Rev 7	Reference Attached: SDM-M15 pp 1, 3-5

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M15-C

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

The plant is at rated power with the Auxiliary Transfer Switch on H13-P870 in the following position:

What is the operational implication of this switch configuration?

A. Allows normal and alternate supply breakers H1201 and H1202 to be closed and remain closed simultaneously.

B. Allows normal and alternate supply breakers L1006 and L1102 to be closed and remain closed simultaneously.

C. Prevents normal and alternate supply breakers H1101 and H1102 from being closed and remaining closed simultaneously.

D. Prevents normal and alternate supply breakers L1003 and L1004 from being closed and remaining closed simultaneously.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 56

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	262001	K5.02
	Importance Rating	2.6	

K&A: Knowledge of the operational implications of the following concepts as they apply to A.C. Electrical Distribution: Breaker control

AC Electrical Distribution

Explanation: **Answer B –** The Aux Transfer Switch (ATS) in the OFF position allows breakers L1006 and L1102 to be closed simultaneously. This is done for certain operations such as backfeeding an L Bus.

A – Incorrect – The ATS only affects breaker control for the L-Buses. Common misconception that the ATS affects the H-Bus breaker controls.

C – Incorrect – The ATS only affects breaker control for the L-Buses. Common misconception that the ATS affects the H-Bus breaker controls.

D – Incorrect – If he ATS was in the AUTO position, this would be true.

Technical Reference(s): SDM-R10 Rev 12	Reference Attached: SDM-R10 pp 23-24

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R10

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 57

A transient occurred and all ECCS systems started automatically.

Then a loss of off-site power occurred.

Which of the following describes the start sequence for the LPCS and RHR Pumps to prevent bus overloading?

Upon closing the respective diesel generator output breaker, ____.

A. LPCS and RHR C start immediately

B. RHR A and C start after a 5 second time delay.

C. RHR A and B start immediately and LPCS starts after a 5 second time delay.

D. LPCS and RHR C start immediately and RHR Pump B starts after a 10 second time delay

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 57

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	262001	A1.02
	Importance Rating	3.1	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the A.C. Electrical Distribution controls including: Effects of loads when energizing a bus

AC Electrical Distribution

Explanation: **Answer A –** When a LOOP occurs, if an ECCS initiation signal is present when power is restored to the EH Buses, the RHR C pump will start immediately and LPCS pump breaker remains closed (no UV trip) so it starts immediately.

B – Incorrect – RHR C starts immediately after the bus is re-energized

C – Incorrect – This is the opposite sequence.

D – Incorrect – RHR C starts immediately. This is the time that the DG is ready to load after a start signal is received.

Technical Reference(s): SDM-E12 Rev 3 & SDM-E21 Rev 1	Reference Attached: SDM-E12 p 37-38 & SDM-E21 p 25

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R43_48-N.1

Question Source:	Bank #	
	Modified Bank #	Perry 2015 # RO-27
	New	
Question History:	Previous NRC Exam	
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

Annunciator INVERTER DB-1-A TROUBLE just alarmed on H13-P870.

What is the cause for the alarm and how will the Static Transfer Switch operate when the alarm condition clears in 10 minutes?

A cause for this alarm is __(1)__ .
If the Static Transfer Switch transfers loads to the Alt Source and the cause of the alarm clears in 10 minutes, the loads will __(2)__ to the inverter.

	(1)	(2)
A.	DC GROUND FAULT	automatically transfer
B.	DC GROUND FAULT	need to be manually transferred
C.	LOW AC OUTPUT VOLTAGE	automatically transfer
D.	LOW AC OUTPUT VOLTAGE	need to be manually transferred

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 58

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	262002	K6.01
	Importance Rating	2.7	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the Uninterruptable Power Supply (A.C./D.C.) : A.C. electrical power

UPS (AC/DC)

Explanation: **Answer C –** Low AC output is annunciated for the BOP inverter, not the ATWS inverter. If the alarm condition clears, the Static Transfer will automatically transfer the load back to the inverter. One condition causes the Static Transfer Switch to latch after 15 minutes.

A – Incorrect – Plausible since DC GROUND FAULT is an alarm condition for the TSC-UPS inverter.

B – Incorrect – Plausible since DC GROUND FAULT is an alarm condition for the TSC-UPS inverter. For the BOP inverter, if the alarm condition clears, the Static Transfer will automatically transfer the load back to the inverter.

D – Incorrect – If the alarm condition clears, the Static Transfer will automatically transfer the load back to the inverter.

Technical Reference(s): ARI-H13-P870-01 Rev 15 & SDM-R14_15 Rev 2	Reference Attached: ARI-H13-P870-01 p 39, & SDM-R14_15 pp 7-8

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R14_15-10

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 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

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

B. rise because an equalizing charge is being provided

C. rise because the charger capacity exceeds the bus load

D. lower because the bus load exceeds the charger capacity

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 59

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	263000	A1.01
	Importance Rating	2.5	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the D.C. Electrical Distribution controls including: Battery charging/discharging rate

DC Electrical Distribution

Explanation: **Answer D –** The charger capacity is 400 amps but the ED1-1B bus current is indicated at 440 amps as shown by the ammeter on P870 in the DISCHARGE region. This will cause ED-1-B voltage to lower.

A – Incorrect – Voltage is low, but with the battery 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 misread.

Technical Reference(s): ARI-H13-P877-02 Rev 13, SOI-R42 (Div 2) Rev 11, SDM-R42 Rev 10	Reference Attached: ARI-H13-P877-02 p 79, SOI-R42 (Div 2) p 47, SDM-R42 pp 7-8

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	River Bend 2003 # RO-65
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	x
	55.43	

Comments: Attach Panel H13-P877 Meters to question

QUESTION RO 60

Div 1 Diesel Generator is running in parallel with Bus EH11 for the monthly surveillance test. Grid conditions are stable.

Then, annunciator DIESEL GENERATOR OUT OF SERVICE H13-P877 alarms.

The NLO in the Div. 1 DG room reports the following:
- Local annunciator 125V DC TROUBLE is in alarm.
- DC Control Power to H51-P054A has been lost.

What is the consequence to the Div 1 Diesel Generator and what is the most expeditious way to shutdown the DG?

Div 1 Diesel Generator speed will (1) .
Shutdown the Div 1 Diesel Generator (2) .

	(1)	(2)
A.	increase	locally by pushing the DIESEL Push To STOP/Pull To RUN valve
B.	remain the same	locally by pushing the DIESEL Push To STOP/Pull To RUN valve
C.	increase	from P877 by taking DIESEL GENERATOR control switch to PULL-TO-LOCK
D.	remain the same	from P877 by taking DIESEL GENERATOR control switch to PULL-TO-LOCK

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 60

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	264000	A2.01
	Importance Rating	3.5	

K&A: Ability to (a) predict the impacts of the following on the Emergency Generators (Diesel/Jet) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Parallel operation of emergency generator

EDGs

Explanation: **Answer B –** With the DG in parallel with the grid (Bus EH11), DG speed will remain unchanged upon a loss of DC Control Power. Also, shutdown from P877 is not available. The only method to S/D the DG with a loss of control power is to press the Run/Stop valve. (This was recent OE at Perry)

A – Incorrect – Speed will not increase with grid conditions stable.

C – Incorrect – Speed will not increase with grid conditions stable. Normally, DG S/D from P877 is the quickest method. However, shutdown from P877 is not available with a loss of control power.

D – Incorrect – Normally, DG S/D from P877 is the quickest method. However, shutdown from P877 is not available with a loss of control power.

Technical Reference(s): ARI-H13-P877-01 Rev 12, ARI-H51-P054A Rev 15, NOBP-OP-1002 Rev 2, SOI-R43 Rev 45, & ONI-R42-1 Rev 7	Reference Attached: ARI-H13-P877-01 pp 13-14, ARI-H51-P054A pp 59-60, NOBP-OP-1002 p 19, SOI-R43 pp 43-44, & ONI-R42-1 pp 7-8

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-R43_48-F.7 & OT-3039-01-L

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

A Non-Licensed Operator reports that the refrigeration unit for in-service Instrument Air (IA) Dryer 1P52-D003A is not operating.

Which of the following contaminants will be introduced into the Instrument Air System if this condition is left uncorrected, including an action that can be taken to terminate further introduction of this contaminant?

The contaminant that will be introduced into the Instrument Air system is __(1)__ .
The action to terminate further introduction of the contaminant is to __(2)__ .

	(1)	(2)
A.	water droplets	shift from malfunctioning IA Dryer 1P52-D003A to the standby IA Dryer 1P52-D003B
B.	water droplets	open the IA Desiccant Air Dryer Bypass Valve to bypass malfunctioning IA Dryer 1P52-D003A
C.	desiccant particles	shift from malfunctioning IA Dryer 1P52-D003A to the standby IA Dryer 1P52-D003B
D.	desiccant particles	open the IA Desiccant Air Dryer Bypass Valve to bypass malfunctioning IA Dryer 1P52-D003A

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 61

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	300000	A2.01
	Importance Rating	2.9	

K&A: Ability to (a) predict the impacts of the following on the INSTRUMENT AIR SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Air dryer and filter malfunctions

Instrument Air

Explanation: **Answer A –** Water is the correct contaminant. Shifting dryers would maintain a low dew point.

B – Incorrect – Bypassing the malfunctioning IA Dryer would not correct the problem.

C – Incorrect – Plausible since the dryer beds contain desiccant and the after-filters can remove particles. However, a failure of the refrigerant unit would cause the IA dew point to go up resulting in the potential introduction of water into the IA System.

D – Incorrect – Plausible since the dryer beds contain desiccant and the after-filters can remove particles. However, a failure of the refrigerant unit would cause the IA dew point to go up resulting in the potential introduction of water into the IA System. Bypassing the malfunctioning IA Dryer would not correct the problem.

Technical Reference(s): Dwg 302-241 Rev DD & SDM-P51/52 Rev 2	Reference Attached: Dwg 302-241 & SDM-P51/52 p 8

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P51_52-8

Question Source:	Bank #	Perry 2009 # RO-62
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2009
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 62

The plant was operating at 75% rated thermal power with the following conditions:

- Transformer LH-2-C is tagged out for deluge testing.
- Loads supplied by LH-2-C were transferred to the Alternate source.

The following then occurred:

- Transformer LH-2-B experienced a lockout

What is the consequence of this electrical transient?

A. Service Water Pump D, P41-C001D, <u>will</u> trip if running

B. Control Complex Chiller C, P47-B001C, <u>cannot</u> be started

C. Nuclear Closed Cooling Pump C, P43-C001C, <u>cannot</u> be started

D. Unit 2 Instrument Air Compressor, 2P52-C001, <u>will</u> trip if running

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 62

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	300000	K2.01
	Importance Rating	2.8	

K&A: Knowledge of electrical power supplies to the following: Instrument air compressor

Instrument Air

Explanation: **Answer D –** A lockout on an LH transformer will cause the buses supplied from the transformer to transfer to the Alternate or Normal supply. U2 IAC is powered from Bus H22 which is normally powered from LH-2-C. But, since LH-2-C is tagged out, H22 is on its Alternate source - LH-2-B. The U2 IAC will trip if running.

A – Incorrect – Plausible since SWP C would trip.

B – Incorrect – Would be true of Lockout was on LH-2-A.

C – Incorrect – Would be true of Lockout was on LH-2-A.

Technical Reference(s): ARI-2H13-P870-01 Rev 8, ELI-R22 Rev 9, & Dwg. 256-016 Rev U	Reference Attached: ARI-2H13-P870-01 p 33, ELI-R22 pp.30-31, & Dwg. 256-016

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P51_52-27

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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.

Annunciator SW PUMP DISCH HEADER PRESSURE LOW on H13-P970 alarmed.

Service Water pump discharge header pressure indicates 36 psig.

What action will restore Service Water pump discharge header pressure to normal?

A. Throttle P41-F390, TBCC HX SW TCV BYP in the OPEN direction

B. Throttle P41-F390, TBCC HX SW TCV BYP in the CLOSE direction

C. Throttle P41-F400, NCC HX SW BYPASS VLV in the OPEN direction

D. Throttle P41-F400, NCC HX SW BYPASS VLV in the CLOSE direction

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 63

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	1	
	K/A#	400000	A4.01
	Importance Rating	3.1	

K&A: Ability to manually operate and / or monitor in the control room: CCW indications and control

Component Cooling Water

Explanation: **Answer D –** P41-F400 controls bypass flow around the NCC HX's and controls SW discharge header pressure. Throttling closed on P41-F400 lowers bypass flow around the NCC HX's and raises SW discharge header pressure.

A – Incorrect – This action is required for a malfunction of the TBCC HX TCV valve and will not raise SW header pressure.

B – Incorrect – Plausible since this valve can affect SW flow if open, but this valve is typically closed and is in parallel to the TBCC HX TCV.

C – Incorrect – This is the opposite action that is required.

Technical Reference(s): ARI-H13-P970-01 Rev 23 & SDM-P41 Rev 10	Reference Attached: ARI-H13-P970-01 pp 29-30 SDM-P41 pp 22 & 41

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P41-I.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 75% rated power when a transient occurred.

Following the transient the Reactor Operator plotted Rx power and core flow on the attached Power Flow Map.

Based on this information, what is the required action?

Attachment Provided: PDB-A06 2-loop P/F Map

A. Insert Control Rods IAW Pull Sheets until Reactor Power is approximately 45%

B. Insert Cram Rods until Reactor Power is approximately 35%

C. Raise Core Flow with FCV A to >42 Mlbm/hr

D. Insert a Manual Reactor Scram

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 64

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	201003	2.1.25
	Importance Rating	3.9	

K&A: Ability to interpret reference materials, such as graphs, curves, tables, etc.

Control Rod and Drive Mechanism

Explanation: **Answer B –** With power and flow plotted inside the Immediate Exit Region, the operator must insert Cram Rods to ≤35% reactor power IAW ONI-C51 Immediate Actions and FTI-B02.

A – Incorrect – While this action will exit the Immediate Exit Region, it is not the prescribed method in ONI-C51.

C – Incorrect – While this action will exit the Immediate Exit Region, it is not the prescribed method in ONI-C51.

