September 12, 2000

Mr. John H. Mueller
Chief Nuclear Officer
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
Operations Building, 2nd Floor
P.O. Box 63
Lycoming, NY 13093

SUBJECT: NINE MILE POINT UNIT 1 REACTOR OPERATOR AND SENIOR REACTOR OPERATOR INITIAL EXAMINATION REPORT 05000220/2000-301

Dear Mr. Mueller:

This report transmits the results of the subject operator licensing examinations conducted by the NRC during the period of July 21 through 28, 2000. These examinations addressed areas important to public health and safety and were developed and administered using the guidelines of the "Examination Standards for Power Reactors" (NUREG-1021, Revision 8).

Based on the results of the examinations, all applicants (four Senior Reactor Operator (SRO) and one Reactor Operator (RO)) passed all portions of the examinations. Performance insights observed during the examination were discussed between Mr. J. D'Antonio and training department personnel following completion of the examinations on July 28, 2000. No significant inspection findings were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

No reply to this letter is required, but should you have any questions regarding this examination, please contact me at 610-337-5183, or by E-mail at RJC@NRC.GOV.

Sincerely,

/RA/

Richard J. Conte, Chief
Operational Safety Branch
Division of Reactor Safety

Docket No. 05000220
License No. DPR-63

1941
ML00375

Enclosure: Initial Examination Report No. 05000220/2000-301 w/Attachments 1, 2 and 3

cc w/encl; w/Attachments 1-3:
Lou Pisano, Manager - Training

cc w/encl; w/o Attachments 1-3:
G. Wilson, Esquire
M. Wetterhahn, Winston and Strawn
J. Rettberg, New York State Electric and Gas Corporation
P. Eddy, Electric Division, Department of Public Service, State of New York
C. Donaldson, Esquire, Assistant Attorney General, New York Department of Law
J. Vinquist, MATS, Inc.
F. Valentino, President, New York State Energy Research
and Development Authority
J. Spath, Program Director, New York State Energy Research
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T. Judson, Central NY Citizens Awareness Network

<u>Distribution w/encl; w/Attachments 1-3</u>:
C. Buracker, DRS (Master Exam File)

<u>Distribution w/encl; w/o Attachments 1-3</u>:
Region I Docket Room (with concurrences)
J. Wiggins, DRS
J. D'Antonio, Chief Examiner, DRS
C. Buracker, DRS (OL Facility File)
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J. Shea, RI EDO Coordinator
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OFFICE	RI/DRS	RI/DRS	RI/DRP		
NAME	JD'Antonio	RConte	MEvans		
DATE	08/24/00	08/ /00	08/12/00	09/ /00	09/ /00

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	05000220
Report No:	05000220/2000-301
License No:	DPR-63
Licensee:	Niagara Mohawk
Facility:	Nine Mile Point Unit 1
Location:	Oswego, NY
Dates:	July 21-27, 2000 (Written and Operating Tests) July 31-August 4, 2000 (Grading)
Chief Examiner:	J. D'Antonio, Operations Engineer/Examiner
Examiners:	S. Dennis, Operations Engineer/Examiner C. Sisco, Operations Engineer/Examiner
Approved by:	Richard J. Conte, Chief Operational Safety Branch Division of Reactor Safety

SUMMARY OF FINDINGS

Nine Mile Point Unit One
NRC Examination Report No. 050220/2000-301

The report covers a 1 week period of onsite examination by NRC region-based examiners. If applicable, the significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609.

- There were no findings.

4. OTHER ACTIVITIES (OA)

4OA4 Cross Cutting Issues

.1 Reactor Operator and Senior Reactor Operator Initial License Examinations

a. Scope

The NRC examination team reviewed the written and operating initial examinations submitted by the Nine Mile Point training staff to verify or ensure, as applicable, the following:

- Prepared and developed in accordance with the guidelines of Revision 8 of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The review was conducted both in the Region I office and at the Ginna facility. Final resolution of comments and incorporation of test revisions was conducted during and following the onsite preparation week.

- Met the overall quality goals (range of acceptability) of NUREG-1021, Revision 8 (interim guidance is contained in Report of Interaction 99-18, dated November 24, 1999, and posted on the NRC's internet home page).

- Simulation facility problems, if any, did not interfere with the examination process.

- Facility licensee completed a test item analysis for feedback into the systems approach to training programs.

- Examination security requirements met.

- Facility operating procedures can be adequately implemented.

The NRC examiners administered the operating portion of the exam to all applicants from July 25 through 27, 2000. The written examinations were administered by the Nine Mile Point training staff on July 21, 2000.

b. Issues and Findings

Grading and Results

All five applicants passed all portions of the initial licensing examination.

The facility did not submit any post-examination comments.

Examination Preparation and Quality

No inspection findings were identified.

Examination Administration and Performance

No inspection findings were identified.

4OA6 Exit Meeting Summary

On July 27, 2000, the NRC Chief Examiner discussed preliminary overall observations noted during the examination with the Acting Operations Manager and other members of the plant staff. On August 25, 2000 final observations and license numbers were provided to the training department by telecon.

The NRC also expressed appreciation for the cooperation and assistance that was provided during the preparation of the exam by the licensee's training staff and examination team.

Attachments:
1. NRC's Revised Reactor Oversight Process
2. SRO Written Exam w/Answer Key
3. RO Written Exam w/Answer Key

PARTIAL LIST OF PERSONS CONTACTED

FACILITY

Brian Booth, Acting Unit One Operations Manager
Louis Pisano, Manager Training - Nuclear
Steve Reininghaus, General Supervisor Operations Training

NRC

J. D'Antonio, Operations Engineer/Examiner
S. Dennis, Operations Engineer/Examiner
C. Sisco, Operations Engineer/Examiner

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

Radiation Safety

- Occupational
- Public

Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.

Attachment 2

SRO WRITTEN EXAM W/ANSWER KEY

Question # RO 1 SRO 30

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	2
	K/A #	295005 AK2.07	295005 AK2.07
	Importance Rating	3.6	3.7

Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Reactor Pressure Control

Proposed Question:

The plant is in a startup and the turbine generator has just been synchronized to the grid by closing R915. As generator load is being raised and the bypass valves **JUST START** to close, operators in the switchyard report excessive arcing on the middle phase of MOD SW 18.

The CRS directs tripping of R915. Which one of the following will occur when R915 is tripped?

a. The Turbine will immediately trip, the Reactor will scram and ERVs will open to control RPV pressure.

b. The Turbine will NOT immediately trip, the Reactor will scram, and ERVs will open to control RPV pressure.

c. The Turbine will NOT trip, the Reactor will NOT scram and Bypass Valves will open to control RPV pressure.

d. The Turbine will immediately trip, the Reactor will NOT scram and Bypass Valves will open to control RPV pressure.

Proposed Answer: c. The turbine will not trip because the breaker trip itself does not cause a turbine trip and a turbine trip below 45% power does not cause a scram.

Explanation (Justification of Distractors):

a. The turbine will not trip and a turbine trip below 45% power does not cause a scram. ERVS will not open.

b. The reactor will not scram and the ERVs will not open

d. The turbine will not trip.

Technical Reference(s): (Attach if not previously provided)	01-OPS-001-245-1-01	

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 2 SRO 2

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1.	1
	K/A #	295006 2.4.11	295006 2.4.11
	Importance Rating	3.4	3.6
Knowledge of abnormal condition procedures.			

Proposed Question:

N1-SOP-1, REACTOR SCRAM, requires verifying all rods inserted to position 04 or beyond. In accordance with this SOP which one of the following methods is used to make this verification if the Full Core Display is inoperative?

a. All control rod individual blue scram lights are lit.

b. Negative reactor period indication from the SRMs.

c. F3, 1-4, SCRAM DUMP VOLUME WTR LVL HIGH alarms.

d. All RODS IN light illuminated on the Remote Shutdown Panel.

Proposed Answer: d.

Explanation (Justification of Distractors):
a. This indicates scram valve position not rod position
b. Power lowering only won't tell control rod positions
c. Indicates water has entered the SDV but does not tell rod positions.

Technical Reference(s): N1-SOP-01, page 5
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10 43.5 45.13	
Comments:		

Question # RO 3 SRO 3

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295007 AK3.05	295007 AK3.05
	Importance Rating	3.0	3.2

Knowledge of the reasons for the following responses as they apply to HIGH REACTOR PRESSURE: Low Pressure System Isolation

Proposed Question:

The plant is shutdown and Shutdown Cooling (SDC) is in service. As pressure rises which one if the following describes how SDC is protected from over-pressurization?

a. SDC pumps trip and SDC inboard isolation valve (38-01) isolates.

b. SDC pumps trip, SDC inboard and outboard valves (38-01 & 38-02) isolate.

c. SDC pumps do NOT trip, but SDC inboard and outboard valves (38-01 & 38-02) isolate.

d. SDC pumps trip, but SDC does NOT isolate, relief valves open to control system pressure.

Proposed Answer: d. The SDC system is protected against over-pressurization by an interlock on the isolation valves that does not permit opening more than one valve above 120 psig. This interlock does not automatically isolate the system, in the event temperature rises to about the saturation temperature for 120 psig (about 350°F) the pumps trip and over-pressurization protection is provided by relief valves.

Explanation (Justification of Distractors):

a. Valves close on high space temperature indicative of a leak, although interlocked to open on pressure there are no auto closures on system pressure or temperature.
b. There are no valve closures on high system pressure or temperature.
c. The pumps trip on high temperature, the SDC valves do NOT close on high temperature or pressure.

Technical Reference(s): N1-OP-4, Sect. D.5.0
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	1
10 CFR Part 55 Content:	41.5	
	45.6	

Comments:

(

Question # RO 4 SRO 4

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295009 AK2.01	259009 AK2.01
	Importance Rating	3.9	4.0

Knowledge of interrelations between LOW REACTOR WATER LEVEL and the following: Reactor Water Level Indication

Proposed Question:

During a LOCA an operator closes all the recirculation pump discharge valves in an attempt to isolate the break. Reactor parameters have the following indications:

- All rods have inserted
- APRMs are downscale
- Narrow Range level is 53 inches and slowly lowering
- RPV pressure is 667 psig and slowly lowering

Which one of the following lists the reactor water level instrumentation that provides an accurate indication of reactor water level in this situation?

a. Only Narrow Range and Fuel Zone

b. Only Lo Lo Lo and Fuel Zone instruments

c. Narrow Range, Wide Range and Vessel Flange

d. Lo Lo Lo Range, Wide Range and Vessel Flange

Proposed Answer: b. The lower taps for these instruments come from the Liquid Poison penetration and the core spray sparger, both of which are inside the shroud. All other instruments are isolated from the area inside the shroud and are inaccurate for determining actual core level because communication between the core and annulus region was stopped when the recirc pump discharge valves were closed.

Explanation (Justification of Distractors):

a. Narrow range cannot tell level inside the shroud with level below the tops of the steam separator stand pipes and the recirc loops isolated.
c. Narrow range and wide range cannot tell level inside the shroud with level below the tops of the steam separator stand pipes and the recirc loops isolated. Vessel flange range is way above the current level.
d. Wide range cannot tell level inside the shroud with level below the tops of the steam separator stand pipes and the recirc loops isolated. Vessel flange range is way above the current level.

Technical Reference(s): (Attach if not previously provided) N1-ODP-PRO-0305, EOPSAP Technical Bases
C-18015-C, Reactor Vessel Instrumentation P & I Diagram

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.7
45.8

Comments:

Question # RO 5 SRO 6

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295010 AK2.05	295010 AK2.05
	Importance Rating	3.7	3.8

Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Drywell Cooling and Ventilation

Proposed Question:

During a LOCA which one of the following describes when the Drywell Air Coolers must be secured?

a. Prior to venting the primary containment through the stack.

b. Prior to venting the primary containment through RBEVs.

c. Drywell Temperature is 230°F and torus pressure is 14 psig.

d. Drywell temperature is approaching 300°F and drywell pressure is 5 psig.

Proposed Answer: c.

Explanation (Justification of Distractors):
a. Drywell coolers should remain in service during venting
b. Drywell coolers should remain in service during venting
d. This condition is outside the containment spray limit, since sprays cannot be used the coolers remain in service.

Technical Reference(s): EOP-4, PRIMARY CONTAINMENT CONTROL
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.8	
Comments:		

Question # RO 6 SRO 8

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295014 A2.03	295014 A2.03
	Importance Rating	4.0	4.3

Ability to determine and/or interpret the following as they apply to INADVERTENT REACTIVITY ADDITION: Cause of reactivity addition.

Proposed Question:

The plant is operating steady state at 100% power with five (5) recirculation pumps in service. The following indications are observed:

- Reactor power lowers
- Recirc suction temperature is constant
- Core d/p lowers
- Total recirc flow rises

Which one of the following failures caused these indications?

a. One (1) recirculation pump has tripped.

b. The core shroud has separated below the core plate.

c. One (1) recirculation pumps speed has raised to maximum.

d. A core shroud separation has occurred between the core plate and top guide.

Proposed Answer: b. A separation has occurred below the core plate that allows recirc flow to bypass the core, this lowering of recirc pump head loss causes flow to rise and power to lower, with a lowering of core d/p.

Explanation (Justification of Distractors):

a. Reactor power would NOT rise and core d/p would lower
c. Power would rise and core d/p would rise
d. Total recirc flow would rise and recirc suction temperature would rise.

Technical Reference(s): (Attach if not previously provided)	N1-SOP-2, Rev 07, Page 4, Page 5	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.10	
	43.5	
	45.13	

Comments:

Question # RO 7 SRO 10

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295015 AK2.04	295015 AK2.04
	Importance Rating	4.0	4.1
Knowledge of the interrelations between INCOMPLETE SCRAM and the following: RPS			

Proposed Question:

Given the following conditions:

- The plant has experienced a failure to scram
- 48 rods remain partially or fully withdrawn
- RPS scram pilot valve power lights are off
- RPV level is stable at 57 inches
- RPV pressure is 920 psig and being controlled by the bypass valves
- Scram air header pressure is currently 0 psig

Which of the following describes the actions required by N1-EOP-3.1, Alternate Control Rod Insertion, to insert the remaining control rods?

a. Insert repeated manual scram signals.

b. Manually initiate Alternate Rod Insertion.

c. Pull RPS fuses in cabinets 1S-53 and 1S-55.

d. Perform individual rod scrams from the M panel.

Proposed Answer: a. Manual scram worked partially already, scram air pressure is 0, SDV volume is causing a hydraulic lock, the scram must be reset to drain the SDV.

Explanation (Justification of Distractors):

b. This would depressurize the scram air header but will not drain the SDV which is the indicated cause of the failure to scram.

c. This would de-energize the scram solenoids, but it does not drain the SDV

d. Step also de-energizes RPS, which is already done, but it does not drain the

SDV.

Technical Reference(s): N1-EOP-3.1, ALTERNATE CONTROL ROD INSERTION
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective: 01-OPS-006-344-1-11 EO 1.2

Question Source:
Bank No.
Modified Bank #
New — New

Question History:
Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:
Memory of Fundamental Knowledge
Comprehension or Analysis — 2

10 CFR Part 55 Content:
41.7
45.8

Comments:

Question # RO 8

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	1
	K/A #	295024 EK3.04
	Importance Rating	3.7

Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL PRESSURE: Emergency Depressurization

Proposed Question:

During a LOCA inside the Drywell, the following conditions exist:

- Reactor Water Level -80 inches
- Reactor Pressure 600 psig
- Drywell Pressure 24 psig
- Torus Pressure 20 psig
- Torus Water Level 11 feet
- Torus Water Temperature 120°F
- NO injection sources are lined up to the RPV.

Which one of the following Emergency Operating Procedure actions is required?

a. Rapidly depressurize the RPV using the Emergency Condensers.

b. Secure Containment Spray and vent the Primary Containment.

c. Continue Containment Spray and Emergency Depressurize the RPV.

d. Enter Steam Cooling and stabilize pressure with Emergency Condensers.

Proposed Answer: c. (PSP has been exceeded requiring Emergency Depressurization per N1-EOP-4 Step PCP-5 and PCP-6)

Explanation (Justification of Distractors):

a. EOP-2 RPV Control pressure control action that is allowable if Emergency Depressurization is "anticipated". With PSP exceeded, "anticipation is not allowed, since Emergency Depressurization is REQUIRED>
b. Securing sprays is not appropriate or directed. Venting is NOT required unitl after depressurizing AND prior to exceeding 43 psig (from the Primary Containment Pressure Limit Curve.
d. Steam Cooling EOP is NOT entered unless RPV level lowers to about –109 inches. EOP-2 step L-10 would prevent Steam Cooling from being entered.

Technical Reference(s): EOPs 2 and 4
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:
EOPs without entry conditions

Learning Objective: N1-OPS-006-344-1-04 EO 3.0

Question Source:
Bank No.
Modified Bank #
New — New

Question History:
Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:
Memory of Fundamental Knowledge
Comprehension or Analysis — 2

10 CFR Part 55 Content: 41.5, 45.6

Comments:

Question # RO 9

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	1
	K/A #	295025 EA1.03
	Importance Rating	4.4
Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: Safety/Relief Valves		

Proposed Question:

Following power operation, the plant scrams due to an MSIV closure. Peak RPV pressure during the transient was 1097 psig.

Which one of the following identifies all the ERV's which have opened?

a. 111 and 122

b. 112 and 113

c. 111, 112, 121, and 122

d. 112, 113, 121, and 123

Proposed Answer: c. 111 and 122 lift at 1090 psig and 112 and 121 lift at 1095 psig.

Explanation (Justification of Distractors):
a. 112 and 121 will also lift
b. 121 and 122 will also lift
d. 113 and 123 will not lift until 1100 psig

Technical Reference(s):	O1-OPS-01-239-1-01 page 7	

Proposed references to be provided to applicants during the examination:

None

Learning Objective:	O1-OPS-001-239-1-01 EO 4.c	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7, 45.6	
Comments:		

Question # RO 10 SRO 21

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295031 EA2.04	295031 EA2.04
	Importance Rating	4.6	4.8
Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL: Adequate Core Cooling			

Proposed Question:

Given the following conditions:

- RPV Blowdown has been initiated
- The plant has experienced a LOCA with a loss of ALL injection.
- RPV water level has lowered to –115 inches (ACTUAL LEVEL).

Which one of the following is the status of core cooling?

a. Adequate core cooling exists at this RPV water level.

b. RPV water level must be raised 7 inches to establish adequate core cooling.

c. Establishing Liquid Poison or CRD injection will assure adequate core cooling.

d. Adequate core cooling can only be established after the ERVs have closed.

Proposed Answer: a. At levels above –121inches with no injection there is sufficient steam flow to provide adequate core cooling.

Explanation (Justification of Distractors):

b. RPV level does not have to be raised to 109".

c. Just establishing injection will not assure adequate core cooling, level must also be restored to >109".

d. Adequate core cooling can be established by establishing injection and restoring level.

Technical Reference(s): EOP Bases Section 1.3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	new
Question History:	Previous NRC Exam	Q
	Previous Test / Quiz	Q
		Q
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.10	
	45.3	
	45.13	

Comments:

Question # RO 11 SRO 24

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295037 EK1.07	295037 EK1.07
	Importance Rating	3.4	3.8

Knowledge of the operational implications of the following concepts as they apply to the SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Shutdown Margin

Proposed Question:

Immediately following a reactor scram, it is determined that seven (7) control rods located throughout the core are stuck between positions 06 and 34.

In accordance with N1-EOP-3, Failure to Scram, which one of the following describes the condition allowing exit from EOP-3?

a. Cold shutdown boron weight has been injected into the reactor core

b. Reactor power will remain below 3% under all conditions without boron.

c. The reactor will remain shutdown with Shutdown Cooling system in service.

d. When six (6) of the seven (7) control rods are fully inserted into the reactor core.

Proposed Answer: d. Per Tech. Specs. 3.1.1.a Reactivity Limitations – core loading, the reactor must be maintained subcritical with the most reactive rod fully withdrawn from the core. This meets the criteria for determining that the reactor will remain shutdown in the EOP Bases.

Explanation (Justification of Distractors):

a. Injection of cold shutdown boron weight only allows cooling down NOT exit from the procedure.

b. This condition does NOT indicate the reactor is shutdown, a requirement for exiting the procedure.

c. This is not a bases for exiting the procedure unless it has been determined the reactor will remain shutdown without boron.

Technical Reference(s): EOP Bases, Sect. 1.5
(Attach if not previously provided) T.S. 3.1.1.a

Proposed references to be provided to applicants during the examination:

EOPs with out entry conditions

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.8, 41.9, 41.10	

Comments:

Question # RO 12 SRO 23

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295037 EK3.02	295037 EK3.02
	Importance Rating	4.3	4.5
Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: SBCL Injection			

Proposed Question:

Given the following conditions:

- The plant has experienced a failure to scram, reactor power is 7%
- Fuel Zone level indicates -51 inches
- RPV Pressure is 1015 psig and slowly lowering
- The MSIVs are shut and both Emergency Condensers have failed
- Containment Spray loop 111 is operating in Torus Cooling mode; Torus
- temperature is 106°F and rising at 2°F/min
- ERV "113" is stuck open
- Drywell pressure is 0.8 psig

Which one of the following describes the required actions?

a. Enter N1-EOP-8 and perform an RPV blowdown.

b. Initiate boron injection with the Liquid Poison System.

c. Maintain RPV water level between this level and -41inches.

d. Open ERVs to control RPV pressure between 965 and 1080 psig.

Proposed Answer: b. Torus Water Temp cannot be maintained below 110°F boron injection is required to shutdown the reactor before HCTL is exceeded

Explanation (Justification of Distractors):

a. Torus will exceed 110°F before HCTL, level reductions can lower power and heat input to the suppression pool to help remain below HCTL

c. Level would be lowered to between -41" and -84", the current level is –51" indicated which is -40" actual, level must be lowered more in accordance with procedure to lower power and lower heat input to the suppression pool.

d. Opening ERVs is NOT required for pressure control with this band. (A single ERV open will pass 7% steam flow)

Technical Reference(s): EOP-3, Failure to Scram
(Attach if not previously provided) EOP-Bases, Sect. 1.5

Proposed references to be provided to applicants during the examination:

EOPs without entry conditions

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.5
45.6

Comments:

Question # RO 13 SRO 26

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	500000 2.4.6	500000 2.4.6
	Importance Rating	3.1	4.0
Knowledge of symptom based EOP mitigation strategies.			

Proposed Question:

The plant has experienced a LOCA. The following conditions currently exist in the Primary Containment:

• Drywell Pressure	3.1 psig
• Drywell Temperature	230°F
• Drywell H2 Concentration	5.0%
• Torus H2 Concentration	7.0%
• Drywell O2 concentration	3.2%
• Torus O2 Concentration	4.2%
• Torus Pressure	2.5 psig
• Suppression Pool Level	12.5 feet

Offsite radioactivity release rate will remain below release limits. Which one of the following identifies the action to take and the reason for this action?

a. Vent the torus through EVS and establish a nitrogen purge since a deflagration cannot occur at these levels.

b. Vent and purge the torus and drywell at maximum flow since a deflagration cannot occur at these levels.

c. Vent the drywell through EVS and establish a nitrogen purge since a deflagration can occur at these levels.

d. Vent and purge the torus and drywell directly from the torus since a deflagration can occur at these levels.