D – Incorrect – This action would be correct if OPRM's were inoperable. However, nothing indicates OPRM's are INOP.

Technical Reference(s): PDB-A06 Rev 15, ONI-C51 Rev 27, & FTI-B02 Rev 15	Reference Attached: PDB-A06 p 3. ONI-C51 p 6, & FTI-B02 p 16-18

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-05(LP)-A.10 & OT-3039-01-O

Question Source:	Bank #	
	Modified Bank #	Quad Cities 2009 # SRO-91
	New	
Question History:	Previous NRC Exam	
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 65

A malfunction with the rod position indication for control rod 30-31 necessitated bypassing the rod in the Rod Action Control System (RACS) per SOI-C11(RCIS), Rod Control and Information System.

How can verification that the correct rod is bypassed be performed from H13-P680?

A. Ensuring the POSITION BYPASS pushbutton is back lit.

B. Ensuring rod 30-31 will not move when selected and given a withdraw command in IND DRIVE MODE.

C. Depressing the POSITION BYPASS pushbutton and observing rod 30-31 has a green LED lit on the full core display.

D. Depressing the SUBST POSITION pushbutton and observing rod 30-31 has a red LED lit on the full core display.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 65

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	201005	K1.05
	Importance Rating	3.5	

K&A: Knowledge of the physical connections and/or cause-effect relationships between Rod Control And Information System (RCIS) and the following: Rod action control system

RCIS

Explanation: **Answer C –** IAW SOI-C11(RCIS), depressing the POSITION BYPASS pushbutton will cause a green LED to illuminate next to any control rod bypassed in RACS.

A – Incorrect – The POSITION BYPASS pushbutton will be back lit for any control rod that is bypassed in RACS.

B – Incorrect – This would be correct if the rod was bypassed in RGDS.

D – Incorrect - Depressing the SUBST POSITION pushbutton will only indicate those rods with substitute date entered, not those that are bypassed.

Technical Reference(s): SOI-C11(RC&IS) Rev 30	Reference Attached: SOI-C11(RC&IS) pp 54 & 57

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C11_RC&IS-1.15

Question Source:	Bank #	Clinton 2009 #RO-56
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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 66

The following plant conditions exist:

- The reactor is operating at 45% power during a plant startup
- A loss of Bus H11 occurs
- A Rx scram was inserted
- Setpoint Setdown activated and maintained RPV level stable

Which of the following describes the status of the Reactor Recirculation System prior to taking any Rx Scram Hardcard actions?

A. Only Reactor Recirculation Pump A is OFF

B. Both Reactor Recirculation Pumps are running in FAST

C. Both Reactor Recirculation Pumps are running in SLOW

D. Only Reactor Recirculation Pump A is running in SLOW

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 66

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	202001	K2.02
	Importance Rating	3.2	

K&A: Knowledge of electrical power supplies to the following: MG sets

Recirculation

Explanation: **Answer A –** Rx Recirc pump 'A' will trip from Fast to OFF when RPV lowers to L3 due to the loss of power to the MG Set for SLOW speed operation. Setpoint Setdown activates at L3.

B – Incorrect – Plausible since pumps are up-shifted ~35%. When RPV level lowers to L3 Recirc pumps will transfer from Fast to Slow.

C – Incorrect – Plausible since both should be running in Slow. But, without power to 'A' MG, Recirc pump 'A' till trip to OFF.

D – Incorrect – Recirc pump 'B' will be running in Slow. Plausible if operator incorrectly recalls power supply to MG set.

Technical Reference(s): ARI-H13-P870-01 Rev 15, SDM-B33 Rev 11, SDM-C34 Rev 3, & SDM-R10 Rev 12	Reference Attached: ARI-H13-P870-01 p 57, SDM-B33 p 35, SDM-C34 p 28, & SDM-R10 p 69

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B33-L.2

Question Source:	Bank #	
	Modified Bank #	Perry 2002 # RO-78
	New	
Question History:	Previous NRC Exam	
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 is operating at rated power.

Temperature Switch 1G33-N008, RWCU Non Regen Heat Exchanger Temp-Hi has failed low.

Which of the following Reactor Water Cleanup (RWCU) valves, if open, could have an adverse effect on Rx water quality?

A. 1G33-F028, RWCU BLWDN HDR INBD ISOL

B. 1G33-F039, RWCU RETURN HDR OTBD ISOL

C. 1G33-F042, RWCU HX OUTLET THROTTLE

D. 1G33-F107, RWCU HX SHELL SIDE BYPASS

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 67

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	204000	K3.01
	Importance Rating	3.2	

K&A: Knowledge of the effect that a loss or malfunction of the Reactor Water Cleanup System will have on following: Reactor water quality

RWCU

Explanation: **Answer D –** Temperature switch G33-N008 provides an isolation signal to G33-F004 to prevent damage to the resin on high demin inlet temperature. If demin inlet temp rises >140°F, the resin can breakdown and release collected contaminants. If G33-F107 fails open, the Regenerative HX is bypassed causing the demin inlet temp to rise.

A – Incorrect – At rated power both the INBD and OTBD isolation valves are closed. Therefore, opening one would not have any effect.

B – Incorrect – This valve is open at power with RWCU in service.

C – Incorrect – This valve is open when RWCU in service. Plausible since it may be confused with G33-F044.

Technical Reference(s): ARI-H13-P680-01 Rev 13, Lesson Plan OT-COMBINED-G33_36 Rev 4, & SDM-G33 Rev 9	Reference Attached: ARI-H13-P680-01 p 29, Lesson Plan OT-COMBINED-G33_36 slide 14, & SDM-G33 pp 16 & 33

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-G33_36-I.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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

During a DBA LOCA, how many loops of Containment Spray are required to be operating to lower containment pressure and what is/are the design function(s) of Containment Spray?

During a DBA LOCA, __(1)__ of Containment Spray must be operating to lower containment pressure.
Containment Spray is designed to provide __(2)__ .

	(1)	(2)
A.	1 loop	Containment cooling only
B.	1 loop	Containment cooling and fission product removal
C.	2 loops	Containment cooling only
D.	2 loops	Containment cooling and fission product removal

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

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: CTMT Spray Mode

Explanation: **Answer B –** 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. Additionally, CS provides cooling and scrubbing of fission products.

A – Incorrect – CS provides scrubbing of fission products as well cooling.

C – Incorrect – One loop of CS is sufficient to lower containment pressure below the containment design limit for pressure. And, CS provides scrubbing of fission products as well cooling.

D – Incorrect – One loop of CS is sufficient to lower containment pressure below the containment design limit for pressure.

Technical Reference(s): USAR C-5 Rev 12 & Lesson Plan OT-COMBINED-E12 Rev 4	Reference Attached: USAR pp 5.4-41, 6.5-9-11 & E12 Lesson Plan p 3

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 full core offload is in progress

The following then occurred:

- An irradiated fuel bundle is being unloaded from the Fuel Handling Building IFTS Upender
- A noticeable decrease in Fuel Pool water level is observed
- The Fuel Handling Building Evacuation Alarm sounded

Based on these conditions, in order to minimize unnecessary exposure, immediate evacuation of ____ from the Fuel Handling Building is required, if present.

1. FME Coordinator
2. Bridge Operator
3. Site Protection Officer
4. Fuel Handling Supervisor
5. Spotter
6. Fuel Handling Building Crane Operator
7. Radiation protection Technician

A. 1, 3, & 7

B. 1, 4, & 6

C. 2, 5, & 6

D. 3, 5, & 7

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 69

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	234000	K5.03
	Importance Rating	2.9	

K&A: Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Equipment: Water as a shield against radiation

Fuel Handling Equipment

Explanation: **Answer A** – Lowering of the fuel pool water level increases radiation exposure to people in the Fuel Handling Building. This requires evacuating unnecessary personnel from the FHB. Per ONI-J11-2 Necessary Personnel are defined as those personnel necessary to place the equipment or fuel in a 'safe condition'. SOI-F11, fuel handling Platform, identifies personnel required for fuel handling in the FHB. At Perry, 'necessary personnel' are the FH Supervisor, the Platform Operator, and the Spotter – all other personnel are to be evacuated.

B – Incorrect – FH Supervisor is necessary personnel.

C – Incorrect – Platform Operator and spotter are necessary personnel.

D – Incorrect – The spotter is considered necessary personnel.

Technical Reference(s): ONI-E12-2 Rev 36 and SOI-F11 Rev 18	Reference Attached: ONI-E12-2 p 6 and SOI-F11 p 5

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-14(LP)-A4, OT-3035-11(LP)-A1

Question Source:	Bank #	Perry 2010 # RO-19
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2010
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 70

The plant was operating at 30% rated power when the main turbine tripped due to a loss of main condenser vacuum.

Following the turbine trip, what is the status of the Combined Intermediate Valves and the Positive Assist Non-return Check valves?

The Combined Intermediate Valves are __(1)__ .
The Positive Assist Non-return Check valves are __(2)__ .

	(1)	(2)
A.	open	open
B.	shut	shut
C.	open	shut
D.	shut	open

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 70

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	239001	K6.08
	Importance Rating	3.3	

K&A: Knowledge of the effect that a loss or malfunction of the following will have on the Main And Reheat Steam System: Main condenser vacuum

Main and Reheat Steam

Explanation: **Answer B –** On a main turbine trip, the CIV's close to isolate Reheat steam to the LP turbine preventing an over-speed condition. Also, The PACV's close to prevent an over-speed condition.

A – Incorrect – Both sets of valves close to protect the main turbine. Plausible misconception that these valves remain open since no reactor scram will occur at this power level.

C – Incorrect – The CIV's are also shut.

D – Incorrect – The PACV's are also shut. Plausible misconception that the PACV open similar to the drain valves on a turbine trip.

Technical Reference(s): ONI-N32 Rev 11, SDM-N31/N11A/39 Rev 2, & SDM-N36/25/26 Rev 9	Reference Attached: ONI-N32 pp 3-4, SDM-N31/N11A/39 pp 14a,-15, & SDM-N36/25/26 pp 14-15

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-09(LP)-B.1, OT-COMBINED-N31-F, OT-COMBINED-N36_25_26-F.1

Question Source:	Bank #	
	Modified Bank #	Hatch 2013 # RO-26
	New	
Question History:	Previous NRC Exam	
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

Power ascension is in progress following a refueling outage.

Reactor power is 50%.

It is observed that as Reactor power is increased, the difference between Reactor pressure and Turbine Throttle pressure is becoming larger.

This condition is __(1)__ because the EHC system controls __(2)__ .

	(1)	(2)
A.	not expected	Turbine Throttle pressure to maintain it within 30 psig of Reactor pressure
B.	not expected	Reactor pressure to maintain it and Turbine Throttle pressure in a 30 psi regulation band
C.	expected	Turbine Throttle pressure to maintain it in a 30 psi regulation band
D.	expected	Reactor pressure to maintain it in a 30 psi regulation band and the lower Turbine Throttle pressure results from Main Steam line headloss

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 71

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	241000	A1.02
	Importance Rating	4.1	

K&A: Ability to predict and/or monitor changes in parameters associated with operating the Reactor/Turbine Pressure Regulating System controls including: Reactor power

Reactor/Turbine Pressure Regulator

Explanation: **Answer C –** The EHC system regulates Turbine Throttle pressure in a 30 psi band as Rx pressure increases. The Turbine Throttle pressure rises from 940 to 970 psig at a 3.33% steam flow per 1 psig rise as Reactor pressure raises from 940 to 1025 psig. Reactor pressure raises more due to increased differential pressure caused by the MSL pressure drop as steam line flow increases.

A – Incorrect – Plausible if candidate confuses the Turbine Throttle pressure regulation band (940-970 psig) verses Reactor pressure (940-1025 psig) relationship.

B & D – Incorrect – Plausible if candidate confuses the Turbine Throttle pressure regulation band vs. Reactor pressure relationship. EHC senses the pressure averaging manifold pressure to maintain it in a 30 psig regulation band, not Reactor pressure

Technical Reference(s): SDM-N32 Rev 6	Reference Attached: SDM-N32 pp 15-17, 22-23, 121

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-N32_C85-A.2

Question Source:	Bank #	Limerick 2012 # RO-61
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
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

Plant startup is in progress with Rx power at 17%.

- Motor Feed Pump in AUTO on DFWCS
- RFPT A Start-up to 1100 RPM in progress and RFPT B shutdown

Then an earthquake occurs and the following condition exists:

- An NLO reports the Instrument Air supply line to the Heater Bay is severed

Which of the following describes the effect to the Feedwater system and actions required to mitigate?

	(1)	(2)
A.	MFP FCV M/A station transfers to Manual	Use MFP to control RPV level 192-200 inches
B.	DFWCS transfer to 1-Element (1E) control	Use MFP to control RPV level 192-200 inches
C.	MFP FCV M/A station transfers to Manual	Lock the Mode Switch in SHUTDOWN
D.	DFWCS transfer to 1-Element (1E) control	Lock the Mode Switch in SHUTDOWN

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 72

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	259001	A2.07
	Importance Rating	3.7	

K&A: Ability to (a) predict the impacts of the following on the Reactor Feedwater System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Reactor water level control system malfunctions

Reactor Feedwater

Explanation: **Answer C –** Loss of Instrument Air (IA) to the Heater Bay causes a loss of IA to the MPF FCVs which will initiate the MFP Freeze circuit. This will prevent the MFP FCV's from moving. Additionally, it causes the MFP Flow controller to shift to manual. It also causes the MFP Recirc valve to fail open causing ~4000 gpm flow to be diverted from the RPV. This will cause RPV level to lower to the L3 scram setpoint since the MFP was at its flow limit. Per ONI-C34, Immediate Actions, a Rx scram is required before hitting L3.

A – Incorrect – The operator not be able to control RPV level since the MFP is at its limit and the recirc valve failed open.

B – Incorrect – This will not cause DFWCS to shift to 1E, nor is the operator able to control RPV level.

D – Incorrect – This will not cause DFWCS to shift to 1E control

Technical Reference(s): ARI-H13-P680-03 Rev 15, ONI-C34 Rev 9, ONI-P52 Rev 18, SOI-C34 Rev 35	Reference Attached: ARI-H13-P680-03 p 105, ONI-C34 pp 5-6, ONI-P52 p 31, SOI-C34 p 4

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C34-1.7 & 1.13

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 73

A plant startup is in progress with Rx power at ~ 1%.

During control rod withdrawal the following annunciators alarm:
- MAIN STEAM LINE RADIATION HIGH
- MAIN STEAM LINE RADIATION HI HI/INOP

The main steam line rad monitors indicate as follows:
- D17-K610A 1500 mrem/hr and increasing
- D17-K610B 1550 mrem/hr and increasing
- D17-K610C 10 mrem/hr and Stable
- D17-K610D 1520 mrem/hr and increasing

What automatic actions will occur and what manual action will need to be performed?
Automatic action performed __(1)__.
Manual action required __(2)__.

	(1)	(2)
A.	1B33-F020, REACTOR WATER SAMPLE ISOL valve closes	Close 1B33-F019, REACTOR WATER SAMPLE ISOL valve
B.	1B33-F020, REACTOR WATER SAMPLE ISOL valve closes	Stop the Mechanical Vacuum pump
C.	All MSIV's close	Close 1B33-F019, REACTOR WATER SAMPLE ISOL valve
D.	All MSIV's close	Stop the Mechanical Vacuum pump

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 73

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	272000	A2.01
	Importance Rating	3.7	

K&A: Ability to (d) predict the impacts of the following on the Radiation Monitoring System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Fuel element failure

Radiation Monitoring

Explanation: **Answer A –** An increasing MSL radiation can be caused by fuel element failure. When the rad level exceeds the setpoint for each rad monitor, certain automatic actions occur or should occur such as isolation of both INBD and OTBD Rx sample isolation valves and tripping of the hoggers. The actions are based on the combination of channels receiving the high rad signal. Since rad monitor C did not trip, the OTBD Rx sample isolation valve did not close automatically and must be closed manually per ARI-H13-P601 and NOP-OP-1002.

B – Incorrect – The hogger will trip on either channel A or C receiving a High signal.

C – Incorrect – The MSIV's no longer isolate automatically on high MSL rads.

D – Incorrect – The MSIV's no longer isolate automatically on high MSL rads and the hogger will trip on either channel A or C receiving a High signal.

Technical Reference(s): ARI-H13-P601-19 Rev 19 and NOP-OP-1002 Rev 11	Reference Attached: ARI-H13-P601-19 pp 25 & 49 and NOP-OP-1002 p 62

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-D17A-I.1

Question Source:	Bank #	
	Modified Bank #	Perry 2007 # RO-25
	New	
Question History:	Previous NRC Exam	
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 74

A Dry Cask Storage campaign is in progress in the Fuel handling Building.

Then annunciator COMMON AIRBORNE P902 on H13-P680 alarms.

All Fuel Handling Building Vent Exhaust D17 Radiation Monitors have HIGH alarms locked in.

Which of the following is the expected Fuel Handling Building Ventilation lineup?

	1	2	3	4
FHB SUPP FAN A	OFF	OFF	ON	ON
FHB SUPP FAN B	OFF	OFF	OFF	ON
FHB EXH HTR A	ON	ON	OFF	OFF
FHB EXH HTR B	ON	ON	OFF	OFF
FHB EXH HTR C	OFF	ON	OFF	ON
FHB EXH FAN A	ON	ON	ON	OFF
FHB EXH FAN B	ON	ON	ON	OFF
FHB EXH FAN C	OFF	ON	OFF	ON

A. 1

B. 2

C. 3

D. 4

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 74

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	288000	A3.01
	Importance Rating	3.8	

K&A: Ability to monitor automatic operations of the Plant Ventilation Systems including: Isolation/initiation signals

Plant Ventilation

Explanation: **Answer A –** Both FHB supply fans trip. All other components remain as is.

B – Incorrect – Plausible since AEGTS and M26 heaters automatically start when fans auto start.

C – Incorrect – The running supply fan trips and the heaters remain energized. Plausible if confuses requirements for supply vs. exhaust fans running.

D – Incorrect – The supply fans trip and exhaust fans continue to run. Plausible if operator incorrectly recalls auto start logic.

Technical Reference(s): ARI-H13-P680-08 Rev 15, ONI-D17 Rev 18, SOI-M40 Rev 10	Reference Attached: ARI-H13-P680-08 pp 3-4, ONI-D17 p 18, SOI-M40 pp 3, 5-6

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M40-B.4

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 75

The plant is operating at rated power when the following annunciator alarms on H13-P680:

- RWCU ISOL PUMP A/B RM TEMP HIGH

How does the reactor operator determine which area is causing this alarm?

Reference Provided: EOP-SPI Supplement Figure 13 - Modified

A. Use the Riley Room Temperature Monitor, on H13-P800

B. Use the Riley Room Temperature Indicator on H13-P904

C. Use the NUMAC Leak Detection Monitors on H13-P632/P642

D. Use the RWCU TEMP SELECTOR SW, G33-N601 on H13-P680.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION RO 75

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #	2	
	Group #	2	
	K/A#	290001	A4.02
	Importance Rating	3.3	

K&A: Ability to manually operate and/or monitor in the control room: Reactor building area temperatures

Secondary CTMT

Explanation: **Answer C –** Per the ARI, this alarm is caused by the NUMAC monitors. These monitors are located on H13-P632 and P642. SOI-E31 gives directions for trending temperatures using the NUMACs

A – Incorrect – Plausible since steam tunnel temps can be monitored using this method.

B – Incorrect – Plausible since these modules causes other alarms in the control room.

D – Incorrect – Plausible since this switch is used to monitor various points within the RWCU system, but not the room temps.

Technical Reference(s): ARI-H13-P680-01 Rev 13, SOI-E31 Rev 8	Reference Attached: ARI-H13-P680-01 p 37, SOI-E31 p 9

Proposed references to be provided to applicants during examination: **EOP-SPI Supplement Figure 13 - Modified**

Learning Objective (As available): OT-COMBINED-E31-C, E.1,

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
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 SRO 1

Per NOP-OP-1002, Conduct of Operations, what is the Command SRO required to do during a plant transient?

A. Announce when entering or exiting an ONI or EOP and when transitioning to a different EOP.

B. Provide peer checks for the ATC RO during component manipulations when the BOP RO is not available.

C. Assist the ATC RO by performing panel manipulations when multiple system manipulations are required.

D. Direct all Annunciator Response Instruction steps performed by the ATC RO while executing ONI's and EOP's.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 1

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.1.6
	Importance Rating		4.8

K&A: Ability to manage the control room crew during plant transients.

Generic

Explanation: **Answer A –** Per NOP-OP-1002, Conduct of Operations: "The Command SRO shall clearly announce to the crew when entering or exiting AOP/ONI's, and when transitioning to different sections/flow charts of the EOPs.

B – Incorrect – Plausible since during normal conditions (non-transient), the Command SRO is required to enforce and utilize peer checks. NOP-OP-1002 4.10.6.1: "SROs should not be used for a peer check of component manipulations".

C – Incorrect – Plausible since the Command SRO prioritizes execution of procedures, but is prohibited from making panel manipulations. NOP-OP-1002 4.10.2.5:" SROs shall not operate plant equipment and must remain in their roles, at all times."

D – Incorrect – Plausible since the Command SRO directs ONI and EOP actions, but ARI actions are owned by ROs. NOP-OP-1002 4.9.2.9:" ARP/ARIs shall be owned by the reactor operators. This allows the Command SRO to maintain an oversight role during the execution of specified actions.

Technical Reference(s): NOP-OP-1002 Rev 11	Reference Attached: NOP-OP-1002 pp 56, 59-60, & 65

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3039-01-1A & OT-3035-01(LP)-D.1.A

Question Source:	Bank #	Perry 2005 Audit
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43	b

Comments: **SRO justification** - Justification for Plant Specific Exemption for task unique to the SRO position. A question is linked to a task that is labeled as an SRO-only task, and the task is NOT listed in the RO task list.

Tasks 344-507-05-02 & 344-508-05-02

QUESTION SRO 2

Reactor power must be lowered from 100% to 60% to repair a steam leak.
The Shift Manager and Shift Engineer are attending a meeting in SB-318

In accordance with NOP-OP-1004, Reactivity Management, who must authorize the Evolution Specific Reactivity Plan prior to use?

A. Ops Manager

B. Shift Engineer

C. Command SRO

D. Reactor Engineer

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 2

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.1.37
	Importance Rating		4.6

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

Generic

Explanation: **Answer C –** The Unit Supervisor is the Command SRO. All reactivity plans must be authorized by the Command SRO. With the other two shift SRO's outside the control room, the Unit Supervisor must be the Command SRO

A – Incorrect – Plausible if the Ops Manager is approval authority for the reactivity plan.

B – Incorrect – Plausible since the SE authorizes most work to be performed.

D – Incorrect – Plausible since the RE prepares the Evolution Specific Reactivity Plan and signs it and the Control Rod Movement Sheets are authorized by a Reactor Engineer.

Technical Reference(s): NOP-OP-1002 Rev 11 & NOP-OP-1004 Rev 13	Reference Attached: NOP-OP-1002 p 13 & NOP-OP-1004 p 31

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	
	Modified Bank #	Grand Gulf 2013 - # 95
	New	
Question History:	Previous NRC Exam:	
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43	b.6

Comments: **SRO justification** – ES-401 Att2 - Procedures and limitations involved in initial core loading, alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity. [10 CFR 55.43(b)(6)]

QUESTION SRO 3

The plant was operating at rated power when the RHR A HX'S BYPASS VALVE, 1E12-F048A, failed in the OPEN position.

Based on this failure, which of the following Technical Specification Limiting Conditions for Operation (LCOs) are NOT currently satisfied?

1 – TS 3.5.1, ECCS Operating
2 – TS 3.6.1.7, Residual Heat Removal (RHR) Containment Spray System
3 – TS 3.6.2.3, Residual Heat Removal (RHR) Suppression Pool Cooling System

A. 1 only

B. 3 only

C. 2 & 3 only

D. 1, 2, and 3

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 3

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.2.22
	Importance Rating		4.7

K&A: Knowledge of limiting conditions for operations and safety limits.

Generic

Explanation: **Answer C –** Per TS Bases 3.6.1.7 & 3.6.2.3, both the Containment Spray and the Suppression Pool Cooling Modes of RHR require an operable heat exchanger. With E12-F048A stuck open, flow will bypass the heat exchanger.

A – Incorrect – As LPCI does not require a HX flow path. Plausible if the candidate assumes that a heat exchanger flow path is required for the LPCI path.

B – Incorrect – Containment Spray also requires a HX flow path. Plausible if candidate assumes only the SP Cooling mode requires a heat exchanger flow path.

D – Incorrect – As LPCI does not require a HX flow path. Plausible if candidate assumes all modes of RHR require a HX flow path.

Technical Reference(s): TS 3.5.1 Bases Rev 0, TS 3.6.1.7 Bases Rev 2, & TS 3.6.2.3 Bases Rev 1	Reference Attached: TS 3.5.1 Bases p 3.5-2, TS 3.6. Bases pp 3.6-34 & 79

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3037-09-B & -10-B

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

- Knowledge of TS bases that are required to analyze TS required actions and terminology.

QUESTION SRO 4

Which of the following requires a 10CFR50.59, (Changes, tests, and experiments), evaluation?

A. Removal of floor plugs in Aux-620' per a Maintenance Work Order for one month to support Turbine Bldg. Chill Water system work.

B. Change of responsibility from Shift Manager to Unit Supervisor for approving Liquid Radwaste Discharge permits.

C. Installation of a jumper directed by SVI-B21-T0246A, ATWS-RPT Logic System Functional Test For Division 1.

D. Installation of a leak sealant device on 1G33-F107 to stop a 5 gpm leak.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 4

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.2.5
	Importance Rating		3.2

K&A: Knowledge of the process for making design or operating changes to the facility.

Generic

Explanation: **Answer D –** IAW NOBP-LP-4003A, installation of a leak sealant device requires a 50.59 evaluation since it is not a temp alt supporting maintenance.

A – Incorrect – Removal of floor plugs for less than 90 days do not require a 50.59 eval. If it was for >90 days, an eval would be required.

B – Incorrect – While some 'managerial' changes require a 50.59 eval, this is specifically exempted in NOBP-LP-4003A

C – Incorrect – Installation of jumpers to support maintenance do not require a 50.59 evaluation unless it were to be left installed >90 days. In this case, the jumpers would be installed less than one shift.

Technical Reference(s): NOBP-LP-4003A Rev 8	Reference Attached: NOBP-LP-4003A pp 6, 10-11, 16-17

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43	b.3

Comments: **SRO justification** = Facility licensee procedures required to obtain authority for design and operating changes in the facility. [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include:

• 10 CFR 50.59 screening and evaluation processes.

QUESTION SRO 5

The Plant is shutdown for a refueling outage.

FDST 'B' discharge is in progress IAW SVI-G50-T5266, Liquid Radwaste Release Permit.

Rad Monitor D17-K606, LRW TO ESW RAD MONITOR fails downscale and is declared inoperable.

The crew terminates the discharge

In order to re-start the discharge, what does the ODCM (Offsite Dose Calculation Manual) require?

Reference Provided: ODCM 4.3.7.9

A. Analyze at least two samples of the tanks content and have at least two technically qualified members of the facility staff independently verify the release rate calculation.

B. Verification by at least two members of the facility staff of the discharge valve lineup and that the discharge valve position corresponds to the desired flow rate.

C. Obtain and analyze grab samples for gross radioactivity at least every twelve hours.

D. Estimate the flow rate at least every four hours during the actual release.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 5

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.3.11
	Importance Rating		4.3

K&A: Ability to control radiation releases.

Generic

Explanation: **Answer A –** D17-K606 is the rad monitor identified in table 4.3.7.9-1 of the ODCM. ACTION 110 must be completed to restart the discharge.

B – Incorrect – Plausible since this is a required Action if G50-N445, Radwaste High Flow Discharge Header Flow rad monitor is OOS (Action 112).