Proposed Answer: a.

The candidate must recognize H2 parameters are over their limits and then recognize the torus as the preferred path for venting, per EOP enter steps 31 and 34, with torus level <27 ft and torus pressure < 3.0 psig enter EOP-4.1 Sect. 1 and Sect. 5. Since O2 levels are < 5.0% the containment is below the deflagration limit.

Explanation (Justification of Distractors):

b. Venting should be from the Torus and through the EVS.

c. Venting should be from the Torus and these levels are below the deflaration limit.

d. Purge should be into the Drywell and these levels are below the deflaration limit.

Technical Reference(s): EOP Bases, EOP-4.2

Proposed references to be provided to applicants during the examination:

EOPs without entry conditions

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.8 41.10 43.5	

Comments:

Question # RO 14

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295001 AA2.06
	Importance Rating	3.2

Ability to determine and interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Nuclear Boiler Instrumentation.

Proposed Question:

The plant is at 100% power when a loss of Power Board 11 occurs. Conditions after the power loss are:

- Reactor power is 45%
- Generator Mwe are slowly rising and lowering
- TCV Positions are cycling
- APRM indications are cycling 12% but the peaks are at different times
- Thirty (30) seconds after the power loss LPRM upscale alarms occur at a constant frequency

Per N1-SOP-02, Unplanned Reactor Power Change, which one of the following describes the required actions?

a. Raise operating RCS pump speeds to raise core flow.

b. Continue to monitor nuclear instruments and insert cram rods.

c. Immediately position the Reactor Mode Switch to SHUTDOWN.

d. Scram the reactor when LPRM upscale and downscale alarms occur simultaneously.

Proposed Answer: c. Thermal hydraulic instability is detected requiring a manual reactor scram and entry into SOP-1.

Explanation (Justification of Distractors):

a. This action is appropriate if power oscillations are not present to exit the restricted area. Power oscillations are present requiring a reactor scram.
b. This action is appropriate if power oscillations are not present and recirc flow has been adjusted. Power oscillations are present requiring a reactor scram.
d. Upscale or downscale alarms are all that are required for THI.

Technical Reference(s): N1-SOP-2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	2
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.10	
	43.5	
	45.13	

Comments:

Question # RO 15 SRO 28

		RO	SRO
Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	1	1
	Group #	2	2
	K/A #	295002 AK2.02	295002 AK2.02
	Importance Rating	3.1	3.2
Knowledge of the interrelations between LOSS OF MAIN CONDENSER VACUUM and the following: Main Turbine.			

Proposed Question:

The plant is at **40% power** with Circulating Water Pumps #11 and #12 in operation. The ATC RO notices a degrading Main Condenser vacuum and reports vacuum is degrading at the rate of 1 inch HGA per minute. The following annunciator is received:

- CONDENSER VACUUM BELOW 24" HG

Assume that NO additional operator actions are taken. Which one of the following describes the scram signal that will scram the reactor if Main Condenser vacuum continues to degrade at the current rate?

a. APRM High

b. Main Turbine Trip

c. Reactor High Pressure

d. Main Steam Isolation Valves Close

Proposed Answer: c. Vacuum trip #2 trips the Turbine Bypass Valves at 10" Hg, reactor pressure will rise to the trip setpoint in less than 3 minutes, which is the amount of time it will take to reach the MSIV isolation at 7" HG.

Explanation (Justification of Distractors):

a. Power will rise because of the loss of feedwater heating and eventually the pressure rise, but at 40% power the power rise will not reach the scram setpoint.

b. The main turbine trip scram is bypassed below 45% reactor power

d. MSIV isolation occurs 3 minutes after the bypass valves close.

Technical Reference(s):	N1-ARP-A1, 3-4, 3-5 N1-OP-31, B.3.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7 45.8	

Comments:

Question # RO 16

Examination Outline Cross-Reference	Level	
	Tier #	
	Group #	295003 AA2.04
	K/A #	3.5
	Importance Rating	

Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: System Lineups
PRA: Supply lake water to EC makeup tanks.

Proposed Question:

During a station blackout, Emergency Condenser (EC) Loop 11 is secured when no longer required for pressure control. The SSS directs makeup be aligned to EC Loop 12 in accordance with N1-SOP-18, Station Blackout.

Which one of the following describes how makeup is supplied to the makeup tank for EC Loop 12?

a. Cross-connect the EC Loop 12 makeup tank to the City Water Tank.

b. Cross-connect the EC Loop 12 makeup tank to the Demin. Water Tank.

c. Align lake water to the EC Loop 12 makeup tank using the Fire Water System.

d. Align CST water to the EC Loop 12 makeup tank using the Condensate Transfer System.

Proposed Answer: c. Per SOP-18 manual actions are taken per Table 18.1 to align makeup to the EC and Attachment 1, Attachment 1 directs this lineup to the Fire System.

Explanation (Justification of Distractors):

a. Not available because of the blackout. Normally during the blackout EC 12 makeup tank could be cross-connected to EC 11 makeup tank
b. This is not available because of the blackout
d. Condensate transfer would be used, but cannot be because of the blackout.

Technical Reference(s): (Attach if not previously provided)	N1-SOP-18, Rev 05, override statement on page 3 and Attachment 1.

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.10 43.5 45.13	

Comments:

Question # RO 17 SRO 29

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295004 K1.02	295004 K1.02
	Importance Rating	3.2	3.4

Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Redundant D.C. power supplies: Plant Specific
PRA: Loss of 125 VDC

Proposed Question:

The plant is operating at 75% power when a loss of power on Battery Board 12 occurs.

Per N1-OP-47A, offnormal procedures for loss of battery boards, which one of the following describes a required action to align alternate power? PB 7/21/01

Control Board

a. Transfer EDG 103 to Battery Board 11.

b. Transfer DC Valve Board 12 to Battery Board 14.

c. Transfer MG 167 loads to the maintenance supply.

d. Transfer RPS UPS 162A-B to the bypass transformer.

Proposed Answer: a.

Explanation (Justification of Distractors):

b. DC Valve Board 12 alternate supply is Battery Board 11, not Battery Board 14.

c. This action is required for a loss of Battery Board 11, not for a loss of Battery Board 12.

d. This action is required but for RPS UPS 172A-B, not for RPS UPS 162A-B.

Technical Reference(s):	N1-OP-47A, Section H.9.0, H.10, H,11 N1-OP-47A, Attachment 3	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 1

10 CFR Part 55 Content:

Comments:

Question # RO 18 SRO 31

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295008 AA1.02	295008 AA1.02
	Importance Rating	3.3	3.3

Ability to predict and/or monitor changes in parameters associated with operating the HIGH REACTOR WATER LEVEL controls including: Reactor Water Cleanup (ability to drain): plant-specific.

Proposed Question:

Given the following conditions:

- The reactor has scrammed from 100% power
- Feedwater (FW) system has responded as designed.
- RPV water level is 83 inches and rising slowly.

Per plant operating procedures, which one of the following describes how to prevent an automatic trip of the FW Pumps?

a. Adjust motor-driven FWP bypass valves.

b. Remove the operating CRD pump from service.

c. Reject to the main condenser using the cleanup system.

d. Position the FWP High Level Bypass switch to BYPASS.

Proposed Answer: c.

Explanation (Justification of Distractors):
a. Will not maintain level below the high level trip. Only permitted during startup.
b. There is no guidance to trip the CRD pump.
d. Only permitted after a high level trip to reset the trip and permit a FWP start.

Technical Reference(s):	N1-OP-3, Section H.3.0 N1-ARP-F2, 3-3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7, 45.6	

Comments:

Question # RO 19

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295012 AA1.02
	Importance Rating	3.8

Ability to determine and interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell Cooling System.

Proposed Question:

With the plant at power, the following plant conditions are observed:

- RPV level is +75 inches and steady
- RPV pressure is 1025 psig and steady
- D/W pressure is 2.4 psig and steady
- D/W average temperature is 147 °F and steady
- Torus temperature is 78 °F and steady

Which one of the following events has occurred inside the primary containment?

a. Loss of one drywell cooling unit.

b. Loss of RBCLC to the drywell coolers.

c. Small steam piping break.

d. Small coolant piping break.

Proposed Answer: a. Six drywell coolers can maintain drywell temperature below 135°F. Five drywell coolers can maintain drywell temperature below 150°F.

Explanation (Justification of Distractors):
b. Drywell temperature and pressure would continue to rise.
c. Drywell temperature and pressure would continue to rise.
d. Drywell temperature and pressure would continue to rise.

Technical Reference(s):	N1-OP-8, Section B	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-223-1-02 EO-3.0	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.6	

Comments:

Question # RO 20 SRO 7

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295013 AA1.01	295013 AA1.01
	Importance Rating	3.8	3.9

Ability to operate and/or monitor the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE: Suppression Pool Cooling.
PRA: Startup Containment Spray in Torus Cooling.

Proposed Question:

Given the following conditions:

At time = 0 seconds:
- ERV 111 opens with the plant at 98% power.

At time = 1 minute:
- Drywell pressure has risen to 1.5 psig and is rising slowly.
- Drywell average temperature has risen to 135°F and is rising slowly.

At time = 2 minutes:
- ERV 111 is determined to be stuck open.
- Drywell average temperature is 152°F and rising.
- Drywell pressure is 1.6 psig and rising slowly.
- Torus water temperature is 80°F and rising.

Which one of the following describes the required operator action?

a. Initiate Torus cooling in accordance with OP-14, Containment Spray System.

b. Place Containment Spray System in Torus Cooling per EOP-1, NMP1 EOP Support Procedure.

c. When Torus temperature reaches 95°F enter EOP-4, Primary Containment Control and take appropriate actions.

d. Continue actions to close ERV 111, when Torus temperature reaches 120°F scram the reactor and enter EOP-2, RPV Control.

Proposed Answer: b. EOP-4 was entered at 150°F drywell temp, Torus Cooling should be started immediately to attempt to maintain Torus temps below 85°F.

Explanation (Justification of Distractors):

a. Already in EOP-4 due to Bulk DW Temp 150°F, Torus Cooling is started in accordance step TT-2 of EOP-4. (the OP directs using Cont. Spray pump 111 and includes local valve operation (93-65), the EOP allows other loops to be used and does not include local operations).

c. EOP-4 has already been entered (DW average temp >150°F) waiting is not required or appropriate.

d. Torus cooling must be started first and reactor should be scrammed before Torus temperature reaches 120°F.

Technical Reference(s): EOP-4, EOP-1, OP-1, Sect. H.8
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

All EOPs without entry conditions

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.6	

Comments:

Question # RO 21 SRO 11

Examination Outline Cross-Reference	Level	RO	RO
	Tier #	1	1
	Group #	2	1
	K/A #	295016 AA1.01	295016 AA1.01
	Importance Rating	3.8	3.9
Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: RPS			

Proposed Question:

A fire has necessitated a Control Room evacuation. Control Room actions have been taken, however, the reactor does NOT scram. The CSO has announced the Control Room evacuation.

Considering the above conditions, which one of the following actions is required to be performed by the CSO per N1-SOP-9.1, Control Room Evacuation, to initiate control rod movement?

a. When directed by the ASSS, place MG 141 Switch to TRIP position, Direct NAOE to place MG131 Switch to the TRIP position, confirm CONTROL RODS IN white light lit.

b. Direct the NAOE to remove the pilot scram valve fuses from cabinets 1S-53 and 1S-55 in the Auxiliary Control Room. Then locally verify lowering scram air header pressure.

c. Direct the NAOE to manually vent the Scram Air Header by opening 113-230, SCRAM AIR HEADER EMERGENCY VENT VALVE. Confirm scram valves at HCUs open.

d. When directed by the ASSS place UPS 172 A and B supply breaker to RPS 12 to OPEN, Direct NAOE to place UPS 162 A and B supply breaker to RPS 11 to OPEN, Verify control rod movement by observing scram accumulator pressures at the HCUs.

Proposed Answer: a. Per N1-SOP-9.1

Explanation (Justification of Distractors):

b. These fuses are in the Auxiliary Control Room and are not accessible. The scram is confirmed by verifying the CONTROL RODS IN white light is lit.
c. The CSO goes to the MG 141 Switch, NAOE to MG 131.
d. Do not want to trip the logics, this would cause isolations and initiations, HCU pressures are not used for scram validation.

Technical Reference(s): N1-SOP-9.1, Control Room Evacuation
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.6	

Comments:

Question # RO 22 SRO 13

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295017 AK3.04	295017 AK3.04
	Importance Rating	3.6	3.8
Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Power Reduction			

Proposed Question:

The plant is operating at 75% power when the following alarm is received:

- H1-1-7, OFF GAS HIGH RADIATION alarm

Per the Alarm Response Procedures, which one of the following describes the required operator action(s) if Chemistry confirms the high radiation?

a. Enter N1-EOP-6, Radioactivity Release Control, and verify the turbine building roof vents are closed.

b. Enter N1-EOP-5, Secondary Containment Control, and verify ventilation system isolations and actuations.

c. Reduce reactor power to near the top of the restricted zone and commence a normal shutdown per N1-OP-43.

d. Lower recirc flow to 38 x 10^6 lb/hr, then scram the reactor and place both Off-Gas Vacuum Pumps in Parallel per N1-OP-25.

Proposed Answer: c. Per ARP and EOP Bases, Lowering reactor power normally may reduce the offgas radiation levels avoiding a unit shutdown.

Explanation (Justification of Distractors):

a. Only entered if release rate reaches alert levels. No alarm given to indicate high release rates.
b. Only entered if a Reactor Building ARM alarms. No alarm given to indicate high radiation levels in the Reactor Building.
d. This is not an appropriate action for this condition. Offgas radiation levels may indicate fuel failure. Inserting a scram may make the leak worse and cause additional fuel failure.

Technical Reference(s): N1-ARP-H1, Ann H1 (1-7) and EOP-6 bases
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.5	
	45.6	

Comments:

Question # RO 23

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295018 AK2.01
	Importance Rating	3.3

Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER and the following: System Loads
PRA: Respond to loss of RBCLC.

Proposed Question:

With the plant in **Cold Shutdown** the following conditions exist:

- One Reactor Building Closed Loop Cooling (RBCLC) pump is out of service for bearing repairs.
- The operating RBCLC pump has tripped
- The standby RBCLC pump has been started.
- Temperatures are rising on systems cooled by RBCLC.

Which one of the following is the major RBCLC system load that is secured to limit the temperature rise while diagnosis of the problem continues?

a. Drywell Air Coolers

b. Control Room Ventilation

c. Fuel Pool Heat Exchangers

d. Reactor Building and Drywell Equipment Drain Tank Coolers

Proposed Answer: c. Major shutdown load

Explanation (Justification of Distractors):
a. This is a minor shutdown load and would have little effect on RBCLC temps.
b. This is a minor shutdown load and would have little effect on RBCLC temps.
d. This is a minor shutdown load and would have little effect on RBCLC temps.

Technical Reference(s): (Attach if not previously provided)	N1-SOP-8, Table 8.1	

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 24 SRO 34

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	1	1
	Group #	2	2
	K/A #	295019 2.4.4	295019 2.4.4
	Importance Rating	4.0	4.3

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.
PRA: Respond to a loss of instrument air.

Proposed Question:

According to N1-SOP-6, Instrument Air Failure, which one of the following describes a condition that requires the reactor to be scrammed?

a. Any control rod drifts into the core.

b. Two or more accumulator faults occur.

c. Scram Air Header pressure drops to 60 psig.

d. Air Systems Cross-tie Valve 94-19 (HAS-BV) fails to open.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. Scram is required for a rod drifting out of the core, not into the core.
b. Not a requirement for a scram on loss of air
d. 94-19 must be verified Open, but failure to open the valve does NOT require a scram

Technical Reference(s): SOP-6, Table 6.1
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10 43.2 45.6	

Comments:

Not counted as SRO only knowledge

Question # RO 25 SRO 35

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295020	295020
		2.1.20	2.1.20
	Importance Rating	4.3	4.2
Ability to execute procedure steps.			

Proposed Question:

With the plant in Cold Shutdown, a Primary Containment Isolation occurred when an operator inadvertently depressed the Manual Containment Isolation pushbuttons. Actual plant parameters prior to and after the isolation were normal.

Which one of the following describes what is required to reset this containment isolation?

a. Verify all containment isolation valves closed, then depress the scram reset pushbutton on the E panel.

b. Depress the 4 high DW pressure reset pushbuttons on the M panel then depress the scram reset pushbutton on the E panel.

c. Confirm all the containment isolation valves are closed and that the control switches for the TIP ball valves on the J panel are in the closed position. B 7/21

d. Ensure the TIP ball valve control switches on the J panel are in the closed position then depress the 4 high DW pressure reset pushbuttons on the M panel.

Proposed Answer: c. Per SOP-17 attached and Dwg. C-19859-C, SH 13

Explanation (Justification of Distractors):

a. Annunciator response procedures state reset RPS channels 11 and 12, this is not required to reset the isolations

b. The four high DW pushbuttons are only required if a high drywell condition caused the isolation, the test pushbuttons do not trip these relays. The scram reset pushbutton does not effect the reset.

d. The four high DW pushbuttons are only required if a high drywell condition caused the isolation, the test pushbuttons do not trip these relays.

Technical Reference(s): (Attach if not previously provided)	SOP-17, Vessel/Containment Isolation, Dwg. 19859-C, SH 13, N1-ARP-F-1 and F-4

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.10	
	43.5	
	45.12	

Comments:

Question # . RO 26

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295022 AK1.01
	Importance Rating	3.3
Knowledge of the operational implications of the following concepts as they apply to the LOSS OF CRD PUMPS: Reactor Pressure vs. Rod Insertion Capability		

Proposed Question:

During a plant startup RPV pressure is 950 psig when a loss of suction causes the "11" CRD pump to trip. The "12" CRD pump is marked up for maintenance.

After one (1) minute, which one of the following statements about rod motion capability is correct?

Rod motion control with RMCS is ...

a. available.
Scram times will exceed technical specification limits.

b. available.
Scram times will be within technical specification limits.

c. NOT available.
Scram times will exceed technical specification limits.

d. NOT available.
Scram times will be within technical specification limits.

Proposed Answer: d.

Explanation (Justification of Distractors):

a. Normal rod motion is lost. Scram times are okay as long as accumulators are charged.
b. Normal rod motion is lost.
c. Scram times are okay as long as accumulators are charged.

Technical Reference(s): N1-ARP-F3, Rev 03, 1-5

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.8	
	41.10	

Comments:

Question #		RO 27	SRO 19

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	1	1
	Group #	2	1
	K/A #	295026 EK1.01	295026 EK1.01
	Importance Rating	3.0	3.4
Knowledge of the operational implications of the following concepts as they apply to the SUPPRESSION POOL HIGH WATER TEMPERATURE: Pump NPSH			

Proposed Question:

During a Loss of Coolant Accident, Core Spray pumps 111 and 112 are required to maintain reactor water level. The following conditions exist:

- Torus water level 11.5 feet
- Torus pressure 2.1 psig
- Torus temperature 198°F
- Containment Spray pumps secured

Which one of the following is the MAXIMUM allowable Core Spray pump flow?

a. 200×10^4 lbm/hr

b. 310×10^4 lbm/hr

c. 350×10^4 lbm/hr

d. 460×10^4 lbm/hr

Proposed Answer: c. $2.1 + 0.433(11.5 - 4.5) = 5.131$ on the curve at 198°F this corresponds to 350×10^4 lbm/hr

Explanation (Justification of Distractors):
a. Flow limit is 0 over-pressure is calculated
b. Flow if 3 psig is used and estimated on the curve
d. Flow if the 10 psig over-pressure curve is used.

Technical Reference(s): EOP-2, N1 Core Spray NPSH Limit
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with entry conditions removed

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.8 to 41.10	

Comments:

Question # RO 28 SRO 38

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295028 EA1.01	295028 EA1.01
	Importance Rating	3.8	3.9
Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell Spray.			

Proposed Question:

During a startup an electrical fire in the drywell has raised drywell temperature and has necessitated a reactor scram. The following conditions exist:

- Drywell temperature is 298°F and rising.
- Drywell pressure is 4 psig and rising slowly.
- Torus temperature 80°F and steady
- Torus Pressure is 1.3 psig and rising slowly
- RPV pressure is 875 psig and steady.
- RPV level is 75 inches and steady.

Which one of the following actions is required per the Emergency Operating Procedures?

a. Initiate drywell sprays.

b. Perform an RPV blowdown.

c. Secure all available drywell cooling fans.

d. Perform containment venting from the drywell.

Proposed Answer: b. Drywell temperature cannot be maintained below 300° F, You can't spray the drywell because of the Containment Spray Initiation Limit, but a blowdown is required

Explanation (Justification of Distractors):

a. Conditions are outside Figure 1: Containment Spray Initiation Limit

c. Since you cannot spray the drywell the drywell coolers should not shutdown.

d. Contingency Action PCP-2 directs the operators to step 17 and away from venting (EOP-1, Att. 10) venting can only be performed with the containment below 3.5 psig.

Technical Reference(s): EOP-4, Primary Containment Control

Proposed references to be provided to applicants during the examination:

All EOPs with the entry conditions removed

Learning Objective:	O1-OPS-006-344-1-04 EO 3.0, 4.0	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.6	

Comments:

Question # RO 29 SRO 39

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295029 EK3.02	295029 EK3.02
	Importance Rating	3.6	4.0

Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL WATER LEVEL: Lowering Suppression Pool Water Level

Proposed Question:

Following a plant transient caused by a feedwater leak in the Drywell, Torus Water level begins to rise. Torus water level continues to rise, reaches 13.6 feet and CANNOT be lowered.

Which one of the following states the action required per the Emergency Operating Procedures and the reasons for that action?

a. An RPV Blowdown is required to protect the integrity of the Primary Containment.

b. Commence a normal plant shutdown and cooldown to limit Torus level rise from external sources.

c. Terminate external injection sources even if adequate core cooling is challenged, to limit Torus level rise.

d. Rapidly depressurize the RPV using the Bypass Valves to prevent exceeding ERV Tailpipe Level Limit.

Proposed Answer: a.

Explanation (Justification of Distractors):

b. EOP-4, step TL-2 requires a scram, not a normal plant shutdown.

c. External injection sources are permitted, if needed for core cooling. (TL-2)

d. Entry into EOP-8 for RPV Blowdown is required. Depressurization through Bypass Valves is not permitted.

Technical Reference(s): N1-ODP-PRO-0305 EOP BASES page 188 and 189

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:	O1-OPS-006-344-1-04 EO 3.0, 4.0	
Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # RO 30 SRO 20

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295030 EK2.07	295030 EK2.07
	Importance Rating	3.5	3.8
Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: Downcomer/Horizontal Vent Submergence			

Proposed Question:

In the Torus Level Leg of EOP-4, Primary Containment Control, Step TL-3 allows lowering the level band if level CANNOT be maintained within the Technical Specification band.

Which one of the following describes the N1-ODP-PRO-0305, EOP/SAP Technical Bases reason for this lower limit on the level band?

a. Lower the heat input to containment before taking the actions.

b. Provide time to try to control torus level to avoid an RPV blowdown.

c. Extend the time that is permitted to use the torus as a heat sink.

d. Allow depressurization by other means to avoid ERV operation.