C – Incorrect – Plausible since this is a required Action if D17-K604, Emergency Service Water Loops rad monitor is OOS (Action 111).

D – Incorrect – Plausible since this is a required Action if P41-N442, Service Water Discharge Header Flow rad monitor is OOS (Action 113).

Technical Reference(s): ODCM Rev 20	Reference Attached: ODCM pp 114-118

Proposed references to be provided to applicants during examination: **ODCM 3.3.7.9**

Learning Objective (As available): OT-COMBINED-D17A-K.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

- Application of Required Actions (Section 3) and Surveillance Requirements (SR) (Section 4) in accordance with rules of application requirements (Section 1).
- Same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM).

QUESTION SRO 6

Which one of the following identifies a condition that would require declaration of an ALERT only?

Reference Provided: EPI-A1 Attachments 1 and 2

A.
- RPV level is lowering slowly
- Fifty Control Rods are withdrawn at various positions
- Reactor Power is 10%
- Mode Switch is in SHUTDOWN

B.
- RPV level at 175 inches and lowering
- Control Rods 30-31, 18-55, 14-15, 46-15, 46-31, & 46-47 are at position 48
- Nuclear Instruments are fully inserted
- IRM's are indicating on range 4

C.
- Mode Switch is placed in SHUTDOWN
- Control Rod 46-15 is at position 48
- Nuclear Instruments are fully inserted
- Power is indicating middle of the source range

D.
- RPV level at 17.9 inches and lowering
- Mode Switch is in SHUTDOWN
- All Control Rods indicate 00
- Nuclear Instruments are fully inserted
- Power is indicating middle of the source range

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 6

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.4.41
	Importance Rating		4.6

K&A: Knowledge of the emergency action level thresholds and classifications.

Generic

Explanation: **Answer B** – This is a CA1 – failure to auto scram and power below 4%. RPS should have actuated at 178" and reactor is not shutdown under all conditions without boron.

A – Incorrect – This is a CS1

C – Incorrect – No EAL entry criteria listed. Reactor shutdown under all conditions without boron. No EAL entry.

D – Incorrect – RPV water level not below TAF. No EAL entry.

Technical Reference(s): EPI-A1 Rev 26	Reference Attached: EPI-A1 pp 14 & 23

Proposed references to be provided to applicants during examination**: EPI-A1, Attachments 1 & 2**

Learning Objective (As available): EPL-0804-01-4

Question Source:	Bank #	Perry 2010 # SRO-11
	Modified Bank #	
	New	
Question History:	Previous NRC Exam:	Perry 2010 # SRO-11
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.5	

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps.

QUESTION SRO 7

Which one of the following conditions requires an Hourly Fire Watch Patrol?

Reference Provided: PAP-1910 Fire Protection Program Body & Attachment #3

A. RCIC Pump Room Wet-Pipe Sprinkler will not deliver water.

B. Heat Detection for Reactor Recirculation Pump B is out of service.

C. Unit 1 Division 1 Cable Spreading Pre-Action Spray System will not deliver water.

D. General area smoke detectors in Containment are functional but the detection system will not transmit an alarm to SAS.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 7

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		3
	Group #		
	K/A#	Generic	2.4.26
	Importance Rating		3.6

K&A: Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage.

Generic

Explanation: **Answer D –** This equipment is required to be functional and transmit an alarm or establish hourly fire watch to protect plant equipment.

A – Incorrect – Continuous fire watch required.

B – Incorrect – Fire watch not required, remote monitoring required.

C – Incorrect – Continuous fire watch with each area inspected every 15 minutes.

Technical Reference(s): PAP-1910 Rev 34	Reference Attached: : PAP-1910 pp 58, 60, 64, 65, 77-78, 81, & 83

Proposed references to be provided to applicants during examination: **PAP-1910 Body & Attachment #3**

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

Question Source:	Bank #	Perry 2009 #SRO-04
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2009 #SRO-04
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.5	

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

QUESTION SRO 8

Plant startup in progress with plant in Mode 2.

Multiple annunciators on panel H13-P877 were received two minutes ago.

Refer to attached picture of partial panel H13-P877 for current conditions.

What Tech Spec LCO(s) Condition(s) must be entered, if any?

Attachment Provided: Panel H13-P877 Meters
Reference Provided: TS 3.8.4 (partial) and TS 3.8.7 (partial)

A. Enter T.S. 3.8.4 Condition A only

B. Enter T.S. 3.8.7 Condition B only

C. Enter T.S. 3.8.4 Condition A and T.S. 3.8.7 Condition B

D. Neither T.S. 3.8.4 Condition A nor T.S. 3.8.7 Condition B are entered

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 8

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295004	AA2.02
	Importance Rating		3.9

K&A: Ability to determine and/or interpret the following as they apply to Partial Or Complete Loss Of D.C. Power: Extent of partial or complete loss of D.C. power

Partial or Total Loss of DC Pwr

Explanation: **Answer C –** With the readings on the Div 1 Battery/Bus meters, the charger output is not sufficient to maintain Bus ED1A voltage >125V TS 3.8.4 Bases, charger must be operable. TS 3.8.4 Condition A is entered. Additionally, since ED1A voltage is less than required by Bases table B 3.8.7-1, TS 3.8.7 Condition B is also entered.

A – Incorrect – TS 3.8.7 Condition B must also be entered since ED1A Bus voltage < 125V. Plausible if candidate doesn't recall that TS 3.8.7 checks bus voltage.

B – Incorrect – TS 3.8.4 Condition A must also be entered since the charger is not maintaining bus voltage ≥ 129V. Plausible if candidate sees battery voltage in normal range and assumes only distribution is inop.

D – Incorrect – Both TS 3.8.4 & 3.8.7 LCO's are not met. Plausible if candidate does not recall the minimum bus voltage for ED1A.

Technical Reference(s): TS 3.8.4, TS 3.8.7, TS 3.8.4 Bases Rev 7, & TS 3.8.7 Bases Rev 1	Reference Attached: TS 3.8.4 p 3.8-24, TS 3.8.7 p 3.8-26, TS 3.8.4 Bases B 3.8-53, & TS 3.8.7 Bases pp 73, 78, 80

Proposed references to be provided to applicants during examination: **TS 3.8.4 (partial) and TS 3.8.7 (partial)**

Learning Objective (As available): OT-3037-12

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

• Knowledge of TS bases that are required to analyze TS required actions and terminology.

QUESTION SRO 9

The Plant is in a forced outage with the following conditions:

- RHR A in operating in SDC
- RCS temperature band 110°F to 120°F.
- RPV water level band is 200" to 210"
- SOI-E12 Residual Heat Removal System, Section 7.40, Protecting Shutdown Cooling Operation was not performed.

While performing maintenance, RHR A Min Flow Valve 1E12-F064A was inadvertently opened. RPV level lowered to 172" before 1E12-F064A was able to be reclosed.

Based on the above conditions only, which of the following describes the NRC Notifications required for this event?

Reference Provided: NOBP-OP-1015

A. Only a 4 Hour Notification

B. Only a 8 Hour Notification

C. 1 Hour Notification and 4 Hour Notification

D. 4 Hour Notification and 8 Hour Notification

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 9

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295021	2.4.30
	Importance Rating		4.1

K&A: Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.

Loss of Shutdown Cooling

Explanation: **Answer B –** When RPV level lowered to <178", a valid RPS signal was generated causing an isolation which resulted in a loss of shutdown cooling. An 8-hour notification is required for a valid RPS signal with reactor not critical and the valid isolation signal.

A – Incorrect – 4-hour notification not required. Plausible if Rx was critical at time of RPS actuation.

C – Incorrect – 1-hour notification not required. Plausible if candidate assumes entry into E-plan required for loss of SDC. Only required if approaching or exceeding 200°F.

D – Incorrect – 4-hour notification not required. Plausible if Rx was critical at time of RPS actuation.

Technical Reference(s): NOBP-OP-1015 Rev 3	Reference Attached: NOBP-OP-1015 pp 33, 64 & 78

Proposed references to be provided to applicants during examination: **NOBP-OP-1015**

Learning Objective (As available): OT-3039-01-A & F

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.5

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

- The SRO is responsible for making NRC Notifications.

QUESTION SRO 10

Refueling activities are in progress.

The following conditions exist on the Refuel Floor:

- A fuel bundle just arrived from the Fuel Handling Building with the IFTS Upender vertical
- A fuel bundle is in transit from the RPV to the fuel storage racks via Refueling Bridge
- An unexplained drop in upper pool level occurs

Which of the following actions is required concerning the status of the two bundles?

A. Incline the IFTS Upender and continue the fuel movement with the Refueling Bridge to the fuel storage racks.

B. Incline the IFTS Upender and return the fuel bundle on the Refueling Bridge back to any open vessel location.

C. Continue fuel movement with the Refueling Bridge to the fuel storage racks, then, transfer the fuel bundle in IFTS to the fuel storage racks.

D. Transfer the fuel bundle in IFTS down to the Fuel Handling Building and return the fuel bundle on the Refueling Bridge back to the vessel location from which it was removed.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 10

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295023	AA2.02
	Importance Rating		3.7

K&A: Ability to determine and/or interpret the following as they apply to Refueling Accidents: Fuel pool level

Refueling Acc

Explanation: **Answer** A – The stem contains entry conditions for ONI-E12-2. The ONI also describes Safe Conditions for a fuel bundle. FTI-D009 further restricts placing a bundle back into the Rx after it has been off-loaded. The SRO is responsible for all the fuel moves on the refuel floor.

B – Incorrect – Moving the bundle back to the core is an unsafe act/condition and not allowed by FTI-D09.

C – Incorrect – An IFTS transfer to the FHB is an unsafe act/condition and not allowed by FTI-D-09.

D – Incorrect – An IFTS transfer to the FHB is an unsafe act/condition - moving the bundle back to the core is an unsafe act/condition, both are not allowed by FTI-D09

Technical Reference(s): ONI-E12-2 Rev 36 & FTI-D009 Rev 18	Reference Attached: ONI-E12-2 pp 4-7 & FTI-D009 pp 11-12

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-11(LP)-A.1 & OT-3602-01-D.4 & E.2

Question Source:	Bank #	Perry 2010 # SRO-12
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2010 # SRO-12
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.7	

Comments: **SRO justification** = Fuel handling facilities and procedures. [10 CFR 55.43(b)(7)]

- Refuel floor SRO responsibilities.
- Decay heat assessment.

QUESTION SRO 11

The plant was operating at rated power when a LOCA occurred in the drywell.

This resulted in suppression pool level rising above the upper limit established by the Technical Specifications and the level is still slowly rising.

Per the Bases for Technical Specification 3.6.2.2, Suppression Pool Water Level, with suppression pool level above the upper limit:

A. RCIC may trip on high exhaust back-pressure.

B. The peak drywell design pressure may be exceeded during a design basis LOCA.

C. The peak containment design pressure may be exceeded during a design basis LOCA.

D. There could be excessive hydrodynamic loads on submerged structures during SRV and horizontal vent steam discharges.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 11

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295024	EA2.03
	Importance Rating		3.8

K&A: Ability to determine and/or interpret the following as they apply to High Drywell Pressure: Suppression pool level

High Drywell Pressure

Explanation: **Answer D –** TS 3.6.2.2 Bases states document states the upper limit is based, in part on precluding excessive dynamic loading on the S/RV.

A – Incorrect – Bases document does not state the RCIC turbine may trip with a high suppression pool level but is credible because with a higher SP water level, RCIC back pressure would be higher.

B – Incorrect – The bases document does not state the drywell design pressure could be exceeded with a high suppression pool level but is credible because drywell pressure would be higher given a DBA LOCA and a higher SP water level.

C – Incorrect – The bases document states the containment design pressure would not be exceeded with a high suppression pool level.

Technical Reference(s): TS 3.6.2.2 Bases Rev 7 and Lesson Plan OT-3037-002-10 Rev 3	Reference Attached: TS 3.6.2.2 Bases p B 3.6-76 & Lesson Plan OT-3037-002-10 p 18

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	Perry 2013 # SRO-16
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2013 # SRO-16
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43 b.2	

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

Knowledge of TS bases that are required to analyze TS required actions and terminology.

QUESTION SRO 12

The following conditions exist:

- SVI-E51-T2001, RCIC Pump and Valve Operability test is in progress following maintenance
- SVI-D23-T1213, Suppression Pool Average Temperature is being performed by an I&C tech

Based on the information from the attached SPDS screen print, select the required action.

Attachment and Reference Provided: SPDS screen print and Technical Specification 3.6.2.1

A. Trip the RCIC turbine
Restore Suppression Pool Average Temperature to ≤95°F within 24 hours
Verify Suppression Pool Average Temperature ≤110°F once per 30 minutes

B. Trip the RCIC turbine
Verify Suppression Pool Average Temperature ≤110°F once per hour
Restore Suppression Pool Average Temperature to ≤95°F within 24 hours

C. Initiate Suppression Pool Cooling
Restore Suppression Pool Average Temperature to ≤95°F within 24 hours
Verify Suppression Pool Average Temperature ≤120°F once per 30 minutes

D. Initiate Suppression Pool Cooling
Reduce Reactor Power to ≤1% RTP in 12 hours
Verify Suppression Pool Average Temperature ≤110°F once per hour

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 12

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295026	2.2.22
	Importance Rating		4.7

K&A: Knowledge of limiting conditions for operations and safety limits.

Suppression Pool High Water Temp.

Explanation: **Answer B –** With a suppression pool average temperature > 105° F, testing adding heat to the pool must be suspended immediately (trip the RCIC turbine). Once testing is stopped, TS Bases states that the SP temperature must be lowered to ≤95°F within 24 hours.

A – Incorrect – Verifying SP temp ≤110°F is once per hour

C & D – Incorrect – Initiating SP Cooling is not required

D – Incorrect – Lowering Rx power is not a correct requirement

Technical Reference(s): TS 3.6.2.1 & TS 3.6.2.1 Bases Rev 1	Reference Attached: TS 3.6.2.1 pp 36-38 & TS 3.6.2.1 Bases pp 70-71

Proposed references to be provided to applicants during examination: **SPDS screen print and Technical Specification 3.6.2.1**

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

Question Source:	Bank #	Perry 2010 # SRO-13
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2010 # SRO-13
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.2	

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

Knowledge of TS bases that are required to analyze TS required actions and terminology.

QUESTION SRO 13

The plant was operating at rated power with Containment Vessel Chiller A in service when the following occurred:

Containment Vessel Chiller A tripped on low refrigerant pressure
Containment temperature rose to 100°F.

Containment temperature continues to rise slowly.

Based on the above information, which of the following procedures provides the required actions that mitigate these plant conditions?

A. EOP-2, Primary Containment Control and SOI-P50, Containment Vessel Chilled Water System

B. EOP-2, Primary Containment Control and EOP-SPI 2.2, Bypass of CVCW Isolation

C. EOP-1, RPV Control and SOI-M11, Containment Vessel Cooling System

D. EOP-1, RPV Control and ONI-C71, Reactor Scram

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 13

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295027	EA2.01
	Importance Rating		3.7

K&A: Ability to determine and/or interpret the following as they apply to High Containment Temperature (Mark III Containment Only): Containment temperature

High Containment Temperature

Explanation: **Answer A –** EOP-2 is entered when containment temperature exceeds 95°F. Since the containment vessel chiller tripped on low refrigerant pressure, SOI-P50 contains actions to start another chiller.

B – Incorrect – Although EOP-2 directs EOP-SPI 2.2, no isolation has occurred.

C – Incorrect – EOP-1 entry is directed from EOP-2, however there is sufficient margin to EOP-1 entry to not require entry at this time. SOI-M11 contains a section to "Maximize Containment Cooling" and EOP-2 directs Maximizing Containment Cooling. But, without a chiller, starting more cooling fans will have no effect.

D – Incorrect – If containment temperature rose high enough, EOP-1 and ONI-C71-1 would be entered. However, there is sufficient margin to EOP-1 entry to not require scramming at this time.

Technical Reference(s): EOP-2 Chart Rev D, SOI-P50 Rev 12, & ARI-H13-P904-01 Rev 10	Reference Attached: EOP-2 chart (partial), SOI-P50 pp, & ARI-H13-P904-01 p 5

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-7-A & -C

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.5

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

Knowledge of diagnostic steps and decision points in the emergency operating procedures (EOP) that involve transitions to event specific subprocedures or emergency contingency procedures.

QUESTION SRO 14

An OBE earthquake caused a rupture of a Radwaste tank.

- Multiple Radwaste Building Area radiation monitors have Alert and High alarms locked in
- The RWB VENT EXH GAS (D17-K727) radiation monitor has Alert and High alarms locked in
- Chemistry reports contamination in the Underdrain System

Which of the following actions would the Unit Supervisor direct?

1 Startup all available Emergency Service Water loops IAW SOI-P45/49, Emergency Service Water System
2 Shutdown all running Emergency Service Water loops IAW SOI-P45/49, Emergency Service Water System
3 Startup all available Underdrain pumps IAW SOI-P72, Plant Foundation Underdrain System
4 Shutdown all running Underdrain pumps IAW SOI-P72, Plant Foundation Underdrain System

A. 1 and 3

B. 2 and 3

C. 1 and 4

D. 2 and 4

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 14

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		1
	K/A#	295038	2.4.50
	Importance Rating		4.0

K&A: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

High Off-site Release Rate

Explanation: **Answer C** – A rupture of a Radwaste tank can migrate to the underdrain system. The underdrain pumps are shutdown to minimize the release of radioactive water. If the radioactive water migrates to the underdrain system as confirmed by Chemistry sampling, and the water level in the underdrain system rises, the ESW pumps are started to provide a dilution source as the water is released off site.

A – Incorrect – Starting underdrain pumps is plausible if candidate thinks this action will control and divert the release.

B – Incorrect – Stopping ESW and Starting underdrain pumps is plausible if candidate believes this will better control the release.

D – Incorrect – Stopping both the ESW pumps and the underdrain pumps is plausible if candidate believes this will prevent any release.

Technical Reference(s): USAR C-15 Rev 13 & ONI-D17 Rev 18	Reference Attached: USAR pp 15.7-17→19 & ONI-D17 pp 3, 9-10, & 14

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): 3035-01(LP)A.3

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.4

Comments: **SRO justification** = Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions. [10 CFR 55.43(b)(4)]

• Analysis and interpretation of radiation and activity readings as they pertain to selection of administrative, normal, abnormal, and emergency procedures.

QUESTION SRO 15

A transient is in progress.

Refer to the attached sheet for current plant conditions.

Which of the following procedures contains the specific actions to mitigate this transient?

Attachment Provided: Picture of H13-P680 (partial)

A. ARI-H13-P660-03-A9, RX LEVEL HI/LO L7/L4

B. ARI-H13-P660-03-B7, FEED FLOW STEAM FLOW MISMATCH

C. ONI-C34, Feedwater Flow Malfunction

D. ONI-C71-1, Reactor Scram

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 15

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		2
	K/A#	295008	AA2.01
	Importance Rating		3.9

K&A: Ability to determine and/or interpret the following as they apply to High Reactor Water Level: Reactor water level

High Reactor Water Level

Explanation: **Answer C –** With the indications given, Feedwater flow is excessive for indicated steam demand (flow). This indicates there is a feed control malfunction. ONI-C34 contains the steps to control feed flow to match steam flow.

A – Incorrect – Plausible since this alarm is received for the indicated conditions. However, this ARI does not contain specific steps to control Feedwater flow.

B – Incorrect – Plausible since this alarm is received for the indicated conditions. However, this ARI does not contain specific steps to control Feedwater flow.

D – Incorrect – Plausible, as ONI-C71-1 does contain a general step to control RPV water level and a reactor scram will occur if feed flow is not controlled. However, for the given conditions, ONI-C71-1 would not be entered yet.

Technical Reference(s): ONI-C34 Rev 9, ONI-C71-1 Rev 20, & ARI-H13-P680-03 Rev 15	Reference Attached:): ONI-C34 pp 3, 5-6, & 8, ONI-C71-1 p 6, & ARI-H13-P680-03 pp 25-26 & 33-34

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3035-04(LP) A1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.5

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

• Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps.

QUESTION SRO 16

The plant was operating at rated power when a transient occurred resulting in a reactor scram.

Current plant conditions are as follows:

- Appropriate EOP's have been entered
- 2 SRV's are open
- RPV pressure is 900 psig and stable
- Suppression Pool temperature is 115°F
- Termination and Prevention of injection into the RPV has been completed
- RPV water level is 89 inches and lowering
- Drywell pressure is 1.9 psig

Based on the above information, when would you to direct the RO to recommence feeding the RPV?

A. All SRVs are closed

B. RPV level lowers to 50 inches

C. Drywell pressure lowers below 1.68 psig

D. APRM Downscale lights illuminate on P680

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 16

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		2
	K/A#	295015	AA2.01
	Importance Rating		4.3

K&A: Ability to determine and/or interpret the following as they apply to Incomplete SCRAM: Reactor power

Incomplete SCRAM

Explanation: **Answer D –** With 2 SRV's open and RPV pressure stable at 900 psig, Rx power is approximately 8-10%. This will require the SRO to direct action from EOP-1A, which requires injection remain Terminated and Prevented until one of several conditions are met. APRM's Downscale is a standalone condition that allows for recommencement of injection to stabilize RPV level.

A – Incorrect – Plausible since reinjection is allowed if SRVs are closed and Drywell pressure <1.68 psig.

B – Incorrect – Would be correct if level lowered to 16.5 inches. Plausible since this is the lower end of the level band if Suppression Pool temperature was <110°F.

C – Incorrect – This is partially correct. However, SRV's must remain closed to recommence injection.

Technical Reference(s): EOP-1A Chart Rev F	Reference Attached: EOP-1A Chart

Proposed references to be provided to applicants during examination: None

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

Question Source:	Bank #	Clinton 2002 #117
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.5	

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

QUESTION SRO 17

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

Subsequently the following annunciators alarmed.

- RHR B PUMP ROOM SUMP LEVEL HIGH
- RHR C PUMP ROOM SUMP LEVEL HIGH
- AUX BLDG. 568 EL WATER LVL HIGH
- SUPR POOL LEVEL A HI/LO
- SUPR POOL LEVEL B HI/LO

An NLO reports there is about 10 inches of water in Aux 568'.
Suppression Pool level is lowering slowly.

Which of the following actions has the highest priority?

A. Perform Emergency Depressurization.

B. Operate RHR B and C sump cubicle drains.

C. Transition to EOP-1, RPV Control and scram the reactor.

D. Commence normal plant shutdown IAW IOI's or ONI-C71-1

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 17

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		1
	Group #		2
	K/A#	295036	2.4.20
	Importance Rating		4.3

K&A: Knowledge of operational inplications of EOP warnings, cautions, and notes.

Secondary Containment High Sump/Area Water Level

Explanation: **Answer D –** Per a NOTE in EOP-3, when any area is inaccessible due to a hazard and the associated sump level annunciator is in alarm then the Max Safe operating Limit for that area is considered exceeded. With RHR B & C sump level alarms in and water in Aux 568, RHR B & C rooms are inaccessible and 2 max safes are exceeded. Since there is no indication of a primary system leaking, the SRO must commence a normal plant shutdown.

A – Incorrect – Plausible since ED is required if 2 or more areas of same parameter exceeded max safe if primary system discharging.

B – Incorrect – Plausible, since this is a required action. However, since there is water on Aux 568, operation of the cubical drain valves would not be possible without extraordinary measures. Additionally, 2 max safes are already exceeded.

C – Incorrect – Plausible since this is the required action if it was a primary system leaking.

Technical Reference(s): EOP-3 Chart Rev E, EOP-3 Bases Rev 5, ARI-H13-P601-18 Rev 16, & ARI-H13-P870-03 Rev 10	Reference Attached: EOP-3 Chart partial, EOP-3 Bases p 49, ARI-H13-P601-18 pp 37-38 & 41-42, and ARI-H13-P870-03 pp 5-6

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-17-C & 17-D

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.5

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

• Knowledge of diagnostic steps and decision points in the emergency operating procedures (EOP) that involve transitions to event specific subprocedures or emergency contingency procedures.

QUESTION SRO 18

The plant is operating at rated power.

- Containment pressure is 0.1 psig
- Containment temperature is 74°F

The NLO Rounds Taker reports that MCC disconnect to the Standby Liquid Control Operating Heater, C41-D002 was inadvertently manipulated to the OFF position.

Based on this information, both SLC A and SLC B subsystems are __(1)__.
The procedure used to restore the MCC disconnect to the ON position is __(2)__.

	(1)	(2)
A.	INOPERABLE	ARI for SLC A/B OUT OF SERVICE
B.	INOPERABLE	ELI-R24, 480 VOLT MCC
C.	OPERABLE	ARI for SLC A/B OUT OF SERVICE
D.	OPERABLE	ELI-R24, 480 VOLT MCC

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 18

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		1
	K/A#	211000	A2.05
	Importance Rating		3.4

K&A: Ability to (a) predict the impacts of the following on the Standby Liquid Control System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of SBLC tank heaters

SLC

Explanation: **Answer D** – Both SLC subsystems remain operable with the heaters off as long as containment temperature remains ≥70°F (requires knowledge of surveillance requirements). The lineup ELI-R24 is the correct procedure for restoring the MCC for the heaters to the ON position.

A & B – Incorrect – First part – SLC remains operable since the given containment temperature is 74°F. SR 3.1.7.2 only looks at tank temperature.

A & C – Incorrect – Second part – The ARI is plausible since loss of power to other SLC components are annunciated by alarms. The ARI directs the operator to check MCC disconnects for loss of power to pumps and valves.

Technical Reference(s): TS 3.1.7, SOI-C41 Rev 20, ELI-R24 Rev 34, PAP-0205 Rev 21, ARI-H13-P601-19 Rev 19, & ARI-H13-P601-18 Rev 16	Reference Attached: TS 3.1.7 pp 3.1-20 & 21, SOI-C41 p 5, ELI-R24 p 47, PAP-0205 pp 4 & 13, ARI-H13-P601-19 p 64, & ARI-H13-P601-18 p 14

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C41-H & M.1

Question Source:	Bank #	Perry 2015 # SRO-18
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2015 # SRO-18
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.2	

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

- Application of Required Actions (Section 3) and Surveillance Requirements (SR) (Section 4) in accordance with rules of application requirements (Section 1).

Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps.

QUESTION SRO 19

The plant was operating at 15% power in preparation of shutdown.
The HPCS pump was tagged out for motor replacement when a LOOP occurred.

Below are the current conditions:
- Div 1 DG tripped on overspeed.
- Div 2 DG failed to start.
- RCIC is injecting at 500 gpm.
- RPV level is 5 inches and stable.
- Containment temperature is 186°F and rising 1°F per minute.
- Maintenance expects repairs to Div 2 DG to be complete in 30 minutes.

How should the Unit Supervisor direct cool down?

Depressurize the RPV __(1)__ to __(2)__ psig.

	(1)	(2)
A.	disregarding cooldown rate	<135
B.	disregarding cooldown rate	between 150 to 250
C.	maintaining Tech Spec cooldown rate	<135
D.	maintaining Tech Spec cooldown rate	between 150 to 250

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 19

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		1
	K/A#	217000	2.4.9
	Importance Rating		4.2

K&A: Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.

RCIC

Explanation: **Answer B –** With containment temperature at 186°F and rising 1°/min, ED is required by EOP-2. The SRO needs to transition from EOP-2 to EOP-1 then to EOP-4-2 (ED). Since RCIC is injecting @ 500 and RPV level is stable, RCIC is required for adequate core cooling. A NOTE in EOP-1 tells the US to terminate ED to maintain RCIC if required for ACC and directs a pressure band of 150 to 250 psig until RCIC no longer required for ACC.

A – Incorrect – Cooldown to <135°F is required to start SDC. However, based on containment H/U rate, ED will be required before SDC could be placed in service.

C – Incorrect – Maintaining TS cooldown rate is not required when ED is required.

D – Incorrect – Maintaining TS cooldown rate is not required when ED is required.