Proposed Answer: b. The delay in the requirement of Step TL-3 to perform additional actions (scram, EOP-2, blowdown) is to continue actions to maintain torus water level > 8 feet.

Explanation (Justification of Distractors):

a. Scramming the reactor reduces the rate of energy production and the heat input to the drywell. A reactor scram is not required until the determination is made that level cannot be maintained above 8 feet. This action is one of the required actions that is being delayed.

c. This is not a consideration in the delay before the actions are required.

d. There is no entry condition for EOP-2, so alternate depressurization is not an option.

Technical Reference(s): N1-ODP-PRO-0305, EOP/SAP Technical Bases
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 31 SRO 41

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295033 EK3.02	295033 EK3.02
	Importance Rating	3.5	3.6

Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT ARE RADIATION LEVELS: Reactor SCRAM

Proposed Question:

The plant is operating at 100% power with the following indications:

- Core Plate dp instrument dPR/FR-32-259 (G-panel) indicates downscale
- CRD cooling and drive water pressure (F-panel) indicate upscale

An AO in the Reactor Building reports hearing a loud hissing sound on the north west side of the 237' level and the area is filling with steam. Over several minutes, the local area radiation monitor, NORTH INSTR ROOM, RB 237 (#28) pegs high (10^3 mr/hr).

Radiation Protection personnel are dispatched to the area with portable monitors. They report they are unable to approach the area due to steam and radiation levels in excess of 6 R/hr at the north east stairwell.

Radiation levels and temperatures are slowly rising throughout the reactor building. Which one of the following Emergency Operating Procedure actions is required?

a. Shift Reactor Building ventilation fans to fast speed and continue to monitor reactor building temperatures and radiation levels.

b. Start a controlled shutdown in accordance with OP-43A, Section G.

c. Scram the reactor and enter EOP-2, RPV Control.

d. Scram the reactor and initiate an RPV Blowdown.

Proposed Answer: c. Per EOP-5, a primary system (core d/p instrument line) has ruptured in the secondary containment and cannot be isolated. Radiation levels are approaching a maximum safe operating level, the reactor should be scrammed and EOP-2 entered.

Explanation (Justification of Distractors):

a. Radiation level is above the alarm setpoint and a primary system is discharging into the secondary containment and cannot be isolated more action is required.
b. The override statement for a primary system is discharging into the secondary containment and cannot be isolated directs the operators to scram the reactor before any area exceeds max safe.
d. Only one area is known to be high at this time, the intent is to scram the reactor and enter EOP-2, if further degradation occurs EOP-2 will direct depressurizing with the bypass valves before a blowdown is required.

Technical Reference(s): EOP-5. EOP-2, N1-ODP-PRO-0305
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source: Bank No.
Modified Bank #
New — New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis — 3

10 CFR Part 55 Content: 41.5
45.6

Comments:

Question # RO 32 SRO 43

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	1	1
	Group #	2	2
	K/A #	600000	600000
		2.4.27	2.4.27
	Importance Rating	3.0	3.5
Knowledge of fire in the plant procedure.			

Proposed Question:

An electrical fire is burning in Battery Room 12. The fire brigade is assembling. Plant controls remain normal. Which one of the following instrument precautions is required?

a. Monitor instruments from RPS Ch. 12 and ignore RPS Ch. 11.

b. Monitor reactor pressure indicator 36-31A and ignore indicator 36-32A.

c. Monitor the instrumentation for EC 121 and EC 122 and ignore 111 and 112.

d. Monitor the idle CTSP 121 Disc. Press and ignore torus level indication.

Proposed Answer: b. per table 9.3

Explanation (Justification of Distractors):

a. RPS instruments for Ch. 11 are reliable, but this could be confusing on the table.
c. Water level instrumentation for EC 121/122 is NOT reliable.
d. The Cont. Spray Pump Disc. Pressure is only used if a fire is occurring in FA-1

Technical Reference(s): N1-SOP-9
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

SOP-9, FIRE IN PLANT, Flowchart

Learning Objective:

Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.10 43.5 45.13	

Comments:

Question # RO 33

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	3
	K/A #	295021 AA2.04
	Importance Rating	3.6
Ability to determine and interpret the following as they apply to LOSS OF SHUTDOWN COOLING: Reactor water temperature.		

Proposed Question:

The plant is in Cold Shutdown when the intake structure is lost:

- All the Recirculation Pumps are secured
- All Shutdown Cooling Pumps trip
- RWCU is NOT available

Which one of the following methods is used to determine if thermal stratification is occurring?

a. Monitor RPV pressure for any change in pressure.

b. Determine the temperature difference between the recirc loops and the RPV bottom vessel drain.

c. Determine if RPV level raises or lowers without a corresponding change in flow to or from the RPV.

d. Monitor the vessel thermocouples for temperature differences between the top and bottom of the vessel.

Proposed Answer: d. OP-4 directs the operators to monitor vessel temperature computer points every half-hour for evidence of thermal stratification

Explanation (Justification of Distractors):

a. This could be caused by other things than thermal stratification. Closing drains or well circulated vessel heatup.
b. This indicates the difference between the loops and RPV temperatures.
c. This could be caused by other things than thermal stratification. Closing drains or well circulated vessel heatup.

Technical Reference(s): (Attach if not previously provided) N1-OP-4, Shutdown Cooling, N1-ARP-K3 Annunciator Response Procedure.

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	New
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10	
	43.5	
	45.13	

Comments:

(

Question # RO 34 SRO 15

Examination Outline Cross-Reference	Level	50	SRO
	Tier #	1	1
	Group #	3	1
	K/A #	295023 AA2.04	295023 AA2.04
	Importance Rating	3.4	4.1
† Ability to determine and interpret the following as they apply to REFUELING ACCIDENTS: Occurrence of fuel handling accident.			

Proposed Question:

The plant is in a refueling outage ready to start the core offload.

- A new fuel assembly was just released in the fuel preparation machine.
- Before the fuel preparation machine is lowered, the refueling floor SRO observes that spent fuel pool level is lowering.

Per N1-SOP-20, LOSS OF SFP LEVEL, which one of the following states the **INITIAL** point at which evacuation of ALL personnel from the refuel floor is required?

a. When the radiation monitor on the Refueling Bridge alarms.

b. When the fuel pool water level is at the top of the fuel pool racks.

c. When the assembly in the fuel prep machine becomes uncovered.

d. When the fuel pool water level lowers to the FSAR limit of 24 feet.

Proposed Answer: a. While executing the steps of N1-SOP-20, if an irradiated fuel bundle has been uncovered or if the Refueling Bridge high radiation alarm sounds, then the 340' elevation of the reactor building must be evacuated. Until either of these conditions are present, the only requirement is to evacuate only unnecessary personnel, not all personnel.

Explanation (Justification of Distractors):

b. Although irradiated fuel will become uncovered, the refueling bridge high radiation alarm will have already sounded. The question asks for the initial point, which will be high radiation.

c. Uncovering a new fuel assembly will not provide any radiological hazard and does not require evacuation of all personnel. If the fuel assembly in the fuel preparation machine were an irradiated fuel assembly, then this response would be correct.

d. The conditions requiring a complete evacuation of the refuel floor are independent of the spent fuel pool level, although level will determine the shielding available and ultimately the conditions for evacuation.

Technical Reference(s): N1-SOP-20, Rev 04, Override Step

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-233-1-01, EO-8	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10, 43.5, 45.13	

Comments:

Question # RO 35

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	3
	K/A #	295035 EK1.01
	Importance Rating	3.9

Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Secondary Containment integrity.

Proposed Question:

While operating at full power the drive belts on the operating reactor building exhaust fan break. Which one of the following describes the effect and the bases for that effect on secondary containment?

a. Secondary Containment is lost because a negative pressure cannot be maintained on the reactor building.

b. Secondary Containment is maintained because the standby fan starts on low reactor building differential pressure.

c. Secondary Containment is lost because two operating Reactor Building Exhaust Fans are required by Technical Specifications.

d. Secondary Containment is maintained because the supply fan suction damper repositions to maintain secondary containment pressure.

Proposed Answer: a. A loss of the operating reactor building exhaust fan would not trip the supply fan, the operating supply fan would raise secondary containment pressure above -.25 inches of water.

Explanation (Justification of Distractors):

b. The standby fan does not start on low reactor building differential pressure.
c. Reactor Building fans are not required by T.S.
d. The supply fan suction dampers cannot reposition to make the reactor building pressure negative.

Technical Reference(s): (Attach if not previously provided)	N1-ARP-L1 (3-4), N1-OP-10, Sect. B.2.0

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.8 to 41.10	

Comments:

Question # RO 36

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	3
	K/A #	295036 EA1.01
	Importance Rating	3.2

Ability to operate and/or monitor the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL: Secondary Containment Equipment and Floor Drain Systems

Proposed Question:

After entering EOP-5, SECONDARY CONTAINMENT CONTROL, which one of the following describes how "Maximum Safe Area Water Level" is determined?

a. Confirm that a corner room level is above its Max Safe elevation using the process computer.

b. An operator must be sent to the corner rooms to locally verify the level probe is submerged.

c. The area water level must be visually verified in the corner room using the painted mark at 5 feet.

d. The annunciator for the Reactor Building Equipment Drain Sump is in alarm and confirmed.

Proposed Answer: a. After receiving annunciator H2, 2-1, the device causing the alarm can be determined from the process computer (4 of 10 annunciator inputs are from max level probes) and from this "Maximum Safe Area Water Level is determined.

Explanation (Justification of Distractors):

b. An operator does not have to be sent to the corner room to verify the level by observing the probe.
c. The level does not have to be locally verified.
d. The annunciator is for equipment drains and does not reflect leakage into the room.

Technical Reference(s): (Attach if not previously provided)	N1-ARP-H2	

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7 45.6	

Comments:

Question # RO 37

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	201001 A2.04
	Importance Rating	3.8

Ability to (a) predict the impacts of the following on the CONTROL ROD DRIVE HYDRAULICS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Scram condition

Proposed Question:

The plant is operating at 100% power, when a spurious scram occurs. Twenty (20) seconds later the following conditions exist:

- All rods in
- Reactor pressure stable at 900 psig
- RPV water level = 45 inches and rising 0.5 inch per minute

Which one of the following describes CRD charging header pressure twenty (20) seconds after the scram?

a. 1400 psig

b. 1250 psig

c. 940 psig

d. <100 psig

Proposed Answer: c. Charging header pressure slightly higher than Rx pressure due to head loss across the CRDMs as CRD Pump feeds the RPV through the open scram valves.

Explanation (Justification of Distractors):

a. This is the low end of normal charging water header pressure (1390-1510) this pressure would be lower because the scram is not reset (water level at 45" Rx scram at 53").
b. Normal drive header pressure, this would be lower because of the scram and the flow control valves closing on high flow.
d. This assumes a run-out condition and not discharging against Rx pressure.

Technical Reference(s): N1-OP-5, Sect. B.
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.5
45.6

Comments:

Question # RO 38

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	201002 A1.02
	Importance Rating	3.4

Ability to predict and/or monitor changes in parameters associated with operating the REACTOR MANUAL CONTROL SYSTEM controls including: Control Rod Position

Proposed Question:

With the plant at 65% power, a control rod is single notch withdrawn from notch 24 to notch 26. While the control rod is being withdrawn, a malfunction of the RMCS timer causes a continuous withdrawal signal to be sent to the selected control rod.

Assume **NO** additional operation actions.

Which one of the following describes the FINAL position of the control rod?

a. Notch 00

b. Notch 28

c. Notch 30

d. Notch 48

Proposed Answer: b. Timer malfunction deselects the rod (longer than the normal timer), causing the control rod to be de-selected.,

Explanation (Justification of Distractors):

a. From the given power level a Rx scram will not occur.
c. Longer time will not result in a two (2) notch change.
d. Rod will be deselected stopping its motion.

Technical Reference(s):	DWG C-22030-C N1-ARP-F3, 2-6

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.5 45.5	

Comments:

Question # RO 39 SRO 44

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	202002 A2.05	202002 A2.05
	Importance Rating	3.1	3.1

Ability to (a) predict the impacts of the following on the RECIRCULATION FLOW CONTROL SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Scoop Tube Lockup: BWR-2, 3, 4

Proposed Question:

The plant is at 85% power when the following are observed:

- F2-2-1, REACT RECIRC M-G SET 11 annunciator alarms
- Red light above the RRMG SCOOP AIR FAILURE LOCK RESET pushbutton for M-G Set 11 is ON

Which one of the following describes the cause of the indications above and the actions required to adjust Recirculation Pump 11 flow?

a. The scoop tube has locked on a loss of air. Adjust speed using the speed controller at the F panel.

b. The scoop tube has locked on a loss of air. Station a licensed operator at the scoop tube to adjust speed.

c. The scoop tube has locked on a loss of speed control signal. Adjust speed using the speed controller at the F panel.

d. The scoop tube has locked on a loss of speed control signal. Station a licensed operator at the scoop tube to adjust speed.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Speed cannot be adjusted using the speed controller at the F Panel.

c. A loss of air caused the scoop tube lock. Speed cannot be adjusted using the speed controller at the F Panel.

d. A loss of air caused the scoop tube lock.

Technical Reference(s):	N1-ARP-F2, 2-1 N1-OP-1, H.6.0 DWG C-19423-C DWG C-22006-C

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2

10 CFR Part 55 Content:

Comments:

Question # RO 40 SRO 45

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	206000 A4.14	206000 A4.14
	Importance Rating	4.2	4.1

Ability to manually operate and/or monitor in the control room: System auto start control.

Proposed Question:

The plant is operating at 100% power with feedwater pump (FWP) 11 in STANDBY. The following events occur:

At time = 0 FWP 12 Trips

At time = 10 seconds Reactor scrams on low level

At time = 15 seconds Main Turbine trips

Which one of the following describes when the FWP 11 will receive the start signal and the value at which RPV level will be controlled following the scram?

FWP 11 will start when ...

a. low level reactor scram signal is received and controls RPV level at 72 inches as FWP 13 coasts down.

b. low level reactor scram signal is received and controls RPV level at 65 inches as FWP 13 coasts down.

c. turbine trip signal is received and controls RPV level at 72 inches as FWP 13 coasts down.

d. turbine trip signal is received and controls RPV level at 65 inches as FWP 13 coasts down.

Proposed Answer: b. The reactor scram signal on low RPV level (53") signals the motor-driven FW pump to start. This is normally a backup signal to the turbine trip signal but occurs first for the conditions provided. Level control for FWP 11 is automatically set to +65" and will take control when FWP 13 output is reduced, during the HPCI mode of operation.

Explanation (Justification of Distractors):

a. FWP 11 will control at 65 inches in the HPCI mode.
c. The HPCI start signal occurs on low level, since the turbine trip signal is given at T = 15 seconds.
d. The HPCI start signal occurs on low level, since the turbine trip signal is given at T = 15 seconds.

Technical Reference(s): N1-OP-16, Section B.2.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.5 to 45.8	

Comments:

Question # RO 41 SRO 46

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	207000 K3.01	207000 K3.01
	Importance Rating	4.2	4.3

Knowledge of the effect that a loss or malfunction of the ISOLATION (EMERGENCY) CONDENSER will have on the following: Reactor Pressure control during conditions in which the reactor vessel is isolated: BWR-2,3

Proposed Question: (low steam line pressure in RUN)

Following a reactor scram and MSIV isolation you manually initiate EC 12 for pressure control. When initiated EC 12 isolates on high steam flow.

The following conditions exist:

- All rods have inserted
- EC 11 is isolated for maintenance
- RPV level is 98 inches and stable
- RPV pressure is 1000 psig and rising
- Torus level is 7.6 feet and stable

Which one of the following actions is required to control reactor pressure?

a. Immediately place one or more ERV Control switches to OPEN and control RPV pressure below 965 psig.

b. Manually Open MSIV drains as necessary to control pressure below 1070 psig to prevent automatic ERV actuation.

c. Place EMERG COOLING CHANNEL 12 isolation bypass keylock switch to BYPASS and manually initiate EC 12.

d. Use N1-EOP-1, Attachment 2, to bypass the MSIV isolation, then reopen the MSIVs and open the Turbine Bypass Valves.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. Torus level is too low (<8') ERVs should not be opened.
b. MSIVs are isolated and the drains are downstream of the isolation.
d. EOP 1, Att 2 only isolates the low-low level isolation and is used during a failure to scram.

Technical Reference(s): N1-OP-13, Page 5
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

.EOPs with entry conditions removed

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 NEW
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.4	

Comments:

Question # RO 42 SRO 47

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	207000 K4.05	207000 K4.05
	Importance Rating	4.0	4.2

Knowledge of ISOLATION (EMERGENCY) CONDENSER design feature(s) and or interlock(s) which provide for the following: Detection of Tube Bundle Leak: BWR2, 3

Proposed Question:

The reactor is operating at 100% power when the following annunciators alarm:

- K1 2-3, EMER COND 111-112 LEVEL HIGH-LOW
- K1 3-3, EMER COND 111-112 SHELL TEMP HIGH
- K1 1-2, EMER COND VENT 11 RAD MONITOR

Investigation reveals that annunciator K1 2-3 alarmed on high level.

Which one of the following describes the cause of the alarms on Emergency Condenser Loop 11?

a. Condensate return piping is leaking.

b. Several condenser tubes have ruptured.

c. Level control valve (60-18) has failed open.

d. Condensate return valve (39-05) is open.

Proposed Answer: b. The radiation monitor alarm indicates a leak in the condenser tubes. The other failures identified are indicated by some of the annunciators provided in addition to others not provided, however, only the tube leak will cause annunciator K1 1-2 to alarm.

Explanation (Justification of Distractors):
See the explanation above for the answer.

Technical Reference(s):	N1-OP-13, Rev 30, Section B N1-ARP-K1, Rev 03, 1-2, 1-3, 2-3, 3-3, 4-2, 4-3	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	10CFR55.41.7	

Comments:

Question # RO 43 SRO 48

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209001 K1.10	209001 K1.10
	Importance Rating	3.7	3.8

Knowledge of physical connections and/or cause-effect relationships between LOW PRESSURE CORE SPRAY SYSTEM and the following: Emergency Generators.

Proposed Question:

Which one of the following describes the Core Spray System pump start timing sequence upon receipt of a core spray initiation signal from both RPS channels?

	0 sec	***7 sec***	***13 sec***	***20 sec***
a.	Core Spray 111 & 112	Core Spray 121 & 122	CS Topping 111 & 112	CS Topping 121 & 122
b.	Core Spray 111 & 121	Core Spray 112 & 122	CS Topping 111 & 121	CS Topping 112 & 122
c.	Core Spray 111 & 112	CS Topping 111 & 112	Core Spray 121 & 122	CS Topping 121 & 122
d.	Core Spray 111 & 121	CS Topping 111 & 121	Core Spray 112 & 122	CS Topping 112 & 122

Proposed Answer: c.
T=0, CS pumps 111 and 112 start.
T=7, CS topping pumps 111 and 112 start.
T=13, CS pumps 121 and 122 start.
T=20, CS topping pumps 121 and 122 start.

Explanation (Justification of Distractors):
See the explanation for the answer above.

Technical Reference(s): N1-OP-45, Rev 24, Section B

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	41.8	
	45.7	

Comments:

Question # RO 44 SRO 49

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209001 K2.01	209001 K2.01
	Importance Rating	3.7	3.8
Knowledge of electrical power supplies to the following: pump power.			

Proposed Question:

During an automatic Core Spray (CS) initiation which one of the following describes the response of the Core Spray Topping pump 111 if the Core Spray pump 111 breaker trips immediately after it closes?

a. The pump will NOT start.

b. The pump starts but trips after 7 seconds on low suction pressure.

c. The pump starts and runs but does not inject and must be tripped by the operator.

d. The pump starts and runs but will NOT inject until RPV pressure is less than 50 psig.

Proposed Answer: a. The breaker will trip immediately on starting because the core spray pump power supply breaker is NOT closed (a/b contacts in the core spray pump breaker are part of the closing interlocks on the topping pump breaker).

Explanation (Justification of Distractors):

b. The pump does not start and there are no low suction trips on these pumps.

c. The pump will not start.

d. The pump will not start and would not pump without the core spray pump to pump water up to the topping pump, the topping pump does not have any suction.

Technical Reference(s): (Attach if not previously provided)
01-OPS-001-209-1-01
N1-ARP-K2, 1-5
P&ID C-19410-C

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	2
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 45 SRO 50

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	211000 A1.02	211000 A1.02
	Importance Rating	3.8	3.9

Ability to predict and/or monitor changes in parameters associated with operating the STANDBY LIQUID CONTROL SYSTEM controls including: Explosive Valve Indication.

PRA: Inject poison solution into the reactor.

Proposed Question:

Following a loss of offsite power, the reactor fails to scram and only PB 102 is powered. EDG 103 cannot be started. The following conditions are observed for the Liquid Poison system:

At control room panel K:

- System 11 explosive valve continuity light is OFF
- System 12 explosive valve continuity light is ON

AT panel 1S-65 in the Auxiliary Control Room:

- System 11 explosive valve continuity meter indicates "0" amps
- System 12 explosive valve continuity meter indicates "0.15" amps

When directed to initiate boron injection, which one of the following describes the method to be used?

a. Start Liquid Poison system 11.

b. Start Liquid Poison system 12.

c. Align the hydro pump for boron injection.

d. Align the RWCU system for boron injection.

Proposed Answer: a. System 11 will start because there is power to the pump and because the discharges are cross-connected before the explosive valves, so either valve fired will permit flow.

Explanation (Justification of Distractors):

b. System 12 will not start because there is no power to liquid poison pump.

c. Although using the hydro pump will work, its use is not permitted until boron injection using the liquid poison system is not successful.

d. Even though power is lost to the RWCU pumps electrical power can be aligned, however, its use is not permitted until boron injection using the liquid poison system is not successful. Use of the hydro pump is preferred.

Technical Reference(s): Attachment 1 of 01-OPS-001-211-1-01
P & ID

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.5
45.5

Comments:

Question # RO 46 SRO 51

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	212000 K4.01	212000 K4.01
	Importance Rating	3.4	3.6

Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and or interlock(s) which provide for the following: System Redundancy and Reliability.
PRA: Transfer RPS to alternate supply.

Proposed Question:

The plant is at 100% power. Battery 11 will be removed from service for some maintenance and will be returned to service within 8 hours.

Which one of the following describes the action required to maintain power to the for the Reactor Protection System BEFORE removing Battery 11 from service?

a. Transfer the RPS loads to the standby UPS.

b. Remove the SBC DC OUTPUT BREAKER trip fuses.

c. Align Power Board 11 DC supply switches to Battery Board 12.

d. Place RPS UPS on transformer bypass and shutdown the UPS.

Proposed Answer: d.

Explanation (Justification of Distractors):
a. This action does not maintain power to the RPS system.
b. Although permitted, this step is not performed to maintain power to the RPS system.
c. This action aligns DC control power to system loads. It does not maintain power to the RPS system.