Technical Reference(s): EOP-1 Chart Rev F, EOP-2 Chart Rev D, & EOP-4-2 Chart Rev E	Reference Attached: EOP-1 Chart, EOP-2 Chart, & EOP-4-2 Chart

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-3402-02-F, -07-C, & 12-C.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.5

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

• Knowledge of diagnostic steps and decision points in the emergency operating procedures (EOP) that involve transitions to event specific subprocedures or emergency contingency procedures.

QUESTION SRO 20

The plant was operating at rated power when a loss of all Feedwater occurred.
A scram was inserted.
The following alarms were received on H13-P680:

- RPS RX LEVEL LO L3
- RRCS RX LEVEL LO L2

HPCS and RCIC then restored RPV water level.

Based on these conditions, which groups of valves should have isolated and what is the Tech Spec Bases for the isolation?

The __(1)__ isolation valves isolated and the Tech Spec Bases for the isolation ensures __(2)__.

	(1)	(2)
A.	Reactor Water Clean Up	peak cladding temperatures remain below limits
B.	Reactor Water Clean Up	MCPR SL is not violated during the assumed transient
C.	Main Steam Line Drain	peak cladding temperatures remain below limits
D.	Main Steam Line Drain	MCPR SL is not violated during the assumed transient

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 20

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		1
	K/A#	223002	2.4.46
	Importance Rating		4.2

K&A: Ability to verify that the alarms are consistent with the plant conditions.

PCIS/Nuclear Steam Supply Shutoff

Explanation: **Answer A –** With Level 3 and Level 2 alarms in, all BOP and L2 isolations should have occurred. RWCU valves isolate on a L2 signal. And the TS Bases for the isolation of these particular valves is to minimize the loss of inventory to ensure peak cladding temps remain below 10CFR50.46 limits.

B – Incorrect – Plausible as this is the Bases for the L8 Scram, RWCU is based on not exceeding PCT.

C – Incorrect – MSLD valves isolate in Level 1. No indications were given that L1 was reached.

D – Incorrect – MSLD valves isolate in Level 1. No indications were given that L1 was reached.

Technical Reference(s): ARI-H13-P680-05 Rev 15, TS 3.3.6.1, TS 3.3.6.1 Bases Rev 1, ARI-H13-P601-19 Rev 19	Reference Attached: ARI-H13-P680-05 pp 5 & 27, TS 3.3.6.1 p 3.3-58, TS 3.3.6.1 Bases p B 3.3-158, ARI-H13-P601-19 pp 11 & 39

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-B21(NS4)-F.2, F.6, K.2 & OT-3037-07-O

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

• Knowledge of TS bases that are required to analyze TS required actions and terminology

QUESTION SRO 21

The following conditions exist:

- The reactor scrammed due to a small-break LOCA
- The only available injection source is from the Condensate Transfer system
- To maximize injection, Emergency Depressurization was initiated approximately 20 minutes ago and all ADS SRVs were verified open
- RPV level is -10 inches and rising slowly
- The SRV OPEN annunciator just reset

You have directed the Reactor Operator to verify the status of the ADS SRVs.

The ADS SRVs are reported to be __(1)__. You would direct the panel operators to __(2)__ .

Reference Provided: Steam Tables

	(1)	(2)
A.	closed based on the GREEN light ON above the SRV switches	bypass Instrument Air Isolations IAW EOP-SPI 2.8 to open non-ADS SRV's
B.	closed based on the GREEN light ON above the SRV switches	open additional SRVs IAW EOP 4-2 Emergency Depressurization
C.	open based on SRV tailpipe temperatures of approximately 250°F and stable.	restore and maintain RPV level greater than 16.5" IAW EOP 4-1 ALTERNATE LEVEL CONTROL
D.	open based on SRV tailpipe temperatures of approximately 250°F and stable.	perform Vessel Flood Prevention IAW EOP-SPI 5.2

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 21

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		1
	K/A#	239002	A2.05
	Importance Rating		3.4

K&A: Ability to (a) predict the impacts of the following on the RELIEF/SAFETY VALVES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low reactor pressure

SRVs

Explanation: **Answer C –** The US is in EOP 4-2 for ED. With ED occurring 20 minutes ago, RPV pressure will decay to <30 psig. This will cause the SRV OPEN annunciator to reset and the SRV Open/Close lights to change state. Since the only injection source is CTS, RPV pressure cannot be >30 psig wirh RPV level @ -10". The SRVs are verified open by observing SRV tailpipe temperature of 250°F which corresponds to reactor pressure of ~25 psig. Since RPV level is <16.5, the US will transition to EOP-4-1 and direct the RO to restore and maintain RPV level using CTS.

A – Incorrect – SRVs are still open. The green light indicates the pressure in < 30 psig in the line. No need to bypass IA isolations to open additional SRV's

B – Incorrect – SRVs are still open. Based on given conditions, actions to open additional SRV's is inappropriate

D – Incorrect – Vessel Flood Prevention is only performed for ECCS systems not required for ACC.

Technical Reference(s): ARI-H13-P601-019 Rev 19, EOP-4-1 Chart Rev F & ABB Steam Tables	Reference Attached: ARI-H13-P601-019 p 17 & EOP-4-1 chart (partial)

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

Learning Objective (As available): OT-COMBINED-B21_N11-F & I.1 and OT-3402-02-F &

Question Source:	Bank #	Perry 2010 # SRO-21
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	Perry 2010 # SRO-21
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43 b.5	

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

• Knowledge of diagnostic steps and decision points in the emergency operating procedures (EOP) that involve transitions to event specific subprocedures or emergency contingency procedures.

QUESTION SRO 22

The plant is in MODE 2.
Lake Erie temperature is 45°F.

Then, annunciator ESW B SLUICE GATE POWER LOSS alarmed.

A walkdown of ESW B Sluice Gate, revealed that the Sluice Gate MCC disconnect was charred and in need of repair.

What is/are the required action(s) if any for maintaining the safety function of the ESW Systems?

A. Manually open ESW B Sluice Gate only.

B. Verify ESW A Sluice Gate is capable of opening.

C. Align all loops of ESW to the swale and open & deactivate ESW A Sluice Gate.

D. No action required unless ESW Forebay temperature approaches maximum design limit.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 22

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		1
	K/A#	400000	2.2.38
	Importance Rating		4.5

K&A: Knowledge of conditions and limitations in the facility license.

Component Cooling Water

Explanation: **Answer C –** Per Tech Spec Bases, 3.7.1, if a sluice gate is being tested or repaired, the safety function of ESW is maintained by locking open one sluice gate and aligning all ESW loops to the swale.

A – Incorrect – The ESW loops also need to be aligned to the swale to maintain safety function.

B – Incorrect – One sluice gate must be locked open, not just capable of opening unless ESW B is declared inop.

D – Incorrect – Misconception that no action required until the forebay warms up. Monitoring ESW forebay temp is a condition of this alignment. However, it will not maintain the safety function.

Technical Reference(s): TS 3.7.1 Bases Rev 5 & ARI-H13-P601-17 Rev 15	Reference Attached: TS 3.7.1 Bases pp B 3.7-3 & 3a and ARI-H13-P601-17 p 117

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-P45-H & -K.2 and OT-3037-11-C

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

• Knowledge of TS bases that are required to analyze TS required actions and terminology.

QUESTION SRO 23

The plant is operating at rated power.
The in-service CRD Flow Control Valve fails open.

What is the effect if a scram condition occurs and what must be done to mitigate this condition?

The scram function __(1)__ maintained and the US would direct the RO to __(2)__ .

	(1)	(2)
A.	is	shift flow control valves per SOI-C11(CRDH), Control Rod Drive Hydraulics System
B.	is	take manual control of CRD HYDRAULICS FLOW CONTROL and control flow per NOP-OP-1002, Conduct of Ops
C.	is not	shift flow control valves per SOI-C11(CRDH), Control Rod Drive Hydraulics System
D.	is not	take manual control of CRD HYDRAULICS FLOW CONTROL and control flow per NOP-OP-1002, Conduct of Ops

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 23

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		2
	K/A#	201001	A2.04
	Importance Rating		3.9

K&A: Ability to (a) predict the impacts of the following on the Control Rod Drive Hydraulic System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Scram condition

CRD Hydraulic

Explanation: **Answer A –** With a failure of the FCV, charging water header pressure is maintained >1520 psig (~1700 psig). Therefore, with Rx at rated pressure and charging water header pressure >1520 psig, the scram will occur if needed. To mitigate this condition, the FCV's must be shifted per SOI-C11(CRDH).

B – Incorrect – Per NOP-OP-1002 if a system is not operating properly in AUTO, the controller may be taken to MANUAL. Taking manual control of the flow controller will not have any effect on the high flow as the controller is already calling for '0' flow.

C – Incorrect – Scram function is maintained.

D – Incorrect – Scram function is maintained and taking manual control of the flow controller will not have any effect on the high flow as the controller is already calling for '0' flow.

Technical Reference(s): SOI-C11(CRDH) Rev 25, SDM-C11-CRDH Rev 8, TS 3.1.5 Bases Rev 1	Reference Attached: SOI-C11(CRDH) pp 21-23, SDM-C11-CRDH p 43, TS 3.1.5 Bases p B 3.1-32

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-C11-L.1 & K.2

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.5

Comments: **SRO justification** = Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

• Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps.

QUESTION SRO 24

The plant is operating at rated power.
The vendor reported a 10CFR Part 21 defect for the hydrogen igniter power supplies.
The US has declared both divisions of hydrogen igniters inoperable.

Which of the following is required to maintain the hydrogen control function of primary containment?

A. Only one division of Hydrogen Recombiners

B. Both divisions of Combustible Gas Mixing Systems

C. Two Hydrogen Recombiners or one Combustible Gas Mixing System

D. One Hydrogen Recombiner and one Combustible Gas Mixing System

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 24

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		2
	K/A#	223001	2.2.25
	Importance Rating		4.2

K&A: Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.

Primary CTMT and Aux.

Explanation: **Answer D –** Per TS 3.6.3.2 Bases, if both divisions of H2 Igniters are inop, the H2 control function is maintained by verifying 1 H2 recombiner and 1 combustible gas mixing system is operable.

A – Incorrect – Plausible since if both recombiners are inop, only one division of H2 igniters will maintain alternate H2 control capabilities per ORM 6.4.12.

B – Incorrect – Not correct per TS bases. Plausible if operator fails to remember that one division of recombiners and mixing system is also required.

C – Incorrect – Both are required. Plausible if operator fails to remember that both are required.

Technical Reference(s): TS 3.6.3.2 Bases Rev 5	Reference Attached: TS 3.6.3.2 Bases p B 3.6-98

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M51_M56-1.11 & OT-3037-10-B

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	x
	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

• Knowledge of TS bases that are required to analyze TS required actions and terminology.

QUESTION SRO 25

The plant was operating at rated power with Control Room Ventilation operating in the NORMAL mode when indication was lost on H13-P904 for M26-D001B, CONT RM EMG RCIRC ELECT HTR.

The NLO reports the control power fuse is blown in MCC EF1C09-H for M26-D001B.

Is entry into any Tech Spec LCO(s) required?

A. No Tech Spec entry is required.

B. Tech Spec 3.7.3, Control Room Emergency Recirculation (CRER) System only.

C. Tech Spec 3.7.4, Control Room Heating Ventilation and Air Conditioning (HVAC) System only.

D. Both Tech Spec 3.7.3, Control Room Emergency Recirculation (CRER) System and Tech Spec 3.7.4, Control Room Heating Ventilation and Air Conditioning (HVAC) System.

LOD = ____ (1 → 5 - Easy to Hard)

TIME TO COMPLETE ____

QUESTION SRO 25

Examination Outline Cross-Reference	Level:	RO	SRO
	Tier #		2
	Group #		2
	K/A#	288000	2.2.42
	Importance Rating		4.6

K&A: Ability to recognize system parameters that are entry-level conditions for Technical Specifications.

Plant Ventilation

Explanation: **Answer B –** In accordance with TS Bases, the electrical heater is required for operability of the Emergency Recirc System, but not the normal HVAC system.

A – Incorrect – TS Bases for 3.7.3 specifically specifies the heater as a requirement for operability. Plausible since CR HVAC in in Normal mode and not ER.

C – Incorrect – TS Bases for 3.7.4 specifically exempts the heater as a requirement for operability. Plausible since the heater is energized if a high humidity condition occurs in the Control Room

D – Incorrect – TS Bases for 3.7.4 specifically exempts the heater as a requirement for operability. Plausible if operator thinks heater is also required in Normal mode for high humitity.

Technical Reference(s): TS 3.7.3, TS 3.7.4, TS 3.7.3 Bases Rev 10, & TS 3.7.4 Bases Rev 4	Reference Attached: TS 3.7.3 p 3.7-4,, TS 3.7.4 p 3.7-8, TS Bases pp 3.7-11a, & 3.7-18

Proposed references to be provided to applicants during examination: None

Learning Objective (As available): OT-COMBINED-M25_M26-K.1

Question Source:	Bank #	
	Modified Bank #	
	New	x
Question History:	Previous NRC Exam	
Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	x
10 CFR Part 55 Content:	55.41	
	55.43	b.2

Comments: **SRO justification** = Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

• Knowledge of TS bases that are required to analyze TS required actions and terminology.

Attachment for Question RO-11

```
                                                                        PAGE   1
                          PERRY-1 CYCLE 16      SEQUENCE NO 10
CORE PARAMETERS           3DM V6.59.04/P11E10   11-MAR-2016 09:59 CALCULATED
POWER  MWT       2656.2   PERIODIC LOG          11-MAR-2016 09:59 PRINTED
POWER  MWE        927.0   AUTOMATIC             CASE ID FMLS1160311095907
FLOW   MLB/HR    63.904   CALC RESULTS          RESTART FMLS1160311085852
FPAPDR            0.943                         LPRM SHAPE - FULL CORE
SUBC   BTU/LB     23.03   Keff         1.0047
PR     PSIa     1037.70   XE WORTH %  -2.34     LOAD LINE SUMMARY
CORE   MWD/sT   23737.7   XE/RATED    1.039     CORE POWER        70.7%
CYCLE  MWD/sT    7600.9   AVE VF       0.467    CORE FLOW         62.3%
MCPR              1.342   FLLLP        0.922    LOAD LINE         99.6%

ALTERNATE INPUT : C16_EIS.INP
CORRECTION FACTORS: MFLCPR= 1.001  MFLPD= 0.999  MAPRAT=  1.000   ZBB=  1.86 ft
OPTION:  ARTS        2 LOOPS ON    MANUAL FLOW   MCPRLIM= 1.370   FCBB= N/A
                  MOST LIMITING LOCATIONS (NON-SYMMETRIC)
MFLCPR   LOC    MFLPD     LOC       MAPRAT    LOC        PCMARG   LOC
1.022   19-30   0.941   15-34- 4    0.819   17-32- 4     0.044  23-32- 5
0.908   43-28   0.940   17-32- 4    0.815   19-28- 4     0.040  25-34- 5
0.899   19-36   0.934   21-30- 4    0.812   21-26- 4     0.040   9-34- 5
0.898   21-28   0.934   41-34- 4    0.807   15-28- 4     0.038   7-34- 5
0.896   45-30   0.922   19-24- 5    0.802   23-24- 5     0.038   7-32- 5
0.889   35-20   0.919   15-32- 4    0.802   21-32- 4     0.036  23-10- 4
0.885   21-38   0.916   23-20- 5    0.800   17-26- 4     0.032  23-28- 5
0.884   37-22   0.912   23-16- 5    0.795   25-22- 5     0.031  15-32- 5
0.882   37-36   0.910   25-18- 5    0.794   25-18- 5     0.030  17-34- 5
0.881   35-38   0.909   17-26- 4    0.791   23-16- 5     0.029  25-30- 5

SEQ. B-1     C=MFLCPR D=MFLPD M=MAPRAT P=PCMARG *=MULTIPLE    CORE AVE AXIAL
                                                             NOTCH REL PW  LOC
                                                                 0.183   25
                                                              00 0.341   24
59                                                            02 0.524   23
  L                                                           04 0.677   22
55                                                            06 0.767   21
51                      10                                    08 0.826   20
  L                                                           10 0.858   19
47                                                            12 0.869   18
43          12                      12                        14 0.918   17
  L                                                           16 0.931   16
39                                                            18 0.979   15
35            D         10                                    20 1.090   14
  L                                                           22 1.128   13
31            M  C  P                                       24 1.184   12
27                      10                                    26 1.231   11
  L                                                           28 1.245   10
23                                                            30 1.297   09
19          12                      12                        32 1.345   08
  L                                                           34 1.387   07
15                                                            36 1.443   06
11                      10                                    38 1.501   05
  L                                                           40 1.493   04 <-
07                                                            42 1.366   03
03                                                            44 1.059   02
       L     L     L     L     L     L     L                  46 0.359   01
   02 06 10 14 18 22 26 30 34 38 42 46 50 54 58
CORE AVERAGE RADIAL POWER DISTRIBUTION
RING #         1      2      3      4      5      6      7      8
REL PW       1.115  1.216  1.366  1.385  1.309  1.136  0.993  0.440
```

Attachment for Question RO-11

PERRY-1 CYCLE 16 INSTRUMENT READINGS/STATUS
CALIBRATED LPRM READINGS

SEQUENCE NO 10
11-MAR-2016 09:59 CALCULATED
11-MAR-2016 09:59 PRINTED
CASE ID FMLS1160311095907
LPRM SHAPE - FULL CORE

57D			23.7	25.0	20.4		
C			27.7	27.3	25.1		
B			32.4	31.7	29.6		
A			27.7	27.4	27.5		
49D	19.0	28.7	31.3	32.1	29.9	26.6	
C	19.3	37.3	43.8	40.2	42.8	29.9	
B	19.7	47.8	55.4	50.6	53.6	0.0	
A	13.1	52.8	0.0	54.4	63.7	30.4	
41D	27.3	34.7	33.5	34.0	33.7	31.7	21.0
C	0.0	42.2	49.0	48.6	48.0	38.3	24.8
B	0.0	51.3	61.1	60.9	59.2	46.9	28.4
A	51.7D	54.0	67.3	67.0	65.9	52.0	25.9
33D	28.4	32.6C	35.2	36.6	33.3	30.8	25.2
C	41.1	49.8	48.8	42.6	50.2	46.9	30.3
B	54.4	62.9	60.2	52.4	62.2	59.5	35.4
A	65.9	71.5*	64.7	52.6	71.1	67.9	32.5
25D	27.7	33.1	34.3	36.6	33.4	31.1	24.1
C	39.8	48.4	0.0	44.6	49.5	44.9	29.0
B	51.7	60.2	61.0	55.4	61.4	56.3	33.8
A	62.3	67.1	66.8	56.7	68.9	64.0	30.6
17D	25.3	33.1	32.5	32.7	32.6	30.9	
C	0.0	40.5	47.3	47.3	46.6	32.6	
B	35.5	48.0	59.4	59.9	57.4	41.0	
A	34.2	48.9	68.3	65.7	62.7	41.2	
09D		0.0	27.6	30.8	26.5	19.4	
C		31.5	36.9	33.6	36.1	20.6	
B		38.0	48.6	43.9	47.3	20.8	
A		37.8	59.5	48.5	0.0	15.6	

08 16 24 32 40 48 56

OF TIPS NOT SCANNED: 8

FAILED SENSORS:
LPRM (8 SIGNALS FAILED)
817C 841B 841C 1609D
2425C 2449A 4009A 4849B
LPRM (0 PANACEA REJECTED)
OTHER SENSORS (0 TOTAL)
SUB RODS
NONE

T = TIP RUN RECOMMENDED
C = MFLCPR LOCATION
M = MAPRAT LOCATION
D = MFLPD LOCATION
P = PCMARG LOCATION
* = MULTIPLE LIMIT

CORE SUMMARY

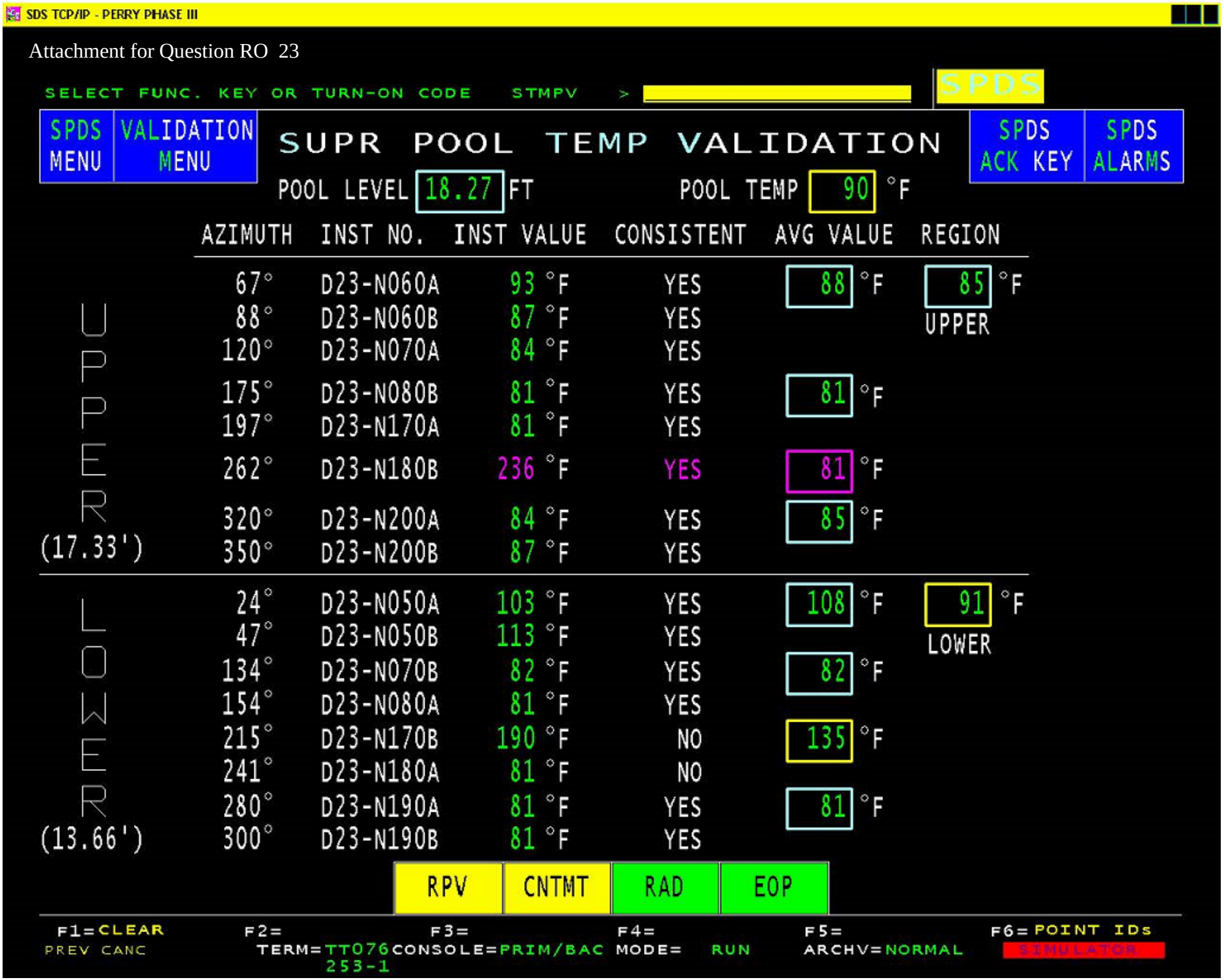
INER	1.105					
CORE POWER	70.7%	CALC SUB FLOW	62.3%	DP MEAS PSI		18.405
CORE FLOW	62.3%	OPER SUB FLOW	-1.0%	DP CALC PSI		22.481
LOAD LINE	99.6%	FLOW BASIS	SUB	FEEDWTR FLOW MLB/HR		11.22

APRM CALIBRATION

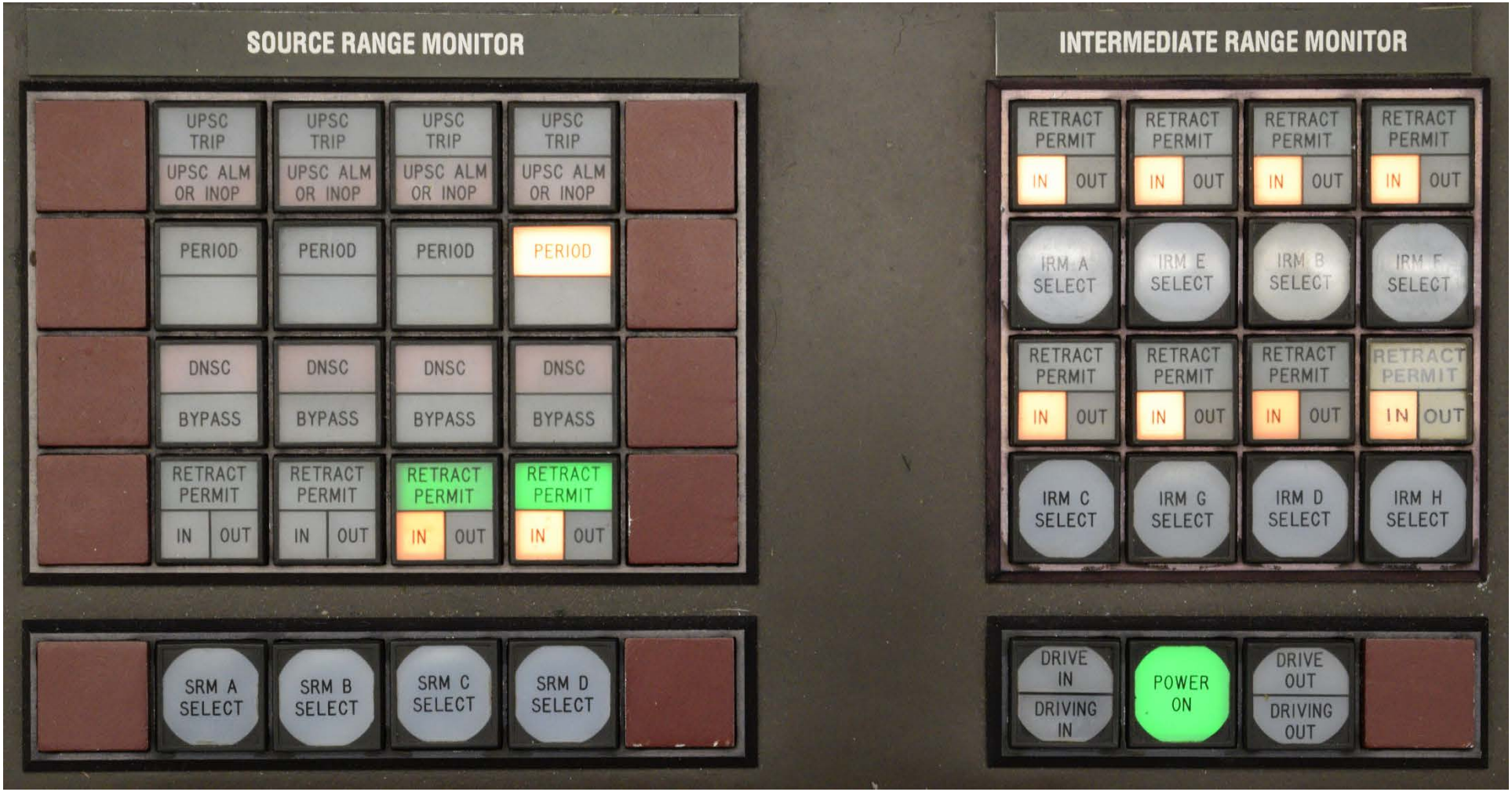
	A	B	C	D	E	F	G	H
READING	70.5	70.8	70.9	70.3	70.0	70.1	70.0	70.4
AGAF	1.003	1.009	1.008	1.001	0.997	0.998	1.000	1.003
APRM - %CTP	-0.3	-0.9	-0.8	-0.1	0.3	0.2	0.0	-0.3