Technical Reference(s):	N1-OP-47A, H.9.0 N1-OP-40, F.6.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 47 SRO 52

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	212000 K6.01	212000 K6.01
	Importance Rating	3.6	3.8

Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR PROTECTION SYSTEM: AC Electrical Distribution

Proposed Question:

The plant is operating at 100% power. UPS 172 A is in service when its inverter fails and its output goes to zero. Which one of the following describes the effect on RPS 12 Logic power?

a. It will be powered from UPS 172 B with no loss of power.

b. It will be powered from 125 VDC BB 12 with no loss of power.

c. It will be powered ~~directly~~ from PB 17 Section B with no loss of power. delete this word As 1/21/01

d. It will lose power and must be manually transferred to UPS 172 B.

Proposed Answer: c. Power is automatically transferred to the Bypass Stepdown Transformer on a loss of the inverter.

Explanation (Justification of Distractors):
a. This requires a manual transfer and loss of bus RPS Logic power
b. The DC power cannot power the logic because the inverter has failed.
d. Logic power will NOT be lost because the Bypass will pick up the logic.

Technical Reference(s): N1-OP-40 and 01-OPS-001-212-1-01
(Attach if not previously provided)

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7 45.7	
Comments:		

Question # RO 48

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	215003 A4.07
	Importance Rating	3.6
Ability to manually operate and/or monitor in the control room: Verification of proper functioning / operabiliity.		

Proposed Question:

The plant is in a startup with IRM channel 11 on range 6. Its recorder is reading:

- **13** on the **0 to 40 scale**
- **40** on the **0 to 125 scale**

If the operator places the range switch for IRM 11 to range 5, which one of the following describes the new IRM 11 reading?

a. Downscale on the 0 to 40 scale

b. 13 on the 0 to125 scale

c. 26 on the 0 to 40 scale

d. Full scale on the 0 to 125 scale

Proposed Answer: d. The reading is 130 on the 125 scale on range 5

Explanation (Justification of Distractors):

a. Down-ranging the IRM will cause the IRM to go upscale.
b. This is lower than the current reading on a higher range.
c. This is twice the current reading, the actual reading should be ten times the original or 130.

Technical Reference(s): N1-OP-38A,

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.5 to 45.8	

Comments:

Question # RO 49

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	215003 K1.01
	Importance Rating	3.5

Knowledge of physical connections and/or cause-effect relationships between INTERMEDIATE RANGE MONITOR SYSTEM (IRMS) and the following: RPS

Proposed Question:

A normal plant startup is in progress with the reactor mode switch in STARTUP. The following Intermediate Range Monitor System conditions exist:

- IRM Channel "11" is failed downscale
- IRM Channel "11" is bypassed
- IRM Channel "11" Drawer Mode Switch is in STANDBY
- All the IRM range switches, including IRM Channel "11" are on Range 2

Which one of the following describes the automatic response when IRM "11" is taken out of bypass?

a. Half scram only.

b. Control rod block only.

c. IRM downscale alarm only.

d. Control rod block and half scram.

Proposed Answer: d. Mode switch is out of OPERATE.

Explanation (Justification of Distractors):

a. Yes, but it also generates a rod block.

b. Normally a downscale is a rod block, but the Mode Switch disables it. INOP generates a half scram.

c. A rod block and half scram are received.

Technical Reference(s): C-22024-C, 3, 4, 13, 14, 16, 17

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	

10 CFR Part 55 Content:

Comments:

Question # RO 50 SRO 53

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	215004 2.1.7	215004 2.1.7
	Importance Rating	3.7	4.4

Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.

Proposed Question:

During a reactor startup with the reactor close to criticality the following events occur:

- Control rod 22-15 is withdrawn from position 08 to 12.
- During control rod movement all the SRM count rates remain at 4×10^4 cps.
- SRM period indication remains at infinite.

Which one of the following is the cause of this indication?

a. Control rod movement is in a low flux area for these conditions.

b. The SRM detectors have been withdrawn too far out of the core.

c. This control rod is uncoupled from its control rod drive and is stuck.

d. This control rod is too far from any SRM for its motion to be detected.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. The control rod is in an area where it will have a significant effect on flux.

b. This would not prevent an indicated flux change from occurring. 4×10^4 cps is well within the required value for detection of changes.

d. This control rod is right next to the SRM. Any rod movement near criticality would be detected by at least one SRM detector.

Technical Reference(s): N1-OP-5, H.3.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	43.5, 45.12, 45.13	

Comments:

Question # RO 51

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	215004 4.07
	Importance Rating	3.4

Ability to manually operate and/or monitor in the control room: Verification of proper functioning / operability.

Proposed Question:

Given the following conditions:

- Reactor is critical
- Control Rod 26-15 is being withdrawn from 24 to position 48
- RWM is operable
- SRMs are partially withdrawn
- The highest SRM indicates 2×10^5 cps and rising
- Reactor period indicates 60 seconds
- All IRM detectors are fully inserted
- IRMs are on mid-scale on Ranges 4 and 5 and rising

The ASSS directs that the startup be stopped. Which one of the following conditions describes why?

a. The reactor period is too short.

b. The SRMs are NOT in the correct position.

c. The control rod withdrawal block has failed.

d. The proper SRM/IRM overlap is NOT present.

Proposed Answer: c. A control rod block should have occurred at 1×10^5 cps

Explanation (Justification of Distractors):

a. Reactor period may be as short as 30 seconds, this period is OK.

b. SRMs are withdrawn when the IRMs are on Range 8 or above.

d. Proper overlap would have been verified earlier, there is no indication here of im-proper overlap.

Technical Reference(s): (Attach if not previously provided)	N1-OP-43A, Sect. E.1.6	
Proposed references to be provided to applicants during the examination:		
N/A		
Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7 45.5 to 45.8	
Comments:		

Question # RO 52 SRO 54

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	215005 2.4.10	215005 2.4.10
	Importance Rating	3.0	3.1
Knowledge of annunciator response procedures.			

Proposed Question:

The plant is operating at 98% power with 65 Mlb/hr core flow with Recirculation Pump 13 shutdown and unisolated. A partial loss of extraction steam occurs causing power to rise to the APRM Upscale Rod Block setpoint. The following annunciators have alarmed:

- F2, 1-6, APRM 11-14
- F3, 1-1, APRM 15-18
- F3, 4-4, ROD BLOCK

Which one of the following actions is required?

a. Immediately manually scram the reactor and enter SOP-1, Reactor Scram.

b. Insert cram rods to lower power to between 80% and 100% of rated power, per the ARP.

c. Lower recirc flow to bring power within the Minimum Allowable Feedwater Temperature of OP-16, Feedwater System.

d. Reduce power to 90% by lowering recirc flow and inserting cram rods to stay within the allowable band of the Power to Flow Operating Map.

Proposed Answer: c. Per the ARP, the power to flow curve is checked, for 4 loop operation, but operation to 100% is allowed as long as the secured recirc pump is not isolated. Entry into SOP-2 is required, which requires entry into OP-16, Section H. It directs lowering power to within the

Minimum Allowable Feedwater Temperature.

Explanation (Justification of Distractors):

a. This is not required for this region of the power/flow curves, 4 recirc pumps are running and there is no mention of THI, SOP-2 and OP-16 do not require it either, the ARP would require it only if the APRMs were INOP.

b. We are not in the restricted zone of the power to flow map so inserting cram rods is not required and the ARP does not require it.

d. The power to flow map does not require the power reduction as long as the idle loop is isolated.

Technical Reference(s): (Attach if not previously provided)	N1-ARP-F2 and F3 N1-SOP-2 Power to flow curves for 5, 4 and 3 loop operation OP-16, Attachment 4

Proposed references to be provided to applicants during the examination:

Power to flow curves for 5, 4 and 3 loop operation

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	3
10 CFR Part 55 Content:	41.10 43.5 45.13	

Comments:

Question # RO 53 SRO 55

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	216000 A3.01	216000 A3.01
	Importance Rating	3.4	3.4

Ability to monitor automatic operations of the NUCLEAR BOILER Instrumentation including: Relationship between meter/recorder readings and actual parameter values: Plant-Specific.

Proposed Question:

The plant is operating at 100% power when a recirculation pump trips. Assuming NO operator action, which one of the following describes how the recirculation pump trip will effect total core flow indication including why?

a. No effect, as flow lowers in the tripped loop it's input to the flow summer lowers also.

b. No effect, when the recirculation MG set breaker opens the loop flow signal is blocked from the flow summer.

c. Core flow will indicate higher than actual if there is reverse flow in the loop, because the flow summer will add this flow.

d. Core flow will indicate lower than actual because the summer will divide the four (4) operating loop flows by the five (5) inputs.

Proposed Answer: c. The flow is measured by determining the d/p across a venturi to determine flow. The d/p will exist if the flow is backward in the loop, but this flow will be flow from the under core area back to the annulus (negative flow). The only way to prevent this is to valve out the flow instrument or block reverse flow through the loop.

Explanation (Justification of Distractors):

a. When flow reverses in the loop, the summer will continue to add this flow which does effect total core flow measurement.
b. Core flow is effected and there is no relationship between the loop flow instrument and the MG set breaker.
d. Core flow will not read lower, it will in all cases have five inputs, but with reverse flow in the loop one input will be a incorrect indication of flow.

Technical Reference(s):	N1-OP-1, Section 01-OPS-001-202-1-01, Figure 1	

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions blank.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2

10 CFR Part 55 Content:

Comments:

Question # RO 54 SRO 56

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	216000 K6.03	216000 K6.03
	Importance Rating	2.8	3.4

Knowledge of the effect that a loss or malfunction of the following will have on the NUCLEAR BOILER INSTRUMENTATION SYSTEM: Temperature Compensation: Plant-Specific

Proposed Question:

During a loss of coolant accident (LOCA), the Fuel Zone RPV level DIGITAL INDICATOR DISPLAYS are flashing. Which one of the following is the cause?

a. Actual reactor water level is below the top of active fuel.

b. Reference Leg temperature is greater than saturation temperature for RPV pressure.

c. Lowering RPV pressure is causing boiling in the variable leg of the level instruments.

d. Core spray injection is causing a large ΔT between the variable and reference legs.

Proposed Answer: b. If reference leg temperature is greater than TSAT for the RPV then reference leg flashing will be indicated because the temperature compensation (clamped legs) will not be effective.

Explanation (Justification of Distractors):

a. The operator must determine the actual water level is above or below TAF using the fuel zone water level correction curve in the EOPs (Detail X).

c. This condition would be indicative of RPV level and is not associated with the flashing displays.

d. A large ΔT would not indicate reference leg flashing, or cause this flashing display

Technical Reference(s):	N1-ODP-PRO-0305, EOP Bases, Fuel Zone restrictions. ARP F1 (2-8)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7, 45.7	

Comments:

Question # RO 55 SRO 57

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	218000 K5.01	218000 K5.01
	Importance Rating	3.8	3.8
Knowledge of the operational implications of the following concepts as they apply to the AUTOMATIC DEPRESSURIZATION SYSTEM: ADS logic operation.			

Proposed Question:

With the plant operating at 100% power I&C reports:

"The 2-1 relay in the 11-1 ADS logic circuit is burned-out and will not perform its intended safety function."

No other ADS circuitry problems exist.

Subsequently, a transient occurs and the signals to initiate ADS are just met.

Assuming that the ADS initiation signals remain valid (are sustained), which one of the following states the effect on ADS system?

a. The secondary valves will be opened when the initiation signal has been present for 111 seconds.

b. The secondary valves will be opened when the initiation signal has been present for 115.5 seconds.

c. The primary valves will be opened when the initiation signal has been present for 111 seconds.

d. The primary valves will be opened when the initiation signal has been present for 115.5 seconds.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. The secondary valves will not open.
b. The secondary valves will not open.
d. The primary valves will open when the initiation signal has been present for 111 seconds (4.5 seconds sooner than indicated).

Technical Reference(s): DWG C-19859-C, Sheets 18, 18A, 24 and 24A.
P&ID C-18015-C

Proposed references to be provided to applicants during the examination:

DWG C-19859-C, Sheets 18, 18A, 24 and 24A.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.5	
	45.3	

Comments:

Question # RO 56 SRO 58

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	223001 A4.03	223001 A4.03
	Importance Rating	3.4	3.4

Ability to manually operate and/or monitor in the control room: Air dilution valves to drywell and suppression pool: Plant-Specific.

Proposed Question:

Drywell pressure is 3.8 psig. If the only OVERRIDE action taken is to position the CAD Channel 11 and 12 RPS Bypass Switches to BYPASS, which one of the following drywell vents paths can be established?

a. Vent using the Reactor Building Ventilation System.

b. Vent using the Drywell and Torus Vent and Purge Fan.

c. Vent to Emergency Ventilation System using 201.1-09, 11, 14, 16, POST-LOCA VENT valves.

d. Vent to Emergency Ventilation System using 201-31 and 201-32, DW N_2 VENT AND PURGE ISOLATION valves.

Proposed Answer: c.

Explanation (Justification of Distractors):
a, b, d – isolation signals prevent use.

Technical Reference(s): (Attach if not previously provided)	N1-ARP-F3, 3-5 C-19859-C, 3, 6, 20

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7, 45.6, 45.7	

Comments:

Question #		RO 57	SRO 59
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	223002 A1.02	223002 A1.02
	Importance Rating	3.7	3.7

Ability to predict and/or monitor changes in parameters associated with operating the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF controls including: Valve closures

Proposed Question:

Given the following conditions:

At time = 0 seconds

- Reactor at 100% power
- Steam line 12 ruptures at Turbine Stop and Control Valve Manifold

At time = 9 seconds

- Reactor scram on MSIV closure

At time = 90 seconds

- Reactor water level steady at 52" on the Narrow Range after dropping to 22" before turning.

At time = 180 seconds you are walking down the control room panels. Beside the MSIVs which one of the following sets of valves do you expect to find isolated?

a. Cleanup supply and return
SDV vents and drains
Emergency Condenser return

b. Drywell Vent and Purge
Emergency Condenser vents and drains
Cleanup supply and return

c. Reactor Sample valves
Drywell Vent and Purge
Emergency Condenser return

d. Emergency Condenser vents and drains
SDV vents and drains
Reactor Sample valves

Proposed Answer: d. Per SOP-17, these are the valves that are expected to isolate on Hi Stm flow

Explanation (Justification of Distractors):

a. Emergency condenser return valves do not close
b. Drywell vent and purge are containment isolation valves and do not isolate for these conditions.
c. Emergency condenser return valves do not close

Technical Reference(s): SOP-17, Vessel/Containment Isolation
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:

Bank No.		
Modified Bank #		
New	New	

Question History:

Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:

Memory of Fundamental Knowledge	1
Comprehension or Analysis	

10 CFR Part 55 Content: 41.5
45.5

Comments:

Question # RO 58 SRO 61

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	239002 A4.01	239002 A4.01
	Importance Rating	4.4	4.4
Ability to manually operate and/or monitor in the control room: SRVs.			
PRA: Manually operate ERVs.			

Proposed Question:

The plant is at 80% power.

- F2-4-1, MAIN STM LINE ELECTROMATIC RELIEF VALVE OPEN annunciator alarms.

Per the Annunciator Response Procedures, which one of the following describes the indications used to CONFIRM which ERV is open?

	BLUE valve indicating light	*RED acoustic monitor light*	*Valve Monitor Panel 1S49*	*ERV Tailpipe temperature*
a.	Off	On	high flow	red
b.	On	Off	alarm light on	red
c.	Off	On	high flow	rising
d.	On	Off	alarm light on	rising

Proposed Answer: c.
Blue valve indicating light is OFF. Red acoustic monitor light (ERV open) is ON. Valve Monitor Panel 1S49, alarm light is ON but high flow must be determined by reading the signal level on the acceleration meter to confirm the ERV is open. ERV tailpipe temperature on process computer is rising.
Explanation (Justification of Distractors):
a. Tailpipe temperature red light is not a valid indication.
b. Blue light is off. Red acoustic monitor light is On. Cannot use only the alarm light, tailpipe temperature red is not a valid indication.

d. Blue light is off. Cannot use only the alarm light.

Technical Reference(s): N1-ARP-F2, 4-1, 4-5

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7 45.5 to 45.8	

Comments:

Question # RO 59

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	241000 K4.19
	Importance Rating	3.6

Knowledge of REACTOR/TURBINE PRESSURE REGULATING SYSTEM design feature(s) and or interlock(s) that provide for the following: Steam bypass valve control.

Proposed Question:

While performing power ascension with reactor power at 15%, reactor pressure oscillations of 2 psig are observed.

Which one of the following describes the initial required operator action?

a. Depress the VACUUM TRIP #2 pushbutton to stop the event.

b. Lower the SPEED/LOAD CHANGER until pressure is stable.

c. Open the BYPASS OPENING JACK until it controls pressure.

d. Lower MANUAL PRESSURE REGULATOR until it is in control.

Proposed Answer: d. When pressure oscillations are occurring, the first action is to lower the MPR setpoint to remove control of the bypass valves from the EPR. When the MPR is in control, reactor pressure is checked to determine if the oscillations are still occurring. If the oscillations continue, then control is transferred to the Bypass Valve Opening Jack.

Explanation (Justification of Distractors):

a. This will close the bypass valves which will not correct the reactor pressure oscillations.

b. These actions will not correct the reactor pressure oscillations and is not authorized by plant procedures for the conditions describes.

c. This action is taken only if the MPR is determined to be not controlling either.

Technical Reference(s): N1-OP-31, H.1.1

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 60 SRO 72

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	2
	K/A #	259001 K6.03	259001 K6.03
	Importance Rating	2.9	3.1

Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR FEEDWATER SYSTEM: A.C. electrical power.

Proposed Question:

The plant is operating at 100% power.

- A loss of offsite power occurs
- A HPCI initiation signal is received
- Feedwater Booster Pump (FBP) 13 fails to start when power is restored to PB 11 and PB 12

Which one of the following describes the response of FBP 11?

a. FBP 11 will NOT start automatically and CANNOT be started manually.

b. FBP 11 will automatically start provided its control switch is NOT in PULL-TO-LOCK.

c. FBP 11 will NOT automatically start, but can be manually started after the bus low voltage relay is reset.

d. FBP 11 will automatically start after its control switch is positioned to TRIP and returned to NEUTRAL.

Proposed Answer: d. When power is restored to PB 11 and PB 12, FBP 11 will not start until its control switch is placed in either TRIP or CLOSE to reset the BP11X relay and allow low discharge header to auto-start the pump.

Explanation (Justification of Distractors):

a. Pump will not auto-start, but it can be manually started.
b. Pump will not auto start in any breaker position because the auto start circuit has been defeated.
c. There is no need to reset the flag (at the breaker). The FBP circuit must be reset by placing its control switch in TRIP or CLOSE.

Technical Reference(s): N1-OP-16, Rev 26, Section B.
01-OPS-001-259-1-01

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	2
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.7	

Comments:

Question # RO 61 SRO 63

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	259002 A3.02	259002 A3.02
	Importance Rating	3.4	3.4
Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including: Changes in reactor water level.			

Proposed Question:

Given the following conditions:

- Reactor power is steady at 100%
- Reactor water level is +74 inches
- Reactor Water Level Control System is in 3-element control
- Channel 11 Narrow Range GEMAC is selected
- Channel 11 Wide Range Pressure is selected

One (1) of the two (2) Reactor Water Level Control System steam flow SIGNALS fails to zero.

Assuming no operator action is taken, which one of the following describes the result of this failure?

a. Reactor scram on a main turbine trip signal.

b. Reactor scram on a reactor water level trip signal.

c. No reactor scram, reactor water level is stable at a lower level.

d. No reactor scram, reactor water level is stable at a higher level

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Reactor water level will lower.

c. Reactor water level will lower, but the magnitude of the RPV level change will cause level to lower below +55" (reactor scram trip setpoint).

d. Reactor water level will lower.

Technical Reference(s):	C-23076-C C-23077-C, Sheets 1-6 N1-ARP-H3, 4-6	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.7	

Comments:

Question # RO 62 SRO 62

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	259002 K4.12	259002 K4.12
	Importance Rating	3.5	3.4

Knowledge of REACTOR WATER LEVEL CONTROL SYSTEM design feature(s) and or interlock(s) which provide for the following: Manual and automatic control of the system.

Proposed Question:

The plant is operating at 100% power with:

- FWP 13 in AUTO (3 element control)
- FWP 11 in MANUAL (carrying 1.6×10^6 lbm/hr)

An Instrument and Control Technician inadvertently places the FW VALVE SEQ COMP MOD to START. Which one of the following describes the effect on #13 Feedpump Flow Control Valve (FCV)?

#13 Feedpump FCV will...

a. stroke open.

b. stroke closed.

c. remain as is, can be operated using the M/A station in MANUAL.

d. remain as is, can only be operated by an operator at the valve.

Proposed Answer: b.

Explanation (Justification of Distractors):
a. The FCVs will close, not open.
c. The FCV will close and cannot be operated
d. The FCV will close and cannot be operated

Technical Reference(s):	N1-OP-16, B.1.0	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 63 SRO 64

		RO 63	SRO 64
Examination Outline Cross-Reference	Level	RO	RO
	Tier #	2	2
	Group #	3	1
	K/A #	261000 A.2.11	261000 A.2.11
	Importance Rating	3.2	3.3

Ability to (a) predict the impacts of the following on the REACTOR BUILDING EMERGENCY VENTILATION SYSTEM and (b) based on those predictions, use procedures to control, or mitigate the consequences of those abnormal abnormal operations: high drywell pressure.

Proposed Question:

Twenty-five (25) minutes following a large break loss of coolant accident, the Control Room "E" Operator reports that NO manual alignment changes have been made to the Reactor Building Emergency Ventilation System (RBEVS).

Which one of the following describes the concern with the RBEVS and the required action to be taken within five (5) minutes?

Design requirements will be exceeded because of ...

a. inlet humidity. Secure one of the two trains.

b. inlet temperature. Secure one of the two trains.

c. inlet humidity. Throttle outlet from one of the two trains.

d. inlet temperature. Throttle outlet from one of the two trains.

Proposed Answer: a. To ensure the 10 kw heater can reduce inlet humidity to within design requirements, one train of RBEVS must be secured within 30 minutes if the RBEVS automatically isolates.

Explanation (Justification of Distractors):
b, c, d – see justification above.

Technical Reference(s):	N1-OP-10, H.2.2 and associated Note N1-OP-10, D.7.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	2
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.5, 45.6	

Comments:

Question # RO 64 SRO 66

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	264000 A2.10	264000 A2.10
	Importance Rating	3.9	4.2

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 operation: LOCA.

PB 101 4160V AUX FEEDER 103 SUPPLY BKR

PS 7/21/00

Proposed Question:

Emergency Diesel Generator (EDG) 102 has been started and loaded to 2580 KW for the monthly surveillance when a LOCA and resulting reactor scram on high drywell pressure occurs. Two (2) minutes following the LOCA, ALL offsite sources are lost and Breakers R1013 and R1012 trip.

PB 101 4160V FEEDER 102 SUPPLY BKR

Which one of the following describes the effect the above conditions will have on EDG102 and 4160 PB 102?

a. EDG 102 engine and output breaker will **NOT** trip. EDG 102 will remain connected to PB 102.

b. EDG 102 output breaker will trip when offsite power is lost. EDG 102 is **NOT** available until the Diesel Generator over current lockout relay (86DG-2) is manually reset.

c. EDG 102 engine and output breaker will trip when the high drywell pressure signal is received. EDG 102 will automatically start and re-connect to PB 102 when all offsite power is lost.

d. EDG 102 output breaker will trip when the high drywell pressure signal is received. EDG 102 output breaker will close when PB 102 is de-energized during the loss of offsite power.

Proposed Answer: a. EDG 102 output breaker, R1022, will remain closed during the scram, there are no trip signals present with this condition and the breaker trips are blocked by the energizing of the Core Spray logic. The EDG will continue to power PB 102 when all off-site power is lost

Explanation (Justification of Distractors):

b. EDG breaker does not trip on loss of offsite power, if voltage lowers on the bus after the loss of power, the lockout relay 86-16, will energize and shed loads on the PB.
c. EDG engine and output breaker will not trip on a LOCA
d. EDG output breaker will not trip on a LOCA

Technical Reference(s): N1-OP-45, Sect. B
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # RO 65 SRO 80

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	3
	K/A #	201003 A1.01	201003 A1.01
	Importance Rating	3.7	3.8

Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: Reactor Power

Proposed Question:

The plant is operating at 100% power near the end of cycle with all control rods fully withdrawn. The SCRAM INLET VALVE for control rod 22-23 opens.

Which one of the following describes the plant response over the next five (5) minutes, including why?

a. Reactor power will be downscale on APRMs. The reactor will scram due to high Scram Discharge Volume level.

b. Reactor power will remain at 100%. **NO** control rod motion occurs. **NO** leakage into the Scram Discharge Volume occurs.

c. Reactor power will be lower. The affected control rod will insert. **NO** leakage into the Scram Discharge Volume occurs.

d. Reactor power will be lower. The affected control rod will insert. Leakage into the Scram Discharge Volume occurs, but **NO** scram occurs.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. A reactor scram will not occur. The SDV level will not change.
b. The control rod will insert into the core. A single control scram will reduce reactor power.
d. No leakage will occur into the SDV.

Technical Reference(s): 01-OPS-001-210-1-01

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.5 45.5	

Comments:

Question # RO 66

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	202001 K1.14
	Importance Rating	3.0

Knowledge of physical connections and/or cause-effect relationships between (RECIRCULATION SYSTEM) and the following: Rod Block Monitor.

Proposed Question:

The plant is at 50% power when APRM Flow Unit 11 output fails to ZERO. Which one of the following describes the plant response?

a. No rod block or scram because the flow comparator shifts to APRM Flow Unit 12.

b. Rod block only because of the loss of the flow comparator occurs at a low power level.

c. Half scram because the APRMs for channel 11 will indicate high.

d. Rod block and half scram because the downscale on the flow unit makes Channel 11 inoperative.

Proposed Answer: b. The only plant response is an APRM Flow Unit 11 alarm and rod block. No downscale is indicated with this failure. Because of the low power level, a half scram will not be received.

Explanation (Justification of Distractors):

a. Flow comparator does NOT shift.

c. APRM indication is NOT effected by the failure.

d. Only a rod block is received. Because of the low power level, a half scram will not be received.

Technical Reference(s):	N1-ARP-F2, Rev 03, 2-6 N1-OP-38c, Rev 17, Section B.

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-215-1-02, EO-4c, EO-5, EO-8	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.6, 41.7, 45.8	

Comments:

Question # RO 67

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	204000 2.4.48
	Importance Rating	3.5

Ability to interpret control room indications to verify the status and operation of system and understand how operator actions and directives affect plant and system conditions.

Proposed Question:

The plant is at 100% power. Following an isolation of the Cleanup System, the system is being returned to service. Which one of the following describes a restoration requirement including why the requirement is important?

a. Reactor power must be lowered to avoid exceeding 1850 MWt and to accommodate the increased FW system demand.

b. After starting the cleanup pump, the discharge valve must be opened slowly to avoid inaccurate 3D Monicore heat balance calculations.

c. Cleanup flow must be maximized by the use of a second pump to prevent the loss of valid inputs to the core thermal power calculation.

d. When the system pressure is lowered to clear the isolation signal, the reject valve must be opened slowly to avoid a loss of condenser vacuum.

Proposed Answer: a.

Explanation (Justification of Distractors):

b. Discharging RWCU flow to the main condenser results in inaccurate 3D Monicore and OD-3 programs. The concern with discharge valve operation is the resultant system-wide pressure spike and RHX shell side relief lifting.

c. Maximizing cleanup flow is performed to minimize long term radiation buildup in the reactor recirculation piping during plant startups, shutdowns, following a scram, when changing demineralizer beds. It has no effect on the computer points being monitored.

d. The concern is that pressure spikes may occur if the piping is not allowed to cool before system pressure is lowered. Opening the reject to the main condenser and to radwaste at the same time will cause condenser vacuum to lower.

Technical Reference(s): N1-OP-3, Section H.1.0, Section E.2.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	1
10 CFR Part 55 Content:	43.5	
	45.12	

Comments:

Question # RO 68 SRO 67

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	205000 K6.03	205000 K6.03
	Importance Rating	3.1	3.2

Knowledge of the effect that a loss or malfunction of the following will have on the SHUTDOWN COOLING SYSTEM: Recirculation System

Proposed Question:

The plant is shutdown with the Shutdown Cooling system operating.
NO Reactor Recirculation Pumps (RRP) are operating.

Per N1-OP-4 Offnormal Section H.1.0, Shutdown Cooling Without Reactor Recirculation Pumps, which one of the following describes the required RPV level and RRP loop valve configuration in this mode of shutdown cooling?

a. RPV level is above the main steam line nozzles. All loop suction valves are closed.

b. Reactor vessel and reactor cavity flooded. All loop discharge and discharge bypass valves are closed.

c. RPV level is above the RPV flange. Loop 15 suction valve, and loop 14 discharge and discharge bypass valves, are closed.

d. RPV level is above the steam separator. The suction, discharge, and discharge bypass valves for loop 11, 12, <u>or</u> 13 are open.

Proposed Answer: a. With no RRP running, vessel level is maintained above the Main Steam Line nozzles and all RRP loop suction OR discharge and discharge bypass valves closed to prevent thermal stratification. The Shutdown Cooling System suction is from the suction piping of RRP loop 14 and returns to the reactor vessel through the discharge piping of RRP loop 15. This information is provided to support the credibility of distractor "c" and "d".

Explanation (Justification of Distractors):
b. RPV level is only required to be above the Main Steam Line nozzles.
c. RPV level is only required to be above the Main Steam Line nozzles. All loop suction OR discharge and discharge bypass valves must be closed.
d. RPV level is required to be above the Main Steam Line nozzles. All loop suction OR discharge and discharge bypass valves must be closed.

Technical Reference(s): N1-OP-4, Rev 21, Section H.1.0.

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-205-1-01, EO-4b, EO-6	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7, 45.7	

Comments:

Question # RO 69

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	214000 A3.03
	Importance Rating	3.5

Ability to monitor automatic operations of the ROD POSITION INFORMATION SYSTEM including: Verification of Proper Functioning/Operability

Proposed Question:

A non-selected control rod at position 36 is uncoupled. The CRDM will be withdrawn to position 48.

Which one of the following describes when the uncoupled control rod can FIRST be identified using the RPIS?

a. As soon as the control rod is selected.

b. As soon as the rod moves from position 36.

c. When the RMCS timer times out at position 48.

d. When the CRDM coupling check is performed.

Proposed Answer: d. An uncoupled control rod cannot be detected by RPIS until it is withdrawn to the overtravel position. This is done during the coupling check.

Explanation (Justification of Distractors):

a. See justification for the correct response.
b. See justification for the correct response.
c. See justification for the correct response.

Technical Reference(s): N1-ARP-F3, Rev 03, 1-6

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-201-1-02, EO-3, EO-4. EO-7	
Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7, 45.7	

Comments:

Question # RO 70 SRO 68

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	219000 K3.01	219000 K3.01
	Importance Rating	3.9	4.1

Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS/ SUPPRESSION POOL COOLING MODE will have on the following: Suppression pool temperature control.

Actual Nine Mile 1 event

Proposed Question:

Following a stuck open ERV you are directed to place Containment Spray System 121 in Torus Cooling using EOP-1, Attachment 16. The test valves are aligned as follows:

80-40, CONT SPRAY BYPASS BV 111....................CLOSED
80-41, CONT SPRAY BYPASS BV 121....................OPEN
80-44, CONT SPRAY BYPASS BV 112....................CLOSED
80-45, CONT SPRAY BYPASS BV 111....................CLOSED
80-118, CONT SPRAY TEST TO TORUS FCV...........CLOSED

When the operator attempts to position 80-118, they inadvertently open 80-40. The Containment Spray pump #121 is then started. Which of the following describes the effect of this lineup on Torus cooling?

a. It is effected because Containment Spray Pump 121 discharge will spray the drywell through containment spray loop #111.

b. It is effected because the Containment Spray System discharge into the torus is adjacent to Containment Spray Pump 121 suction.

c. It is NOT effected because a check valve is installed in the test line to prevent flow between Containment Spray loop 121 and loop 111.

d. It is NOT effected because flow through 80-40, CONT SPRAY BYPASS BV 111 flows into the Torus through Containment Spray Loop 111.

Proposed Answer: a. The 80-40 control switch is located directly below the control switch for 80-118, Opening 80-40 with 80-118 closed directs Cont. Spray pump 121 flow into the drywell sprays through loop 111.

Explanation (Justification of Distractors):

b. The Cont. Spray discharge is near the suction for 112 and 122 Cont. Spray pumps

c. Flow in to Cont. Spray loop 111 enters the drywell.

d. ThE check valve prevents flow into Cont. Spray loop during containment spray lineups, NOT torus cooling lineups.

Technical Reference(s): (Attach if not previously provided)	EOP-1, Attachment 16, Torus Cooling P&ID C-18012C, Sh 2

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.		
	Modified Bank #		
	New	New	
Question History:	Previous NRC Exam		
	Previous Test / Quiz		
Question Cognitive Level:	Memory of Fundamental Knowledge		
	Comprehension or Analysis		2
10 CFR Part 55 Content:	41.7		
	45.4		

Comments:

Question # RO 71 SRO 60

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	226001 A1.06	226001 A1.06
	Importance Rating	3.2	3.2

Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE controls including: System flow.

Proposed Question:

Following a LOCA, the SSS directs the alignment of Containment Spray Raw Water (CSRW) pump 111 to Core Spray Loop 11. After starting CSRW Pump 111 and obtaining the desired flowrate, the following are observed:

- Reactor pressure is 270 psig and lowering due to plant cooldown
- CSRW Pump 111 amperage is 79 amps

Per N1-EOP-1, Attachment 5, Containment Spray Raw Water to Core Spray, which one of the following is a consequence for these conditions and what action is required to be taken?

The lowering reactor pressure...

a. causes a rise in the CSRW pump flow and motor amperage. To avoid damage to the CSRW pump motor, throttle **open** the CSRW Pump discharge valve.

b. causes a rise in the CSRW pump flow and motor amperage. To avoid damage to the CSRW pump motor, throttle **closed** the CSRW Pump discharge valve.

c. causes the CSRW pump flow and motor amperage to lower. To avoid CSRW pump overheating, throttle **open** the CSRW Pump discharge valve.

d. causes the CSRW pump flow and motor amperage to lower. To avoid CSRW pump overheating, throttle **closed** the CSRW Pump discharge valve.

Proposed Answer: b. Monitor CSRW Pump 111 motor amps and if load exceeds 76 amps, throttle the pump discharge valve closed to reduce load below 76 amps. If load is not reduced motor damage can occur.

Explanation (Justification of Distractors):
a. Discharge valve is throttled closed, not open.
c. Flow and motor amps will rise, not lower. Concern is motor damage.
d. Flow and motor amps will rise, not lower. Concern is motor damage.

Technical Reference(s): N1-EOP-1, Rev 03, Attachment 5

Proposed references to be provided to applicants during the examination:

None.

Learning Objective: 01-OPS-001-226-1-01, EO-9

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1

10 CFR Part 55 Content: 41.5, 45.5

Comments:

Question # RO 72 SRO 70

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	230000 A1.10	230000 A1.10
	Importance Rating	3.7	3.7
Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: TORUS SPRAY MODE controls including: System lineup.			

Proposed Question:

Following a LOCA and rupture of the Torus it becomes necessary to spray the containment. With the Containment Spray pumps NOT available which one of the following lineups is directed by EOP-1, Attachment 17?

a. Use one containment spray raw water pump per loop to spray through loops 11 and 12.

b. Use two containment spray raw water pumps per loop to spray through loops 111 and 122.

c. Line up the fire system to loops 111 and 122 and start the diesel fire pump or the electric fire pump.

d. Line up fire system to loop 11 and 12 and start the electric and diesel fire pumps or the unit 2 fire pump.

Proposed Answer: a. Per EOP-1, Att. 17, use one raw water pump per loop, the loops are cross connected so although the cross ties are physically to loops 111 and 122, spray water enters both loops (111and 121, 112 and 122)

Explanation (Justification of Distractors):
b. Only one pump per loop is used (with its' discharge valve throttled)
c. Fire system is not used for containment spray, only containment flooding.
d. Fire system is not used for containment spray, only containment flooding.

Technical Reference(s): N1-EOP-1, Attachment 17

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.5, 45.5	

Comments:

Question # RO 73 SRO 69

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	2	2
	K/A #	230000 K1.05	230000 K1.05
	Importance Rating	3.2	3.3
Knowledge of physical connections and/or cause-effect relationships between RHR/LPCI: TORUS SPRAY MODE and the following: A.C. electrical.			

Proposed Question:

During full power operations with the Containment Spray system in a normal standby lineup a large break LOCA occurs.

Which one of the following describes how the loss of PB 102 or PB 103 would effect Containment Spray?

a. Insufficient spray flow would exist because only one pump in each loop would discharge into the primary and secondary loops providing 50% flow in each.

b. Insufficient spray flow would exist because one pump would be required to provide a water seal while the other would discharge into either the primary or secondary loops.

c. Sufficient spray flow would exist because two 50% capacity pumps would discharge into either the primary or secondary loop providing 100% design flow in that loop.

d. Sufficient spray flow would exist because two pumps would be operating with only one required to provide full sprays from the primary and secondary loop.

Proposed Answer: d. Each containment spray pump is rated for 100% flow an open cross-tie valve on loops 111 and 122 insure that either of these pumps operating will supply the other header (Pumps 111 and 112 – supplied by PB 102 feeds the primary loop. Pumps 121 and 122 supplied by PB 103 feeds the secondary loop). Therefore either of the pumps into two loops would provide full rated spray flow.

Explanation (Justification of Distractors):

a. Each pump is rated at 100% of the required containment spray flow
b. Each pump is rated at 100% of the required containment spray flow and would discharge into both loops.
c. Each pump is rated at 100% , and they would spray into both loops (open cross-ties)

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

N1-OP-14, Section B
P&ID C-18012-C. Sheet 2

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.2 to 41.9 45.7 to 45.8	

Comments:

Question # RO 74 SRO 82

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	3
	K/A #	239001 A3.01	239001 A3.01
	Importance Rating	4.2	4.1

Ability to monitor automatic operations of the MAIN AND REHEAT STEAM SYSTEM including: Isolation of main steam system.

Proposed Question:

The plant is at 80% power. The 125 VDC Battery Board 11 and 12 power to the Main Steam Isolation Valves (MSIVs) is lost.

Which one of the following states the FINAL position of the inboard and outboard MSIVs due to this power loss?

	Inboard MSIV Position	Outboard MSIV Position
a.	Open	Open
b.	Closed	Open
c.	Open	Closed
d.	Closed	Closed

Proposed Answer: c. The inboard isolation valves (01-01 and 01-02) are AC powered from PB161B and PB 171B respectively. Upon loss of power, the inboard isolation valves fail AS IS. The outboard isolation (01-03 and 01-04) valves are air-operated but have dual solenoids powered from the 125VDC distribution system. Upon loss of power, the outboard isolation valves fail closed.

Explanation (Justification of Distractors):

a. Upon loss of power, the outboard isolation valves fail closed.

b. Upon loss of power, the inboard isolation valves fail AS IS. Upon loss of power, the outboard isolation valves fail closed.

d. Upon loss of power, the inboard isolation valves fail AS IS.

Technical Reference(s):	N1-OP-47A, Rev 17, Section H.9.0, H.10.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-239-1-01, EO-10a		
Question Source:	Bank No.		
	Modified Bank #		
	New	New	
Question History:	Previous NRC Exam		
	Previous Test / Quiz		
Question Cognitive Level:	Memory of Fundamental Knowledge		1
	Comprehension or Analysis		
10 CFR Part 55 Content:	41.7, 45.7		

Comments:

Question # RO 75 SRO 65

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	262001 K2.01	262001 K2.01
	Importance Rating	3.3	3.6

Knowledge of electrical power supplies to the following: Off-site sources of power.

Proposed Question:

The plant is at 100% power with the motor-operated disconnect (MOD 8106) between Line 1 (*South Oswego No. 1)* and Line 4 (*NMP-Fitzpatrick No. 4)* open. A loss of off-site power occurs.

Which one of the following describes the 115 KV distribution system response and the effect on the High Pressure Coolant Injection (HPCI) system availability?

a. The Bennett's Bridge Station will energize Line 4, but the *"R40"* breaker will NOT close. The HPCI system is NOT available.

b. The *"R10"* and *"R40"* breakers will NOT trip. The Bennett's Bridge Station Output Breakers open and remain open. The HPCI system is NOT available.

c. The Bennett's Bridge Station will energize transformer *"T101S"* and its associated power boards. The HPCI system is available but some components are locked out.

d. The Bennett's Bridge Station will energize the Fitzpatrick switchyard restoring power to transformers *"T101N"* and *"T101S."* The entire HPCI system is available.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. The R40 breaker will re-close and HPCI will be available with some components will be locked out.
b. The R10 and R40 breakers will open and then re-close when power is restored to *"NMP-Fitzpatrick No. 4"*.
d. Power is not restored to T101N and PB101, PB102, and PB11 remain deenergized. Not all HPCI components are available because of electrical lockouts.

Technical Reference(s): N1-OP-16, Rev 26, Section B
N1-OP-33A, Rev 19, Section B, Attachment 1 and 2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective: 01-OPS-001-259-1-01, EO-8, EO-9, 17f
01-OPS-001-262-1-01, EO-8

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.7

Comments:

Question # RO 76 SRO 73

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	262002 K4.01	262002 K4.01
	Importance Rating	3.1	3.4

Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and or interlock(s) which provide for the following: Transfer from preferred power to alternate power supplies.

Proposed Question:

The reactor is in cold shutdown with a normal electrical lineup when AC power is lost to PB 12. With NO OPERATOR ACTIONS, which ONE of the following AC power supplies would supply the RPS scram trip solenoid valves following this loss of power?

	Rx Trip System 11	Rx Trip System 12
a.	None	PB 141C
b.	I&C Bus 130	PB 131A
c.	PB141A	I&C Bus 130
d.	PB131A	None

Proposed Answer: d. The transfer of power supplies is manual. When power is lost to PB 12 power is also lost to RPS MG Set 141, which is powered by PB 141C (via PB12). Power to RPS MG Set 131 is un-affected so RPS 11 is un-affected.

Explanation (Justification of Distractors):

a. PB 131 is un-affected so RPS 11 is un-affected, PB 141C is de-energized
b. RPS 11 is powered from PB 131A which can not supply RPS 12
c. RPS 11 is powered from PB 131A, Powering RPS 12 from I&C 130 requires a manual transfer.

Technical Reference(s): (Attach if not previously provided)	N1-OP-40 N1-OP-48, Sect. H.4.0, H.5.0 N1-OP-30, Sect. B	

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 77 SRO 74

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	263000 K2.01	263000 K2.01
	Importance Rating	3.1	3.4
Knowledge of electrical power supplies to the following: Major D.C. loads.			

Proposed Question:

Which one of the following describes a plant effect from a loss of power to Battery Board 11?

a. PB 101 feeder breakers R1011 and R1014 "A" Panel controls and trip protection will NOT function.

b. EC 11 Condensate Return Valve control switch in the Control Room still functions although its valve position indication is NOT available.

c. ERV 111, 112, and 113 control switches at the F Panel still function but these ERVs will NOT open for an ADS actuation.

d. EDG 102 Output Breaker R1022 still functions from the Control Room but breaker position indication is NOT available.

Proposed Answer: b. Only the valve position indication is lost. The valve will still operate from the K Panel.

Explanation (Justification of Distractors):

a. These valves are powered from Battery Board 12.
c. RV 111, 112, and 113 control at the F Panel is lost, and the valves will NOT function in the automatic pressure relief mode or the ADS mode.
d. Breaker will NOT function from the Control Room, its control power is lost.

Technical Reference(s): N1-OP-47A, Attachment 4 (Loss of BB 11/12)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 78 SRO 75

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	271000 A2.04	271000 A2.04
	Importance Rating	3.7	4.1

Ability to (a) predict the impacts of the following on the OFFGAS SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Offgas system high radiation.

Proposed Question:

The plant is operating a 100% power when fuel element failures cause high radiation in the main steam lines and condenser. Which one of the following is the **most direct** path for this radiation to the plant stack?

a. Steam Jet Air Ejectors

b. Off-Gas Vacuum Pumps

c. Off-Gas Sample Pumps

d. Steam Packing Exhausters

Proposed Answer: d. All the other components have filters or discharge into the 30 minute holdup, the SPEs take steam and air directly from the turbine glands and discharge through a 1.75 minute holdup directly to the plant stack.

Explanation (Justification of Distractors):

a. Air ejectors discharge through the off-gas system, where gases and particulate radioactive material are removed, it is not direct to the stack.
b. Off-gas vacuum pumps take a suction from the off gas system, the 30 minute holdup, charcoal absorbers and recombiners would significantly reduce any radiation, this is not direct to the stack.
c. The Off-Gas sample pumps discharge into the 30 minute holdup.

Technical Reference(s):	N1-ARP-H1, 1-8 01-OPS-001-255-1-01

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # RO 79 SRO 76

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	272000 K4.02	272000 K4.02
	Importance Rating	3.7	4.1

Knowledge of RADIATION MONITORING System design feature(s) and or interlock(s) which provide for the following: Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded.

Proposed Question:

During an airborne radiation condition in the secondary containment the Reactor Building Ventilation (RBV) Radiation Monitor, RN07A5, reaches 5 mr/hr.

Which one of the following describes how this will effect the Reactor Building Ventilation and the Emergency Ventilation (EV) systems?

a. RBV shuts down and both EV systems 11 and 12 start.

b. Only when the RBV Radiation Monitor, RN07B5, reaches 5 mr/hr will the RBV shutdown and the EV systems start.

c. RBV shuts down and EV systems 11 starts. When RBV Radiation Monitor, RN07B5 reaches 5 mr/hr EV system 12 starts.

d. Only if the second RBV Radiation Monitor, RN07B5, reaches its' high level trip <u>or</u> fails downscale (0.1 mr/hr) will RBV shutdown and the EV systems start.

Proposed Answer: a. When either Rad Monitor reaches 5 mr/hr Reactor Building Ventilation will shutdown and both Emergency Ventilation systems will start.