TIP RUNS RECOMMENDED
STRINGS: NONE

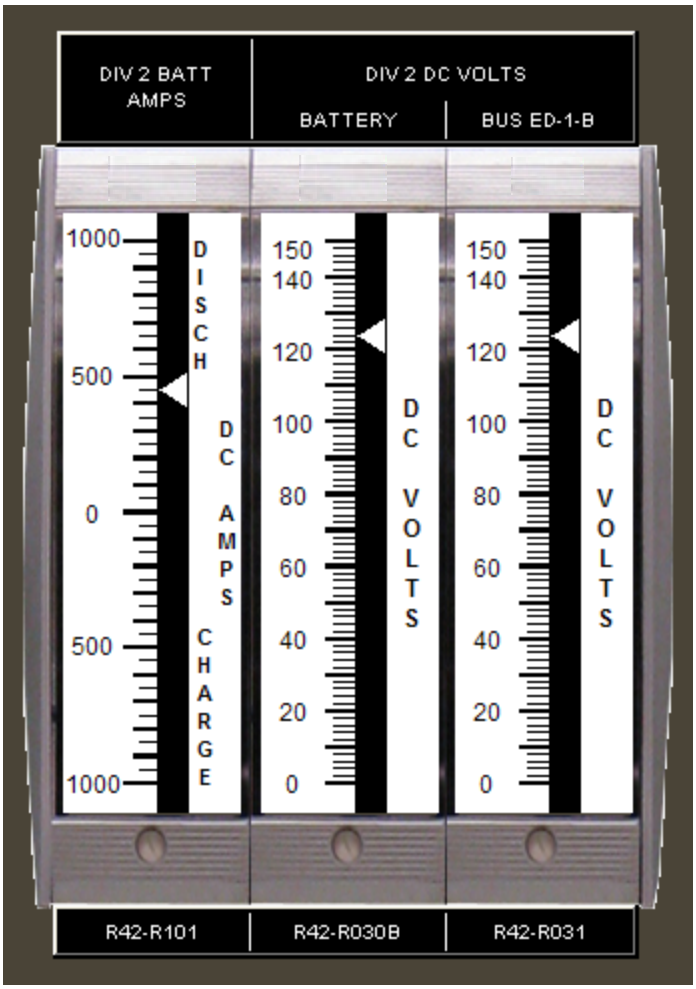
DRIVE FLOW	MLB/HR	22.15
FEEDWTR TEMP	Deg F	386.2
CORE AVG VOID FRACTION		0.467


SDS TCP/IP - PERRY PHASE III
Attachment for Question RO 23
SELECT FUNC. KEY OR TURN-ON CODE STMPV >
SPDS
SPDS MENU
VALIDATION MENU
SUPR POOL TEMP VALIDATION
SPDS ACK KEY
SPDS ALARMS
POOL LEVEL 18.27 FT
POOL TEMP 90 °F
AZIMUTH INST NO. INST VALUE CONSISTENT AVG VALUE REGION
67° D23-N060A 93 °F YES 88 °F 85 °F
88° D23-N060B 87 °F YES UPPER
120° D23-N070A 84 °F YES
175° D23-N080B 81 °F YES 81 °F
197° D23-N170A 81 °F YES
262° D23-N180B 236 °F YES 81 °F
320° D23-N200A 84 °F YES 85 °F
350° D23-N200B 87 °F YES
UPPER REACTOR (17.33')
24° D23-N050A 103 °F YES 108 °F 91 °F
47° D23-N050B 113 °F YES LOWER
134° D23-N070B 82 °F YES 82 °F
154° D23-N080A 81 °F YES
215° D23-N170B 190 °F NO 135 °F
241° D23-N180A 81 °F NO
280° D23-N190A 81 °F YES 81 °F
300° D23-N190B 81 °F YES
LOWER REACTOR (13.66')
RPV
CNTMT
RAD
EOP
F1=CLEAR PREV CANC
F2=
F3=
F4=
F5=
F6=POINT IDs
TERM=TT076 CONSOLE=PRIM/BAC MODE= RUN ARCHV=NORMAL
253-1
SIMULATOR

Attachment for Question RO 45



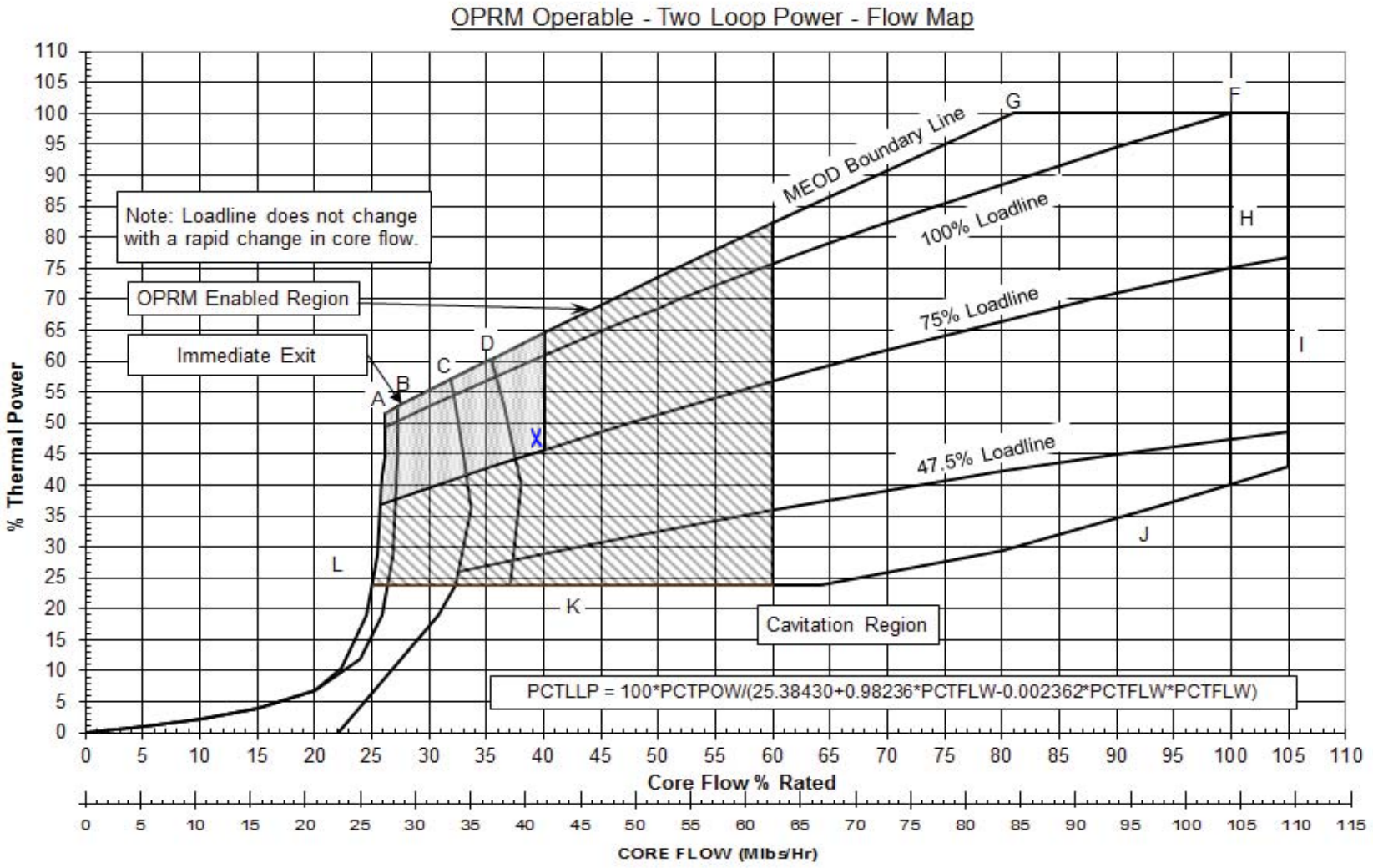
Question RO 59 Attachment



Partial panel picture of H13-P877

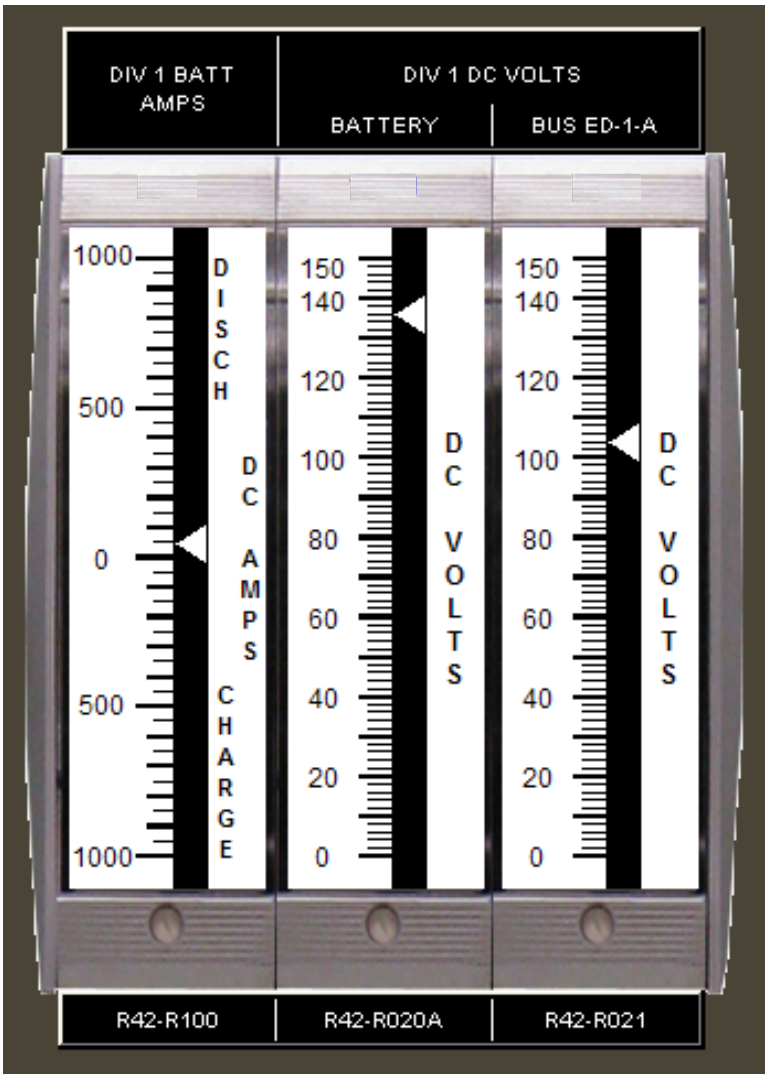
Question RO 64 Attachment

PERRY NUCLEAR POWER PLANT	Number: PDB-A0006	
Title: Power Flow Map	Use Category: In-Field Reference	
	Revision: 15	Page: 3 of 10



QUESTION SRO 8 Attachment

Partial Panel Picture of H13-P877



SDS TCP/IP - PERRY PHASE III

Functions Print Help PI Subsystem

Question SRO 12 Attachment

11 / 23 / 16 11 : 25 : 35

SELECT FUNC. KEY OR TURN-ON CODE OATC >

OPERATOR ATC

DG NOT OPER	0 SRVs OPEN
MSIV OPEN	NO SCRAM RODS OUT
ISOL COMPLETE	ECCS NPSH

	INJ	KGPM
FDW	YES	38
CRD	YES	0.1
RCIC	YES	0.7
HPCS	NO	-0.1
LPCS	NO	0.0
LPCI A	NO	0.0
LPCI B	NO	0.0
LPCI C	NO	0.0

DW PRESS	0.2	PSIG
DW TEMP	129	°F
CNTMT PRESS	0.2	PSIG
CNTMT TEMP	84	°F
SP LEVEL	18.2	FT
SP TEMP	106	°F

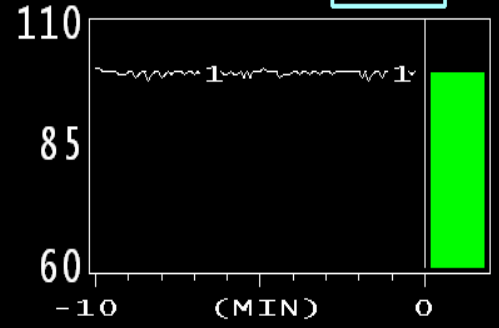
LOAD LINE	FMEOD
105.3 %	0.921

FEED FLOW 16.3 MLB/HR

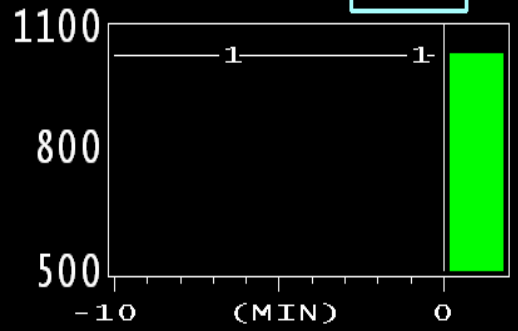
STEAM FLOW 16.7 MLB/HR

JET PUMP FLOW DIFF	JET PUMP FLOW MLB/HR	FCV POSN %
0.9 %	A 48.5	A 63.5
	B 47.1	B 63.6

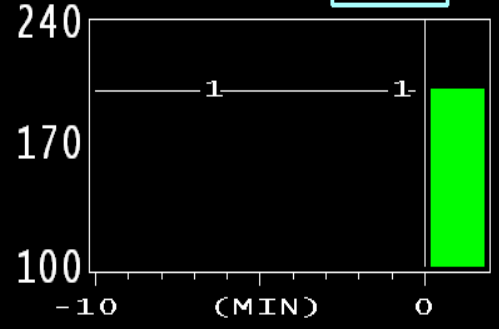
RX POWER 100 %



RPV PRESS 1024 PSIG



RPV LEVEL 200 IN



F1=CLEAR PREV CANC F2= F3= F4=RESCALE F5= F6=POINT IDs

TERM=TT029 CONSOLE=PRIM/BAC MODE= RUN ARCHV= ICSU1M

ANONYMOUS

Question SRO 15 Attachment

H13-P680 Partial

Instrument displays on Section 3 and Section 5