Explanation (Justification of Distractors):

b. A second high radiation is not required, one will cause the trip and auto start. Off-Gas requires two.

c. Both EVS trains start on a single monitor.

d. A second monitor is not required for this function

Technical Reference(s): N1-ARP-L1 (4-3)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 80 SRO 77

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	286000 K5.04	286000 K5.04
	Importance Rating	2.9	2.9

Knowledge of the operational implications of the following concepts as they apply to the FIRE PROTECTION SYSTEM: Valve operation.

Proposed Question:

The Fire Detection System senses a fire in Hazard C-2123, Power Board Room 102. The following Alarm Detection Zones are received at the Main Fire Control Panel:

- DX-2123A
- DX-2123B

Which one of the following describes the response of the Fire Protection system?

a. Deluge system actuated and the fixed foam system pump is operating.

b. Deluge system actuated and the motor-driven fire pump is running.

c. Local horn and light actuate, and after 30 seconds carbon dioxide is discharged.

d. Local alarm and strobe light actuate after halon flow is detected in the zone discharge line.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. This area has CO2 fire suppression. Foam suppression systems are for the Main turbine island and lube oil areas.
b. This area has CO2 fire suppression. Water suppression system are throughout the plant but not in electrical areas.
d. This area has CO2 fire suppression. Halon suppression systems are in electronic equipment areas such as the auxiliary control room, EC isolation valve room, Security Alarm Station, Security CPU/Equipment Room, RSSB

Control Room, and RSSB Electrical Equipment Room.
Technical Reference(s): N1-OP-21C, Section b

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.5, 45.3	

Comments:

Question # RO 81 SRO 78

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	290003 A3.01	290003 A3.01
	Importance Rating	3.3	3.5

Ability to monitor automatic operations of the CONTROL ROOM HVAC including: Initiation / reconfiguration.

Proposed Question:

Which one of the following describes how the control room ventilation system will respond to a temperature of 205°F in the steam tunnel?

a. There will be no effect unless outside air contamination rises above 168 cpm.

b. There will be no effect unless the temperature occurs with a high steam flow signal.

c. The normal outside air supply will isolate and air will be redirected through an emergency filtration system.

d. The outside air supply will isolate and Control Room ventilation will shift to recirculation mode with HEPA and charcoal filters.

Proposed Answer: c. High steam tunnel temp will isolate the normal supply to CR HVAC, and start and lineup emergency ventilation.

Explanation (Justification of Distractors):

a. Outside air >168 cpm will cause an automatic initiation of CR ventilation, but it is not needed, because high steam tunnel temperature will initiate it.
b. No confirmation signal is required, high steam flow will also cause CR HVAC to shift to emergency mode.
d. CR HVAC does not shift to recirculate, the outside air is filtered.

Technical Reference(s): N1-OP-49, sect. B
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7 45.7	

Comments:

Question # RO 82

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	300000 K3.02
	Importance Rating	3.3

Knowledge of the effect that a loss or malfunction of the INSTRUMENT AIR SYSTEM will have on the following: Systems having pneumatic valves and controls.

Proposed Question:

While the plant is at 100% power, a Loss of Offsite Power (LOOP) concurrent with a Loss of Coolant Accident (LOCA) occurs.

During implementation of the Emergency Operating Procedures, which one of the following actions is prevented by the automatic plant response to the LOOP/LOCA?

a. Establishing Torus Cooling.

b. Isolating of the EC condensate return valves.

c. Keeping RPV level in the directed band using Feedwater.

d. Maintaining MSIV leakage within limits following isolation.

Proposed Answer: c. If a LOOP/LOCA occurs, power to the SR IACs is lost and system components fail to a safe position. Sufficient air is available for approximately 15 minutes in the IAS piping volume and Containment Spray Air Test Receiver in order to implement EOP actions and maintain safe plant conditions, RPV level control using Feedwater is prevented due to the effects of the loss of air and loss of power. After 15 minutes, the SR IACs can be powered from EDGs by cross-tying PB 16A/16B and/or PB 17A/17B per N1-SOP-5.

Explanation (Justification of Distractors):

a. Establishing Torus Cooling are actions that can be performed
b. EC condensate returns are isolated using the steam isolation valves.
d. The MSIVs remain "leak tight" per Appendix J containment leakage considerations following the MISV isolation.

Technical Reference(s):	N1-OP-20, Section B N1-OP-16, Section B	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 None
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7 45.6	

Comments:

Question # RO 83 SRO 79

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	400000 K1.02	400000 K1.02
	Importance Rating	3.2	3.4

Knowledge of the physical connections and/or cause-effect relationships between CCWS and the following: Loads cooled by CCWS.

Proposed Question:

The plant has been operating at 100% power for 75 days when the AO assigned to the turbine upper rounds reports that the Reactor Building Closed Loop Cooling (RBCLC) elevated drain is leaking a steady stream of water.

Which one of the following is the cause?

a. A high level in the Closed Loop Cooling Makeup Tank.

b. Tube leak in #13 Instrument Air Compressor heat exchanger.

c. A third RBCLC pump has been manually or automatically started.

d. Tube leak in Reactor Cleanup non-regenerative heat exchanger.

Proposed Answer: d. System pressure must be higher than the RBCLC pressure at the location of the leak. Cleanup NRHX is the only leak identified above that has ample pressure to cause in-leakage to the RBCLC system and cause leakage at the elevated drain in the turbine building (RBCLC cannot flow into the Makeup Tank because there are check valves on lines into RBCLC).

Explanation (Justification of Distractors):

a. The elevated drain is above the level for a high level in the tank.
b. This would leak into the TBCLC system.
c. The makeup tank and elevated relief are on the suction of the pumps and would not be effected by pump discharge pressure.

Technical Reference(s):	N1-OP-11, Section B P&ID C-18022-C (TBCLC) N1-ARP-H1, 4-4

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.2 to 41.9 45.7, 45.8	

Comments:

Question # RO 84

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	3
	K/A #	233000 K3.01
	Importance Rating	3.2

Knowledge of the effect that a loss or malfunction of the FUEL POOL COOLING AND CLEAN-UP will have on the following: Fuel pool temperature.

Proposed Question:

The plant will be removing both Spent Fuel Pool Cooling Loops from service for maintenance while in a refueling outage.

Per N1-OP-6, Fuel Pool Filtering and Cooling System, which one of the following describes a requirement that must be met to remove both loops from service including why?

a. Calculation and close monitoring of fuel pool temperature to ensure fuel pool temperature remains below 140°F to avoid exceeding a design limit.

b. Determination that the duration of the maintenance remains below the calculated time for fuel pool temperature to reach 105°F to avoid a radiological hazard on the refuel floor.

c. Condensate transfer makeup is available and an operator is stationed for manual fuel pool level control to avoid a radiological hazard on the refuel floor.

d. Alternate cooling using condensate transfer and a drain path from the spent fuel pool surge tanks must be established for feed and bleed to avoid exceeding a design limit.

Proposed Answer: a. A calculation is required to ensure the duration of the activity is within the calculated time to reach 140°F with no cooling, fuel pool temperature must be closely monitored during the activity, and condensate transfer available for makeup. Requirements are to avoid exceeding a design limit of 140°F.

Explanation (Justification of Distractors):

b. Temperature requirement is 140°F, not 105°F. 105°F is the high end of the normal temperature control band for the fuel pool.

c. Although condensate storage makeup is required, there is no requirement for manual control at the skimmer surge tanks. High airborne is not the concern.

d. This is an alteration that is not authorized in the station procedures. Portable pumps are used for emergency makeup, not circulation. High airborne is not the concern.

Technical Reference(s): N1-OP-6, D.5
N1-OP-6, H.10

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge 1
Comprehension or Analysis

10 CFR Part 55 Content: 41.7
45.6

Comments:

Question # RO 85 SRO 71

Examination Outline Cross-Reference		RO	SRO
	Level	RO	SRO
	Tier #	2	2
	Group #	3	2
	K/A #	234000 A4.02	234000 A4.02
	Importance Rating	3.4	3.7

Ability to manually operate and/or monitor in the control room: Control rod drive system.

Proposed Question:

The reactor core is being reloaded. Conditions are as follows:

- Reactor Mode Switch is in the REFUEL position
- All control rods are fully inserted into the reactor core

Step 19: removal and transfer of a fuel assembly to the fuel pool. The fuel assembly has been unlatched in the fuel pool.

Step 20: transfer of a fuel assembly to the reactor core. The fuel assembly has just been latched in the fuel pool. The main hoist has NOT been raised.

Which one of the following describes when the Rod Block Monitor Panel REFUEL INTERLOCK indicator lights during the performance of **Step 20**?

a. LIGHTS when the main hoist is raised to the Normal-Up position in the fuel pool.

b. LIGHTS when the main hoist is Normal-Up and the refuel bridge is moved over the reactor core.

c. LIGHTS when the refuel bridge is over the reactor core and the main hoist is lowered from Normal-Up position.

d. LIGHTS when the fuel assembly is lowered into the reactor core and the main hoist load lowers below 400 psig.

Proposed Answer: b.

Explanation (Justification of Distractors):
a. The refuel bridge must be over the reactor core.
c. This is correct if the main hoist is not loaded.
d. The indications are that the HOIST LOADED light clears and then the SLACK

CABLE light turns on at the refuel bridge interlock display. Not a rod block.

Technical Reference(s): N1-OP-34, H.4.0 (note)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.6, 45.6, 45.7, 45.8	

Comments:

Question # RO 86

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	3
	K/A #	288000 K5.03
	Importance Rating	2.5

Knowledge of the operational implications of the following concepts as they apply to the PLANT VENTILATION SYSTEMS: Temperature control.

Proposed Question:

The plant is operating at 100% power. The Turbine Building Ventilation (TBV) System operation is as follows:

- TBV Supply Fans #111 and #121 are operating
- TBV Supply Fans #112 and #122 are in standby

- TBV Exhaust Fan #11 is operating
- TBV Exhaust Fan #12 is in standby

If outside air temperature rises to 94°F, which one of the following actions is required by N1-OP-26, Turbine Building Ventilation System?

a. Open the Turbine Building Roof Vent.

b. Contact engineering to evaluate plant operation.

c. Notify RP to increase surveys in the Turbine Building.

d. Stop all unnecessary activities in the Turbine Building.

Proposed Answer: b. If outside air temperature exceeds 93°F, HVAC design basis, engineering must be contacted for a formal determination on plant operation.

Explanation (Justification of Distractors):
a. If authorized by the SSS, this action is taken before the limiting outside air temperature is reached.
c. This action will not assist in lowering TB temperature.
d. This action will not assist in lowering TB temperature.

Technical Reference(s): N1-OP-26, D.8.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7 45.4	

Comments:

Question # RO 87

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	3
	K/A #	290002
		2.1.32
	Importance Rating	3.4
Ability to explain and apply system limits and precautions.		

Proposed Question:

The plant is operating at 100% power when Recirc Pump 11 trips. After closing the discharge valve for Recirc Pump 11, the ATC RO positions the REACTOR PUMP 11 DISCHARGE VALVE control switch to OPEN for 2.5 seconds.

Which one of the following describes why this action is performed?

a. Minimize the thermal transient on the discharge valve as the loop cools.

b. Provide for valve stem warmup and growth to prevent limitorque lockup.

c. Prevent thermal cycling of the RPV lower head due to thermal stratification.

d. Ensure reactor water level instruments indicate actual water level in that core region.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Cooldown of the discharge valve is not a concern under these conditions.

c. This is a concern following a trip/loss of all recirc pumps if at least one pump is not restarted within 30 minutes of the loss. This is not the concern for stroking open the discharge valve.

d. To ensure reactor water level instruments indicate actual water level in that core region, the suction and discharge valves of at least two recirc loops are fully opened. This is not the concern for stroking open the discharge valve.

Technical Reference(s): N1-OP-1, D.11

N1-OP-1, H.1.3 and associated note

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10 43.2 45.12	

Comments:

Question # RO 88

Examination Outline Cross-Reference	Level	RO
	Tier #	-
	Group #	-
	K/A #	Generic 2.1.20
	Importance Rating	4.3
Ability to execute procedure steps.		

Proposed Question:

Per NIP-PRO-01, Use of Procedures, which one of the following describes when steps can be marked "Not Required" without receiving a supervisor's approval first?

a. Documenting acceptance criteria for in-service testing guidelines.

b. Prerequisite steps needed to perform the startup section of a procedure.

c. Procedure steps not needed to return a system to its standby lineup after testing.

d. Emergency Plan action steps which do not apply to the events experienced.

Proposed Answer: d.

NOT REQUIRED may be used: (1) when specifically allowed by the procedure, (2) to indicate portions not used when only a portion of the procedure is used, (3) when performing EPIP steps which do not apply to the events experienced, and (4) if the procedure requires a markup and the Markup Controller indicates a markup is not required.

Explanation (Justification of Distractors):

a. Acceptance criteria shall be documented.
b. Prior to starting a system, the prerequisites shall be met.
c. When returning a system to normal/standby, steps in that section of the procedure shall be performed.

Technical Reference(s): NIP-PRO-01, Section 3.6.1, 3.6.2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.10	
	43.5	
	45.12	

Comments:

Question # RO 89

Examination Outline Cross-Reference	Level	RO
	Tier #	-
	Group #	-
	K/A #	Generic 2.1.30
	Importance Rating	3.9
Ability to locate and operate components/including local controls.		

Proposed Question:

The plant is at 80% power. All five Reactor Recirculation pumps are operating. Following a failure of its scoop tube, Reactor Recirc pump 15 is transferred to LOCAL MANUAL control per N1-OP-1, Section H.6.0, Recirc Pump Operation W/ Speed Control In Local Manual.

Regarding the following local components (***Operating Lever, Supply Valve, Bypass Valve***), which one of the following describes their current positions?

	Operating Lever	*Supply Valve*	*Bypass Valve*
a.	MANUAL	AUTO	AUTO
b.	LOCK	AUTO	HAND
c.	MANUAL	HAND	AUTO
d.	LOCK	HAND	HAND

Proposed Answer: d. When transferring to local manual control, the OPERATING LEVER is rotated through MANUAL to LOCK. The SUPPLY and BYPASS air valves are placed in the HAND position. The hand lever is at the approximate scoop tube position for 80% reactor power with five recirc pumps in operation.

Explanation (Justification of Distractors):
See explanation for the correct answer.

Technical Reference(s): N1-OP-1, Section H.6.0

Proposed references to be provided to applicants during the examination:

N1-OP-1, Attachment 4, Local Recirculation Pump Speed Control Unit.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 1
10 CFR Part 55 Content:	41.7 45.7	

Comments:

Question # RO 90 SRO 84

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	3	2
	K/A #	2.1.2	2.1.2
	Importance Rating	3.0	4.0
Knowledge of operator responsibilities during all modes of plant operations			

Proposed Question:

During your shift the following events occur:

1. The emergency plan is entered because of a security-related event.
2. Work on replacing a safety related breaker is NOT completed before its' extended late date.
3. Before being used in a surveillance test a pressure gauge is determined to be out of calibration.
4. The plant enters a Technical Specification LCO because the acceptance criteria for a Surveillance Test are NOT met.

Per NIP-ECA-01, DEVIATION/EVENT REPORT, which two events require the initiation of a DER?

a. 1 and 2.

b. 2 and 4.

d. 3 and 1.

d. 4 and 3.

Proposed Answer: b.
Preventive maintenance activities not completed before late date or deferrred date require a DER. Test failures require a DER.
Explanation (Justification of Distractors):
a. Security related events are documented per Nuclear Security Procedures. They are exempt from this procedure.
c. Security related events are documented per Nuclear Security Procedures. They are exempt from this procedure. Out-of-calibration M&TE must have adversely or potentially adversely affected other plant equipment.
d. Security related events are documented, reported, and evaluated per

Nuclear Security Procedures. They are exempt from this procedure.

Technical Reference(s): NIP-ECA-01, Section 1.1, 1.2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.10 45.13	

Comments:

Question # RO 91 SRO 87

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.1.29	Generic 2.1.29
	Importance Rating	3.4	3.3
Knowledge of how to conduct and verify valve lineups.			

Proposed Question:

In accordance with the Operations Manual, which one of the following set of conditions permit the independent verification of a valve to be waived, for a valve that will be repositioned during a valve lineup?

a. The valve requires the use of a ladder so that it is accessible.

b. The valve location will cause the verifier to receive a high dose.

c. The valve must be locked and is locked in position by the performer.

d. The valve area has an ambient temperature in excess of 95°F and high humidity.

Proposed Answer: b.

Explanation (Justification of Distractors):
a. Not a permitted waiver for independent verification.
c. Not a permitted waiver for independent verification.
d. Not a permitted waiver for independent verification.

Technical Reference(s): Operations Manual, Section 3.10.3.e

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	10CFR55.41.10	
	10CFR55.45.1	
	10CFR55.45.12	

Comments:

Question # RO 92 SRO 90

		RO	SRO
Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.2.22	Generic 2.2.22
	Importance Rating	3.7	4.1
Knowledge of limiting conditions for operations and safety limits.			

Proposed Question:

The plant is operating at 25% with Feed Water Pump (FWP) 12 in service. A plant transient occurs resulting in the following conditions:

- FWP 12 trips and level lowers to 48" above TAF before a second feed pump is started and level is restored.
- The plant did not scram automatically but a manual scram was successfully inserted.
- No additional actions have been taken.

Which of the following correctly describes the Tech. Spec. concerns associated with this event?

a. A Limiting Safety System Setting and a Safety Limit were exceeded.

b. Neither a Safety Limit nor a Limiting Safety System Setting were exceeded.

c. A Safety Limit was exceeded but no Limiting Safety System Settings were exceeded.

d. A Limiting Safety System Setting was exceeded but no Safety Limits were exceeded.

Proposed Answer: a. LSSS 2.1.2.d scram at 53" and safety limit 2.1.1.c on failure to scram on expected signal were exceeded.

Explanation (Justification of Distractors):
b. LSSS <u>and</u> a Safety Limit were exceeded
c. LSSS <u>and</u> a Safety Limit were exceeded
d. LSSS <u>and</u> a Safety Limit were exceeded

Technical Reference(s): (Attach if not previously provided)	T.S. 2.1.1 and 2.1.2	

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	43.2 45.2	

Comments:

Question # RO 93

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	PWG 2.2.1
	Importance Rating	3.7
Ability to perform pre-startup procedures for the facility including operating those controls associated with plant equipment that could effect reactivity.		

Proposed Question:

Given the following conditions:

- Reactor is shutdown prior to commencing a startup.
- Reactor Coolant Temperature: 240°F and lowering.
- Recirc Flow is 30% (20.25×10^6 lb/hr).
- SRM A: 3.3 cps, B: 2.3 cps, C: 2.7 cps, D: 3.3 cps
- Rod 26-23 inoperable and valved out.

Which of the following describes the required actions prior to commencing the startup per N1-OP-43A, Reactivity Control?

a. Rod 26-23 must be returned to service.

b. At least one more SRM channel must be >3 cps.

c. Reactor coolant temperature must be stabilized.

d. Recirc flow must be lowered to 25% (16.87×10^6 lb/hr).

Proposed Answer: b. At least 3 SRMs >3 cps per startup preparations

Explanation (Justification of Distractors):

a. Inop rods must be valved out of service, 6 may be inop.
c. Startup from hot condition is permitted.
d. Recirc flow must be greater than 30%.

Technical Reference(s): N1-OP-43A, Sect. E.1.5
(Attach if not previously provided) T.S. 3.1

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7 45.5 to 45.8	

Comments:

Question # RO 94 SRO 89

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.2.13	Generic 2.2.13
	Importance Rating	3.6	3.8
Knowledge of tagging and clearance procedures.			

Proposed Question:

Which one of the following describes the use of a CONTROL TAG posted on a control switch located in the Reactor Building?

a. To allow operation of a component that is not covered under station procedures.

b. To identify that a station employee with CSO permission can operate the control switch.

c. To provide protection to personnel or equipment when a component is undergoing maintenance.

d. To present instructions regarding the safe operation of a component as a result of an abnormal condition.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Control tags are not used for personnel protection and although they allow operation of the component they do not supplement procedures

c. Control tags are not used for personnel protection.

d. Control tags are not used to control abnormal conditions and resulting equipment operation.

Technical Reference(s): (Attach if not previously provided)	GAP-OPS-02, 3.14, Rev 10

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.10	
	45.13	

Comments:

Question # RO 95

Examination Outline Cross-Reference	Level	RO
	Tier #	
	Group #	
	K/A #	Generic 2.3.9
	Importance Rating	2.5
Knowledge of the process for performing a containment purge.		

Proposed Question:

During a reactor startup, the procedure step is reached to inert containment with nitrogen.

Which one of the following describes how the gasses in the containment atmosphere are vented to the Reactor Building Ventilation System?

a. The torus and drywell purge outlet valves are opened, the torus and drywell purge inlet valves are opened, and then nitrogen is admitted to both the torus and drywell.

b. The torus and drywell purge inlet valves are opened, nitrogen is admitted and when containment pressure is positive, the Torus and drywell purge outlet valves are opened.

c. Drywell purge inlet valve is opened, nitrogen is admitted and when drywell pressure is positive, drywell purge outlet valve is opened. After the drywell is inerted, the torus is inerted.

d. Torus purge inlet valve is opened, nitrogen is admitted and when torus pressure is 1.3 to 1.5 psig, torus purge outlet valve is opened. After the torus is inerted, the drywell is inerted.

Proposed Answer: c.

The drywell is inerted and then the torus. The sequence is to align the drywell purge inlet valves and admit nitrogen to the drywell. When drywell pressure becomes positive, the drywell purge outlet valve is opened to vent the gasses. When the desired O2 concentration is achieved, inerting is secured and then the torus is inerted in a similar manner.

Explanation (Justification of Distractors):

a. b. Drywell and torus are not inerted at the same time. The drywell is inerted and then the torus is inerted.

d. The drywell is inerted and then the torus is inerted.
Technical Reference(s): N1-OP-9, E.4.0, E.5.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	43.4 45.10	

Comments:

Question # RO 96 SRO 95

		RO	SRO
Examination Outline	Level	-	-
Cross-Reference	Tier #	-	-
	Group #	Generic	Generic
	K/A #	2.3.10	2.3.10
	Importance Rating	2.9	3.3

Ability to perform procedures to reduce excessive levels of radiation and guard against radiation exposure.

Proposed Question:

Which one of the following conditions allow leaving a Very High Radiation Area entryway OPEN?

a. Any time during EOP operations.

b. Whenever anyone is inside that area.

c. When the area is under direct surveillance.

d. Any time an Radiation Work Permit (RWP) is issued for entry.

Proposed Answer: c. Any time the entry is under direct surveillance so that entry is controlled (also while it's being used)

Explanation (Justification of Distractors):
a. EOPs do not allow relaxation of the locked requirements.
b. The area must still be locked to prevent anyone else, who may not be authorized to enter.
d. An RWP is always required for entry into this area, but it must be controlled (locked) to prevent un-authorized access.

Technical Reference(s): GAP-RPP-01, Attachment 1

Proposed references to be provided to applicants during the examination:

None

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 NEW
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	10CFR55.43.4 10CFR55.45.10	
Comments:		

Question # RO 97 SRO 96

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.3.2	Generic 2.3.2
	Importance Rating	2.5	2.9
Knowledge of facility radiation ALARA requirements.			

Proposed Question:

In accordance with GAP-RPP-08, Control of High, Locked High, and Very High Radiation Areas:

When comparing requirements for a High Radiation Area to requirements for a locked High Radiation Area, which one of the following **ONLY** applies to the locked High Radiation Area?

a. SSS approval is required prior to key issue for entry.

b. The Control Room shall be contacted prior to entering the area.

c. A Specific RWP must be developed and issued prior to entering the area.

d. The RWP shall specify the maximum stay time and dose rates in the work area.

Proposed Answer: d.

Explanation (Justification of Distractors):

a. Radiation protection controls the keys.
b. Although the control room will be informed of the entry, this is not a requirement specific to either area.
c. This is an optional requirement for entry into both areas, however, a General RWP could be used for either area. A SRWP is required for entry into a Very High Radiation Area.

Technical Reference(s):	GAP-RPP-08, Rev 05, Section 3.3.1 Tech. Spec. 6.12	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	10CFR55.41.12 10CFR55.43.4 10CFR55.45.9 10CFR55.45.10	

Comments:

Question # RO 98 SRO 97

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	-	-
	K/A #	Generic 2.4.1	Generic 2.4.1
	Importance Rating	4.3	4.6
Knowledge of EOP entry conditions and immediate action steps			

Proposed Question:

During a startup with the plant operating at 29% power a spurious scram occurs. Given the following conditions:

- Reactor scrammed, seven rods at position 02, five at 04, all others at 00.
- MSIVs open
- RPV pressure 965 psig
- RPV level 61 inches
- Drywell temperature 144°F
- Torus water temperature 88°F
- Drwell pressure 3.2 psig
- Torus level 10.3 feet
- No indications of fuel damage
- All plant temperatures and radiation levels are normal.

Which one of the following states **all** the EOPs and/or SOPs the crew is required to enter because their entry conditions have been met?

a. SOP-1, REACTOR SCRAM, SOP-17 VESSEL/CONTAINMENT ISOLATION

b. EOP-2, RPV CONTROL, EOP-3 FAILURE TO SCRAM, EOP-4 CONTAINMENT CONTROL

c. EOP-4, PRIMARY CONTAINMENT CONTROL, SOP-1 REACTOR SCRAM, SOP-4, TURBINE TRIP

d. SOP-1 REACTOR SCRAM, SOP-4, TURBINE TRIP, SOP-17, VESSEL/CONTAINMENT ISOLATION

Proposed Answer: c. EOP-4 entered on high Torus Temperature (88°F versus 85°F, SOP-1 entered on a reactor scram occurring, SOP-4 entered on a turbine trip occurring.

Explanation (Justification of Distractors):
a. Does not include EOP-4 and SOP-4
b. Does not include SOP-1 or 4, There are no entry conditions for EOP-2 or EOP-3.
d. Does not include EOP-4, there are no entry conditions for SOP-17.

Technical Reference(s): EOPs 2,3,4, SOPs 1,4,17

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.10 43.5 45.13	

Comments:

Question # RO 99 SRO 98

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	-	-
	K/A #	Generic 2.4.6	Generic 2.4.6
	Importance Rating	3.1	4.0
Knowledge of symptom based EOP mitigation strategies			

Proposed Question:

The plant was at 100% power when a manual reactor scram was inserted but many control rods failed to insert. Conditions are:

- The main turbine is online
- Liquid poison (LP) is initiated and injecting
- All RPV injection is prevented, except for CRD and LP
- RPV level is currently -66 inches indicated on Fuel Zone level
- Reactor Power is currently 11% and lowering slowly
- Reactor pressure is 960 psig
- Suppression pool temperature has risen to 114°F

When suppression pool temperature reached 114°F, the main condenser boot catastrophically failed. Per N1-EOP-3, FAILURE TO SCRAM, which one of the following describes the required EOP level control step (indicate the step number) to be performed at this time?

a. Go to point ⑧ and perform the actions of step L-7.

b. Go to point ⑨ and perform the actions of step L-8.

c. Re-enter at point ❻ and continue the current actions of step L-6.

d. Re-enter at point ❼ and continue the current actions of step L-6.

Proposed Answer: a.
Condenser boot failure causes a loss of vacuum and loss of the turbine and bypass valves, this will cause a pressure rise and subsequent ERV opening. This completes the requirements to enter ⑧.

Explanation (Justification of Distractors):

b. Must go through step L-8 or have been in EOP-8, RPV BLOWDOWN. Level has lowered to -66 inches and power is 11% so ⑧ had not been previously entered. EOP-8, has not been entered.

c. Overrides are continually evaluated, they are not re-entered, must go to ⑧.

d. Overrides are continually evaluated, they are not re-entered, must go to ⑧.

Technical Reference(s): EOP-3, FAILURE TO SCRAM
N1-ODP-PRO-0305, EOP/SAP TECHNICAL BASES

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 3

10 CFR Part 55 Content: 10CFR55.41.10
10CFR55.45.12

Comments:

Question # RO 100 SRO 99

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	-	-
	K/A #	Generic 2.4.13	Generic 2.4.13
	Importance Rating	3.3	3.9
Knowledge of crew roles and responsibilities during EOP flowchart use.			

Proposed Question:

During EOP use it becomes necessary to depart from the EOP and NOT perform a required step to protect the public health and safety. Which one of the following conditions must be met to depart from the EOP?

a. The plant manager must approve the departure within 1 hour and at least one other operating procedure provides general guidance.

b. There is no other action that could be taken and a licensed senior reactor operator approves the departure before it's taken.

c. One member of plant management and a licensed senior reactor operator approve the change within 4 hours of the departure.

d. Two senior reactor operators approve the departure before it's taken and the action complies with the general requirements of the FSAR.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Plant manager is NOT required and the plant manager may NOT have the required SRO license, approval must be given before the action is taken.

c. The member of plant management is not required and approval must occur before the action is taken.

d. There can NOT be any action consistent with the condition that provides adequate protection immediately apparent and only one SRO is needed.

Technical Reference(s): GAP-OPS-01, Section 3.13.2.c

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	10CFR55.41.10	
	10CFR55.45.12	

Comments:

Attachment 3

RO WRITTEN EXAM W/ANSWER KEY

Question # SRO 1

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295003 AK1.06
	Importance Rating	4.0

Knowledge of the operational implications of the following concepts as they apply to the PARTIAL OR COMPLETE LOSS OF A.C. POWER: Station Blackout.
PRA: Respond to loss of offsite and onsite power.

Proposed Question:

The plant is operating at 100% power when the following occur:

- Both 115 KV lines are lost
- EDG 102 and EDG 103 will NOT start
- PB 11 and PB 12 are lost

Per the Special Operating Procedures, which one of the following describes the use of the Emergency Condenser (EC) 11 and 12 once reactor pressure is less than 1000 psig?

a. Using both EC 11 and EC 12, maintain reactor pressure between 800 and 1000 psig.

b. Using only EC 11 or EC 12, lower reactor pressure at a cooldown rate up to the TS limit of ≤100°F/hr.

c. Using both EC 11 and EC 12, reduce reactor pressure but the cooldown rate must be maintained ≤75°F/hr.

d. Using only EC 11 or EC 12, lower reactor pressure at the maximum capability of the EC until RPV water level is between +5 and +53 inches.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. During a SBO, the reactor must be depressurized within the TS cooldown limit. Maintaining the reactor at pressure is not appropriate.

c. Both the SOP and the OP require that one EC be removed from service and the cooldown performed using only one EC. The cooldown rate is not limited to 75°F per the SOP; this is a limitation in the OP which can be overridden by the SSS. Also, the limitation of the SOP is the TS rate of 100°F/hr.

d. Lowering reactor pressure at the maximum capability of one EC will exceed the TS cooldown limit. Although +5" (Lo-Lo RPV level) is the level at which RWCU is verified closed, it is plausible since at this level a candidate may determine that the cooldown rate must be slowed to permit establishing makeup to the RPV.

Technical Reference(s): N1-SOP-18, Rev 05

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-207-1-01, EO-7c, 9, 12	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	43.5	

Comments:

Question # RO 2 SRO 2

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295006	295006
		2.4.11	2.4.11
	Importance Rating	3.4	3.6
Knowledge of abnormal condition procedures.			

Proposed Question:

N1-SOP-1, REACTOR SCRAM, requires verifying all rods inserted to position 04 or beyond. In accordance with this SOP which one of the following methods is used to make this verification if the Full Core Display is inoperative?

a. All control rod individual blue scram lights are lit.

b. Negative reactor period indication from the SRMs.

c. F3, 1-4, SCRAM DUMP VOLUME WTR LVL HIGH alarms.

d. All RODS IN light illuminated on the Remote Shutdown Panel.

Proposed Answer: d.

Explanation (Justification of Distractors):
a. This indicates scram valve position not rod position
b. Power lowering only won't tell control rod positions
c. Indicates water has entered the SDV but does not tell rod positions.

Technical Reference(s): N1-SOP-01, page 5
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10 43.5 45.13	
Comments:		

Question # RO 3 SRO 3

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295007 AK3.05	295007 AK3.05
	Importance Rating	3.0	3.2

Knowledge of the reasons for the following responses as they apply to HIGH REACTOR PRESSURE: Low Pressure System Isolation

Proposed Question:

The plant is shutdown and Shutdown Cooling (SDC) is in service. As pressure rises which one if the following describes how SDC is protected from over-pressurization?

a. SDC pumps trip and SDC inboard isolation valve (38-01) isolates.

b. SDC pumps trip, SDC inboard and outboard valves (38-01 & 38-02) isolate.

c. SDC pumps do NOT trip, but SDC inboard and outboard valves (38-01 & 38-02) isolate.

d. SDC pumps trip, but SDC does NOT isolate, relief valves open to control system pressure.

Proposed Answer: d. The SDC system is protected against over-pressurization by an interlock on the isolation valves that does not permit opening more than one valve above 120 psig. This interlock does not automatically isolate the system, in the event temperature rises to about the saturation temperature for 120 psig (about 350°F) the pumps trip and over-pressurization protection is provided by relief valves.

Explanation (Justification of Distractors):

a. Valves close on high space temperature indicative of a leak, although interlocked to open on pressure there are no auto closures on system pressure or temperature.
b. There are no valve closures on high system pressure or temperature.
c. The pumps trip on high temperature, the SDC valves do NOT close on high temperature or pressure.

Technical Reference(s): N1-OP-4, Sect. D.5.0
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 1
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # RO 4 SRO 4

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295009 AK2.01	259009 AK2.01
	Importance Rating	3.9	4.0

Knowledge of interrelations between LOW REACTOR WATER LEVEL and the following: Reactor Water Level Indication

Proposed Question:

During a LOCA an operator closes all the recirculation pump discharge valves in an attempt to isolate the break. Reactor parameters have the following indications:

- All rods have inserted
- APRMs are downscale
- Narrow Range level is 53 inches and slowly lowering
- RPV pressure is 667 psig and slowly lowering

Which one of the following lists the reactor water level instrumentation that provides an accurate indication of reactor water level in this situation?

a. Only Narrow Range and Fuel Zone

b. Only Lo Lo Lo and Fuel Zone instruments

c. Narrow Range, Wide Range and Vessel Flange

d. Lo Lo Lo Range, Wide Range and Vessel Flange

Proposed Answer: b. The lower taps for these instruments come from the Liquid Poison penetration and the core spray sparger, both of which are inside the shroud. All other instruments are isolated from the area inside the shroud and are inaccurate for determining actual core level because communication between the core and annulus region was stopped when the recirc pump discharge valves were closed.

Explanation (Justification of Distractors):

a. Narrow range cannot tell level inside the shroud with level below the tops of the steam separator stand pipes and the recirc loops isolated.
c. Narrow range and wide range cannot tell level inside the shroud with level below the tops of the steam separator stand pipes and the recirc loops isolated. Vessel flange range is way above the current level.
d. Wide range cannot tell level inside the shroud with level below the tops of the steam separator stand pipes and the recirc loops isolated. Vessel flange range is way above the current level.

Technical Reference(s): (Attach if not previously provided)	N1-ODP-PRO-0305, EOPSAP Technical Bases C-18015-C, Reactor Vessel Instrumentation P & I Diagram

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7 45.8	

Comments:

Question # SRO 5

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295009 AA1.03
	Importance Rating	3.1
Ability to operate and/or monitor the following as they apply to LOW REACTOR WATER LEVEL: Recirculation System		

Proposed Question:

The plant is operating at 80% power with the following conditions:

- A power ascension using recirculation flow is in progress.
- Feedwater pumps 11 and 13 are operating.
- Feedwater Pump 12 is marked up out of service for maintenance.

Subsequently:

- Feedwater Pump 11 trips
- H3-1-7, REACTOR FW PUMP 11 TRIP OVERLOAD SUCTION HI-LEVEL, alarms
- F2-3-3, REACTOR VESSEL LEVEL HIGH-LOW, alarms

Per the Alarm Response Procedures, which one of the following actions is the ASSS required to direct?

a. Manually scram the reactor and enter N1-SOP-1.

b. Take manual control of feedwater and restore RPV level.

c. Insert cram rods to reduce reactor power and control RPV level.

d. Use recirc flow to lower reactor power within the feed flow capability.

Proposed Answer: d. The required action is to reduce power to remain within the capability of the running Feedwater Pumps.

Explanation (Justification of Distractors):

a. A reactor scram is required only if the automatic scram is imminent, however, the correct action of lowering reactor power using recirc flow will reduce the feed flow requirements to within the capability of the operating shaft driven feedwater pump. If a reactor scram did occur, then entry into N1-SOP-1 is required.
b. Taking manual control is an appropriate action only if the system is misoperating. There is NO indication that the Feedwater Control System is malfunctioning. Only a Feedwater Pump trip has occurred.
c. Cram rods insertion will reduce reactor power but not soon enough to avoid the reactor scram. The alarm procedures direct using recirc flow which provides a more rapid response to the event and is therefore more effective in restoring RPV level.

Technical Reference(s): N1-ARP-H3, 1-7, Rev 03
N1-ARP-F2, 3-3, Rev 03

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	43. (b) item 5	

Comments:

Question # RO 5 SRO 6

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295010 AK2.05	295010 AK2.05
	Importance Rating	3.7	3.8
Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Drywell Cooling and Ventilation			

Proposed Question:

During a LOCA which one of the following describes when the Drywell Air Coolers must be secured?

a. Prior to venting the primary containment through the stack.

b. Prior to venting the primary containment through RBEVs.

c. Drywell Temperature is 230°F and torus pressure is 14 psig.

d. Drywell temperature is approaching 300°F and drywell pressure is 5 psig.

Proposed Answer: c.

Explanation (Justification of Distractors):
a. Drywell coolers should remain in service during venting
b. Drywell coolers should remain in service during venting
d. This condition is outside the containment spray limit, since sprays cannot be used the coolers remain in service.

Technical Reference(s): EOP-4, PRIMARY CONTAINMENT CONTROL
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:		
Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 20 SRO 7

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295013 AA1.01	295013 AA1.01
	Importance Rating	3.8	3.9

Ability to operate and/or monitor the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE: Suppression Pool Cooling.
PRA: Startup Containment Spray in Torus Cooling.

Proposed Question:

Given the following conditions:

At time = 0 seconds:
- ERV 111 opens with the plant at 98% power.

At time = 1 minute:
- Drywell pressure has risen to 1.5 psig and is rising slowly.
- Drywell average temperature has risen to 135°F and is rising slowly.

At time = 2 minutes:
- ERV 111 is determined to be stuck open.
- Drywell average temperature is 152°F and rising.
- Drywell pressure is 1.6 psig and rising slowly.
- Torus water temperature is 80°F and rising.

Which one of the following describes the required operator action?

a. Initiate Torus cooling in accordance with OP-14, Containment Spray System.

b. Place Containment Spray System in Torus Cooling per EOP-1, NMP1 EOP Support Procedure.

c. When Torus temperature reaches 95°F enter EOP-4, Primary Containment Control and take appropriate actions.

d. Continue actions to close ERV 111, when Torus temperature reaches 120°F scram the reactor and enter EOP-2, RPV Control.

Proposed Answer: b. EOP-4 was entered at 150°F drywell temp, Torus Cooling should be started immediately to attempt to maintain Torus temps below 85°F.

Explanation (Justification of Distractors):

a. Already in EOP-4 due to Bulk DW Temp 150°F, Torus Cooling is started in accordance step TT-2 of EOP-4. (the OP directs using Cont. Spray pump 111 and includes local valve operation (93-65), the EOP allows other loops to be used and does not include local operations).

c. EOP-4 has already been entered (DW average temp >150°F) waiting is not required or appropriate.

d. Torus cooling must be started first and reactor should be scrammed before Torus temperature reaches 120°F.

Technical Reference(s): EOP-4, EOP-1, OP-1, Sect. H.8
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

All EOPs without entry conditions

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.6	

Comments:

Question # RO 6 SRO 8

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295014 A2.03	295014 A2.03
	Importance Rating	4.0	4.3

Ability to determine and/or interpret the following as they apply to INADVERTENT REACTIVITY ADDITION: Cause of reactivity addition.

Proposed Question:

The plant is operating steady state at 100% power with five (5) recirculation pumps in service. The following indications are observed:

- Reactor power lowers
- Recirc suction temperature is constant
- Core d/p lowers
- Total recirc flow rises

Which one of the following failures caused these indications?

a. One (1) recirculation pump has tripped.

b. The core shroud has separated below the core plate.

c. One (1) recirculation pumps speed has raised to maximum.

d. A core shroud separation has occurred between the core plate and top guide.

Proposed Answer: b. A separation has occurred below the core plate that allows recirc flow to bypass the core, this lowering of recirc pump head loss causes flow to rise and power to lower, with a lowering of core d/p.

Explanation (Justification of Distractors):

a. Reactor power would NOT rise and core d/p would lower

c. Power would rise and core d/p would rise

d. Total recirc flow would rise and recirc suction temperature would rise.

Technical Reference(s): N1-SOP-2, Rev 07, Page 4, Page 5
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.10	
	43.5	
	45.13	

Comments:

Question # SRO 9

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295014 AK2.06
	Importance Rating	3.5
Knowledge of the interrelations between INADVERTENT REACTIVITY ADDITION and the following: moderator temperature.		

Proposed Question:

The plant is at 85% power when the following annunciators are received:

- Feedwater HTR 131-135 LEVEL HIGH
- Feedwater HTR 131-135 LEVEL HIGH-HIGH

It is determined that the high level exists in heater 134. The high-high level CANNOT be restored to normal using the level control valve.

Which one of the following describes the required operator action including the reason for the action?

a. Lower reactor recirc flow to compensate for the colder feedwater. Remove the affected feedwater heater string from service.

b. Lower reactor recirc flow to reduce feedwater flow and prevent heater over-pressurization. Notify engineering to raise the MCPR limit.

c. Insert cram rods to compensate for the reduced feedwater heating. Remove the 5th stage feedwater heater from service.

d. Scram the reactor because the feedwater temperature reduction will exceed 100°F. Execute N1-SOP-01, Reactor Scram, concurrently.

Proposed Answer: a.

Explanation (Justification of Distractors):

b. Lowering recirc flow is done to lower power, heater over-pressurization is not a concern.
c. Emergency power reduction requires that recirculation flow be adjusted before inserting cram rods. For this failure, it will not be necessary to insert cram rods.
d. The feedwater temperature change resulting from this failure including performance of the required ARP, SOP, and OP actions will not result in a 100°F feedwater temperature decrease.

Technical Reference(s): N1-ARP-H3, 3-4, 3-5
N1-OP-16, H.5.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	43. (b) 5 SRO must assess impact of high level, determine response and direct removal of equipment from service. 45.8	

Comments:

Question # RO 7 SRO 10

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295015 AK2.04	295015 AK2.04
	Importance Rating	4.0	4.1
Knowledge of the interrelations between INCOMPLETE SCRAM and the following: RPS			

Proposed Question:

Given the following conditions:

- The plant has experienced a failure to scram
- 48 rods remain partially or fully withdrawn
- RPS scram pilot valve power lights are off
- RPV level is stable at 57 inches
- RPV pressure is 920 psig and being controlled by the bypass valves
- Scram air header pressure is currently 0 psig

Which of the following describes the actions required by N1-EOP-3.1, Alternate Control Rod Insertion, to insert the remaining control rods?

a. Insert repeated manual scram signals.

b. Manually initiate Alternate Rod Insertion.

c. Pull RPS fuses in cabinets 1S-53 and 1S-55.

d. Perform individual rod scrams from the M panel.

Proposed Answer: a. Manual scram worked partially already, scram air pressure is 0, SDV volume is causing a hydraulic lock, the scram must be reset to drain the SDV.

Explanation (Justification of Distractors):
b. This would depressurize the scram air header but will not drain the SDV which is the indicated cause of the failure to scram.
c. This would de-energize the scram solenoids, but it does not drain the SDV
d. Step also de-energizes RPS, which is already done, but it does not drain the

d. Step also de-energizes RPS, which is already done, but it does not drain the SDV.

Technical Reference(s): (Attach if not previously provided)	N1-EOP-3.1, ALTERNATE CONTROL ROD INSERTION

Proposed references to be provided to applicants during the examination:

None

Learning Objective:	01-OPS-006-344-1-11 EO 1.2	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.8	

Comments:

Question # RO 21 SRO 11

Examination Outline Cross-Reference	Level	RO	RO
	Tier #	1	1
	Group #	2	1
	K/A #	295016 AA1.01	295016 AA1.01
	Importance Rating	3.8	3.9
Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: RPS			

Proposed Question:

A fire has necessitated a Control Room evacuation. Control Room actions have been taken, however, the reactor does NOT scram. The CSO has announced the Control Room evacuation.

Considering the above conditions, which one of the following actions is required to be performed by the CSO per N1-SOP-9.1, Control Room Evacuation, to initiate control rod movement?

a. When directed by the ASSS, place MG 141 Switch to TRIP position, Direct NAOE to place MG131 Switch to the TRIP position, confirm CONTROL RODS IN white light lit.

b. Direct the NAOE to remove the pilot scram valve fuses from cabinets 1S-53 and 1S-55 in the Auxiliary Control Room. Then locally verify lowering scram air header pressure.

c. Direct the NAOE to manually vent the Scram Air Header by opening 113-230, SCRAM AIR HEADER EMERGENCY VENT VALVE. Confirm scram valves at HCUs open.

d. When directed by the ASSS place UPS 172 A and B supply breaker to RPS 12 to OPEN, Direct NAOE to place UPS 162 A and B supply breaker to RPS 11 to OPEN, Verify control rod movement by observing scram accumulator pressures at the HCUs.

Proposed Answer: a. Per N1-SOP-9.1

Explanation (Justification of Distractors):

b. These fuses are in the Auxiliary Control Room and are not accessible. The scram is confirmed by verifying the CONTROL RODS IN white light is lit.
c. The CSO goes to the MG 141 Switch, NAOE to MG 131.
d. Do not want to trip the logics, this would cause isolations and initiations, HCU pressures are not used for scram validation.

Technical Reference(s): N1-SOP-9.1, Control Room Evacuation
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.6	

Comments:

Question # SRO 12

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295016 AA1.09
	Importance Rating	4.0
Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: Isolation/Emergency Condenser(s): plant-specific		
PRA: Initiate emergency condenser from remote shutdown panel #11, #12.		

Proposed Question:

A plant fire requires that the Control Room be evacuated. In accordance with N1-SOP-9.1, Control Room Evacuation, which one of the following operations personnel is directed to control the cool down rate using EC 11?

a. CSO

b. NAOC

c. In-Plant E

d. Control Room E

Proposed Answer: d. Control Room E performs the RSP #11 actions including the operation of EC 11.

Explanation (Justification of Distractors):

a. CSO performs the RSP #12 actions including the operation of EC 12. EC 12 which is not available.

b. NAOC performs actions for vessel isolations, manual FW control, fire water injection to the RPV, and EC makeup.

c. In-Plant E proceeds performs actions at PB11, PB12, DG PB rooms, and battery load shedding if required.

Technical Reference(s): N1-SOP-9.1, Rev 04, (Control Room E actions)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	43.(b).5 SRO must direct crew members without reference to a procedure and ensure they get to there locations in a timely manner.	

Comments:

Question # RO 22 SRO 13

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	1	1
	Group #	2	1
	K/A #	295017 AK3.04	295017 AK3.04
	Importance Rating	3.6	3.8

Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Power Reduction

Proposed Question:

The plant is operating at 75% power when the following alarm is received:

- H1-1-7, OFF GAS HIGH RADIATION alarm

Per the Alarm Response Procedures, which one of the following describes the required operator action(s) if Chemistry confirms the high radiation?

a. Enter N1-EOP-6, Radioactivity Release Control, and verify the turbine building roof vents are closed.

b. Enter N1-EOP-5, Secondary Containment Control, and verify ventilation system isolations and actuations.

c. Reduce reactor power to near the top of the restricted zone and commence a normal shutdown per N1-OP-43.

d. Lower recirc flow to 38 x 10^6 lb/hr, then scram the reactor and place both Off-Gas Vacuum Pumps in Parallel per N1-OP-25.

Proposed Answer: c. Per ARP and EOP Bases, Lowering reactor power normally may reduce the offgas radiation levels avoiding a unit shutdown.

Explanation (Justification of Distractors):

a. Only entered if release rate reaches alert levels. No alarm given to indicate high release rates.

b. Only entered if a Reactor Building ARM alarms. No alarm given to indicate high radiation levels in the Reactor Building.

d. This is not an appropriate action for this condition. Offgas radiation levels may indicate fuel failure. Inserting a scram may make the leak worse and cause additional fuel failure.

Technical Reference(s): N1-ARP-H1, Ann H1 (1-7) and EOP-6 bases
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.5	
	45.6	

Comments:

Question # SRO 14

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295003 AA2.02
	Importance Rating	4.3
Ability to determine and interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF AC POWER: Reactor power / pressure / and level.		

Proposed Question:

The plant is at 100% power when a loss of Power Board 11 occurs. Conditions after the power loss are:

- Reactor power is 45%
- Generator Mwe are slowly rising and lowering
- TCV Positions are cycling
- APRM indications are cycling 12% but the peaks are at different times
- Thirty (30) seconds after the power loss LPRM upscale alarms occur at a constant frequency

Per N1-SOP-02, Unplanned Reactor Power Change, which one of the following describes the required actions? Reactor Recirculation

AB 7/21/05

a. Raise operating ~~RCS~~ pump speeds to raise core flow.

b. Continue to monitor nuclear instruments and insert cram rods.

c. Immediately position the Reactor Mode Switch to SHUTDOWN.

d. Scram the reactor when LPRM upscale and downscale alarms occur simultaneously.

Proposed Answer: c. Thermal hydraulic instability is detected requiring a manual reactor scram and entry into SOP-1.

Explanation (Justification of Distractors):
a. This action is appropriate if power oscillations are not present to exit the restricted area. Power oscillations are present requiring a reactor scram.
b. This action is appropriate if power oscillations are not present and recirc flow has been adjusted. Power oscillations are present requiring a reactor scram.
d. Upscale or downscale alarms are all that are required for THI.

Technical Reference(s): N1-SOP-2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	2
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.10	
	43.5	
	45.13	

Comments:

Question # RO 34 SRO 15

Examination Outline Cross-Reference	Level	50	SRO
	Tier #	1	1
	Group #	3	1
	K/A #	295023 AA2.04	295023 AA2.04
	Importance Rating	3.4	4.1

† Ability to determine and interpret the following as they apply to REFUELING ACCIDENTS: Occurrence of fuel handling accident.

Proposed Question:

The plant is in a refueling outage ready to start the core offload.

- A new fuel assembly was just released in the fuel preparation machine.
- Before the fuel preparation machine is lowered, the refueling floor SRO observes that spent fuel pool level is lowering.

Per N1-SOP-20, LOSS OF SFP LEVEL, which one of the following states the **INITIAL** point at which evacuation of ALL personnel from the refuel floor is required?

a. When the radiation monitor on the Refueling Bridge alarms.

b. When the fuel pool water level is at the top of the fuel pool racks.

c. When the assembly in the fuel prep machine becomes uncovered.

d. When the fuel pool water level lowers to the FSAR limit of 24 feet.

Proposed Answer: a. While executing the steps of N1-SOP-20, if an irradiated fuel bundle has been uncovered or if the Refueling Bridge high radiation alarm sounds, then the 340' elevation of the reactor building must be evacuated. Until either of these conditions are present, the only requirement is to evacuate only unnecessary personnel, not all personnel.

Explanation (Justification of Distractors):

b. Although irradiated fuel will become uncovered, the refueling bridge high radiation alarm will have already sounded. The question asks for the initial point, which will be high radiation.
c. Uncovering a new fuel assembly will not provide any radiological hazard and does not require evacuation of all personnel. If the fuel assembly in the fuel preparation machine were an irradiated fuel assembly, then this response would be correct.
d. The conditions requiring a complete evacuation of the refuel floor are independent of the spent fuel pool level, although level will determine the shielding available and ultimately the conditions for evacuation.

Technical Reference(s): N1-SOP-20, Rev 04, Override Step

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-233-1-01, EO-8	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10, 43.5, 45.13	

Comments:

Question # SRO 16

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295024 EA2.01
	Importance Rating	4.4
Ability to determine and interpret the following as they apply to HIGH DRYWELL PRESSURE: Drywell Pressure		

Proposed Question:

Following a steam line break in the Drywell, all level instruments were lost and EOP-7, RPV Flooding, was entered. It was not possible to open any ERVs so the SAPs were entered.

The Primary Containment is being flooded with the Fire Water system per EOP-1, attachment 19. The following conditions exist:

- All rods were inserted 10 hours ago
- There are no indications of core damage
- Fire water injection flow rate is 27.7 x 10^4 lbm/hr
- RPV pressure is 15 psig and steady
- Torus pressure is 44 psig and slowly rising
- Containment level is 80 feet and rising
- Liquid Poison #11 and both CRD pumps are injecting

JB 7/21/06

Per the SAP's, Which one of the following actions is required?

a. Vent the primary containment while injecting with fire water.

b. Stop fire water injection but do not vent the primary containment.

c. Stop all sources that are injecting into the primary containment.

d. Stop fire water injection and then vent the primary containment.

Proposed Answer: a. SAP-1 flowchart directs the use of leg 6, Outside PSP, Figure L. Because of the fire water injection, the Minimum Debris Retention Injection Rate is met (Detail Y). Torus pressure is 44 psig which is well above PSP. In this leg if we are approaching or above the PCP limit (Figure D) it requires venting the PC.

Explanation (Justification of Distractors):

b. If legs 2, 3 or 4 are entered this could be interpreted as the correct step if you believe the fire water system injects directly into the PC but it injects into the feed water discharge header to the RPV first. Legs 2, 3, and 4 are not entered. This requires determining that RPV injection is below the Minimum Debris Retention Rate which it is Detail Y). Legs 1 and 5 do not allow venting, if these legs are entered venting is not an option.

c. This paraphrases the step in the procedure for legs 2, 3, and 4 and is incorrect for the same reasons as b. Additionally if the assumption is made that all injection must be stopped, this is incorrect because injection into the RPV is a priority. Legs 1 and 5 do not allow venting, if these legs are entered venting is not an option.

d. Since pressure is above the PCP limit (44 psig vs. 43 psig) Leg D directs venting and stopping injection if you "still" cannot stay below the PCP limit. "Still" implies venting should be tried first. The bases states that "If venting is ineffective" then stop injection. In this case venting is required first.

Technical Reference(s): N1-SAP-1, Primary Containment Flooding
N1-ODP-PRO-0305, EOP/SAP Technical Bases

Proposed references to be provided to applicants during the examination:

All EOPs and SAPs with the entry conditions removed

Learning Objective:

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 3
10 CFR Part 55 Content:	43.5 45.13	

Comments:

Question # SRO 17

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295024 EK3.04
	Importance Rating	4.1
Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL PRESSURE: Emergency Depressurization		

Proposed Question:

Given the following conditions:

- A LOCA has occurred inside the Drywell
- Torus water level is 10.5 ft and steady
- Torus pressure is 18 psig and rising steadily
- Torus water temperature is 120°F and slowly rising
- RPV pressure is 600 psig and slowly lowering

Per N1-ODP-PRO-0305, EOP/SAP Technical Bases, which of the following is the basis for performing an RPV Blowdown?

a. Permit ERV operation without exceeding the torus boundary load.

b. Prevent exceeding allowable downcomer stresses on high d/p.

c. Remove primary system heat while sufficient heat capacity exists.

d. Lower pressure before the torus vent downcomers are uncovered.

Proposed Answer: a. (about to exceed PSP)

Explanation (Justification of Distractors):
b. This is a basis for ERV tailpipe limit and does not apply to downcomers
c. Sufficient heat capacity exists see fig M on EOP-4
d. 10.5 ft is the Tech Spec. minimum level

Technical Reference(s): EOP Bases attached
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs without entry conditions

Learning Objective:

Question Source:

Bank No.
Modified Bank #
New — New

Question History:

Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:

Memory of Fundamental Knowledge
Comprehension or Analysis — 3

10 CFR Part 55 Content: 43. (b) item 5

Comments: SRO only: Requires application of the knowledge of the EOP Curve Bases to determine how plant parameters challenge those bases.

Question # SRO 18

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295025 EA1.03
	Importance Rating	4.4
Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: Safety Relief Valves		

Proposed Question:

Following an ATWS, conditions required entering EOP-8, RPV BLOWDOWN. Fifty (50) seconds after initiating the blowdown one (1) of the ERVs has closed. Reactor pressure is 103 psig and lowering. Which one of the following actions is required?

a. Verify emergency condensers in service and continue the RPV blowdown with the two (2) remaining open ERVs.

b. Leave the two (2) remaining ERVs open. Manually open other ERVs as necessary to maintain at least three (3) open.

c. If shutdown cooling is available place it in service with the two (2) remaining open ERVs and continue the RPV blowdown.

d. If two (2) ERVs remain open and RPV pressure is lowering, ensure the remaining ERVs remain open and continue the RPV blowdown.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. ECs were placed in service prior to opening ERVs, three ERVs are still required above 72 psig.

c. Shutdown cooling can not be placed in service until after the steps in the previous hold point are met and they are not met.

d. EOP requires opening another ERV or using another blowdown system until pressure is less than 72 psig.

Technical Reference(s): (Attach if not previously provided)	EOP-8, RPV Blowdown, N1-ODP-PRO-0305, EOP/SAP Technical Bases, Sect. 1.11

Proposed references to be provided to applicants during the examination:

All EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	43. (b) item 5	
	45.6	

Comments:

Question # RO 27 SRO 19

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295026 EK1.01	295026 EK1.01
	Importance Rating	3.0	3.4
Knowledge of the operational implications of the following concepts as they apply to the SUPPRESSION POOL HIGH WATER TEMPERATURE: Pump NPSH			

Proposed Question:

During a Loss of Coolant Accident, Core Spray pumps 111 and 112 are required to maintain reactor water level. The following conditions exist:

- Torus water level 11.5 feet
- Torus pressure 2.1 psig
- Torus temperature 198°F
- Containment Spray pumps secured

Which one of the following is the MAXIMUM allowable Core Spray pump flow?

a. 200×10^4 lbm/hr

b. 310×10^4 lbm/hr

c. 350×10^4 lbm/hr

d. 460×10^4 lbm/hr

Proposed Answer: c. $2.1 + 0.433(11.5 - 4.5) = 5.131$ on the curve at 198°F this corresponds to 350×10^4 lbm/hr

Explanation (Justification of Distractors):
a. Flow limit is 0 over-pressure is calculated
b. Flow if 3 psig is used and estimated on the curve
d. Flow if the 10 psig over-pressure curve is used.

Technical Reference(s): EOP-2, N1 Core Spray NPSH Limit
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with entry conditions removed

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.8 to 41.10	

Comments:

Question # RO 30 SRO 20

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295030 EK2.07	295030 EK2.07
	Importance Rating	3.5	3.8
Knowledge of the interrelations between LOW SUPPRESSION POOL WATER LEVEL and the following: Downcomer/Horizontal Vent Submergence			

Proposed Question:

In the Torus Level Leg of EOP-4, Primary Containment Control, Step TL-3 allows lowering the level band if level CANNOT be maintained within the Technical Specification band.

Which one of the following describes the N1-ODP-PRO-0305, EOP/SAP Technical Bases reason for this lower limit on the level band?

a. Lower the heat input to containment before taking the actions.

b. Provide time to try to control torus level to avoid an RPV blowdown.

c. Extend the time that is permitted to use the torus as a heat sink.

d. Allow depressurization by other means to avoid ERV operation.

Proposed Answer: b. The delay in the requirement of Step TL-3 to perform additional actions (scram, EOP-2, blowdown) is to continue actions to maintain torus water level > 8 feet.

Explanation (Justification of Distractors):

a. Scramming the reactor reduces the rate of energy production and the heat input to the drywell. A reactor scram is not required until the determination is made that level cannot be maintained above 8 feet. This action is one of the required actions that is being delayed.

c. This is not a consideration in the delay before the actions are required.

d. There is no entry condition for EOP-2, so alternate depressurization is not an option.

Technical Reference(s): N1-ODP-PRO-0305, EOP/SAP Technical Bases
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 10 SRO 21

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295031 EA2.04	295031 EA2.04
	Importance Rating	4.6	4.8

Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL: Adequate Core Cooling

Proposed Question:

Given the following conditions:

- RPV Blowdown has been initiated
- The plant has experienced a LOCA with a loss of ALL injection.
- RPV water level has lowered to –115 inches (ACTUAL LEVEL).

Which one of the following is the status of core cooling?

a. Adequate core cooling exists at this RPV water level.

b. RPV water level must be raised 7 inches to establish adequate core cooling.

c. Establishing Liquid Poison or CRD injection will assure adequate core cooling.

d. Adequate core cooling can only be established after the ERVs have closed.

Proposed Answer: a. At levels above –121inches with no injection there is sufficient steam flow to provide adequate core cooling.

Explanation (Justification of Distractors):

b. RPV level does not have to be raised to 109".

c. Just establishing injection will not assure adequate core cooling, level must also be restored to >109".

d. Adequate core cooling can be established by establishing injection and restoring level.

Technical Reference(s):	EOP Bases Section 1.3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	new
Question History:	Previous NRC Exam	Q
	Previous Test / Quiz	Q
		Q
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.10	
	45.3	
	45.13	

Comments:

Question # SRO 22

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295031 EK3.04
	Importance Rating	4.3
† Knowledge of the reasons for the following responses as they apply to REACTOR LOW WATER LEVEL: Steam cooling.		

Proposed Question:

While executing N1-EOP-2, RPV Control, the SSS determines that due to a very low RPV level it is necessary to enter N1-EOP-9, Steam Cooling. Which one of the following describes the bases for executing this strategy?

Entering N1-EOP-9, Steam Cooling...

a. permits fuel clad temperatures to rise to the threshold for fuel rod perforation to maximize heat transfer.

b. permits fuel clad temperatures to rise to the threshold for the metal-water reaction to maximize heat transfer.

c. maximizes the time that reactor level is above the Minimum Steam Cooling RPV Water Level for alignment of injection sources.

d. maximizes the time that reactor level is above the minimum water level required to use EC 11/12 while aligning injection sources.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. This threshold for fuel rod perforation is 1500°F. Steam cooling EOP allows fuel cal temperatures to rise to 1800°F, the threshold for the metal-water reaction.

b. It maximizes the time that the reactor water level remains above the Minimum Zero Injection Water Level (-121 inches), not the Minimum Steam Cooling RPV Water Level (-109 inches). Steam cooling allows reactor water level to continue to lower below -109 inches.

c.

d. The basis for steam cooling is decay heat removal by permitting fuel clad temperature and transfers more heat to the steam passing through the reactor core. This strategy (mechanism for cooling) is independent of the Emergency Condensers and can be accomplished without the Emergency Condensers in service.

Technical Reference(s): N1-ODP-PRO-0305, Section 1.3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-006-344-1-09, EO-1.5	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	43.(b) item 5 45.6	

Comments:

Question # RO 12 SRO 23

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295037 EK3.02	295037 EK3.02
	Importance Rating	4.3	4.5
Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: SBCL Injection			

Proposed Question:

Given the following conditions:

- The plant has experienced a failure to scram, reactor power is 7%
- Fuel Zone level indicates -51 inches
- RPV Pressure is 1015 psig and slowly lowering
- The MSIVs are shut and both Emergency Condensers have failed
- Containment Spray loop 111 is operating in Torus Cooling mode; Torus temperature is 106°F and rising at 2°F/min
- ERV "113" is stuck open
- Drywell pressure is 0.8 psig

Which one of the following describes the required actions?

a. Enter N1-EOP-8 and perform an RPV blowdown.

b. Initiate boron injection with the Liquid Poison System.

c. Maintain RPV water level between this level and -41inches.

d. Open ERVs to control RPV pressure between 965 and 1080 psig.

Proposed Answer: b. Torus Water Temp cannot be maintained below 110°F boron injection is required to shutdown the reactor before HCTL is exceeded

Explanation (Justification of Distractors):

a. Torus will exceed 110°F before HCTL, level reductions can lower power and heat input to the suppression pool to help remain below HCTL
c. Level would be lowered to between -41" and -84", the current level is –51" indicated which is -40" actual, level must be lowered more in accordance with procedure to lower power and lower heat input to the suppression pool.
d. Opening ERVs is NOT required for pressure control with this band. (A single ERV open will pass 7% steam flow)

Technical Reference(s): EOP-3, Failure to Scram
(Attach if not previously provided) EOP-Bases, Sect. 1.5

Proposed references to be provided to applicants during the examination:

EOPs without entry conditions

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.5
45.6

Comments:

Question # RO 11 SRO 24

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295037 EK1.07	295037 EK1.07
	Importance Rating	3.4	3.8

Knowledge of the operational implications of the following concepts as they apply to the SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Shutdown Margin

Proposed Question:

Immediately following a reactor scram, it is determined that seven (7) control rods located throughout the core are stuck between positions 06 and 34.

In accordance with N1-EOP-3, Failure to Scram, which one of the following describes the condition allowing exit from EOP-3?

a. Cold shutdown boron weight has been injected into the reactor core

b. Reactor power will remain below 3% under all conditions without boron.

c. The reactor will remain shutdown with Shutdown Cooling system in service.

d. When six (6) of the seven (7) control rods are fully inserted into the reactor core.

Proposed Answer: d. Per Tech. Specs. 3.1.1.a Reactivity Limitations – core loading, the reactor must be maintained subcritical with the most reactive rod fully withdrawn from the core. This meets the criteria for determining that the reactor will remain shutdown in the EOP Bases.

Explanation (Justification of Distractors):

a. Injection of cold shutdown boron weight only allows cooling down NOT exit from the procedure.

b. This condition does NOT indicate the reactor is shutdown, a requirement for exiting the procedure.

c. This is not a bases for exiting the procedure unless it has been determined the reactor will remain shutdown without boron.

Technical Reference(s): (Attach if not previously provided)	EOP Bases, Sect. 1.5 T.S. 3.1.1.a

Proposed references to be provided to applicants during the examination:

EOPs with out entry conditions

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.8, 41.9, 41.10	

Comments:

Question # SRO 25

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295038 2.3.9
	Importance Rating	3.4
Knowledge of the process for performing a containment purge.		

Proposed Question:

During a LOCA the following containment conditions exist:

- Drywell Pressure is 40 psig and slowly rising
- Torus Pressure is 39 psig and slowly rising
- Torus Level is 15 feet and stable

The SSS has been decided to vent the primary containment to avoid exceeding any containment limits. Which one of the following describes the action required for these conditions?

a. Vent the Torus using the Emergency Ventilation System.

b. Vent the Drywell using the Emergency Ventilation System.

c. Vent the Torus using the Drywell and Torus Vent and Purge Fan.

d. Vent the Drywell using the Drywell and Torus Vent and Purge Fan.

Proposed Answer: c. Per N1-EOP-PCC, Primary Containment Control, Step PCP-8: If torus level is < 27', then vent the torus using EOP-4.1, Section 2. If torus level is > 27' or if the torus cannot be vented, then vent the drywell using EOP-4.1, Section 4. There are no challenges that prevent venting from the torus. EOP-4.1 must be referenced to determine how to vent the specified area. EOP-4.1, Section 2, is venting using the Drywell and Torus Vent and Purge Fan.

Explanation (Justification of Distractors):

a. The EVS is only used at a lower torus pressure and when EOP-4.2, Hydrogen Control, has been entered.
b. The EVS is only used at a lower torus pressure and when EOP-4.2, Hydrogen Control, has been entered.
d. If torus level is > 27' or if the torus cannot be vented, then vent the drywell using EOP-4.1, Section 4. There are no challenges that prevent venting from the torus. Torus level is below 27'.

Technical Reference(s): N1-EOP-4, Step PCP-8
N1-EOP-4.1, Section 2
N1-EOP-4.1, Section 4

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	43. (b) item 5	

Comments:

Question # RO 13 SRO 26

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	500000 2.4.6	500000 2.4.6
	Importance Rating	3.1	4.0
Knowledge of symptom based EOP mitigation strategies.			

Proposed Question:

The plant has experienced a LOCA. The following conditions currently exist in the Primary Containment:

• Drywell Pressure	3.1 psig
• Drywell Temperature	230°F
• Drywell H2 Concentration	5.0%
• Torus H2 Concentration	7.0%
• Drywell O2 concentration	3.2%
• Torus O2 Concentration	4.2%
• Torus Pressure	2.5 psig
• Suppression Pool Level	12.5 feet

Offsite radioactivity release rate will remain below release limits. Which one of the following identifies the action to take and the reason for this action?

a. Vent the torus through EVS and establish a nitrogen purge since a deflagration cannot occur at these levels.

b. Vent and purge the torus and drywell at maximum flow since a deflagration cannot occur at these levels.

c. Vent the drywell through EVS and establish a nitrogen purge since a deflagration can occur at these levels.

d. Vent and purge the torus and drywell directly from the torus since a deflagration can occur at these levels.

Proposed Answer: a.
The candidate must recognize H2 parameters are over their limits and then recognize the torus as the preferred path for venting, per EOP enter steps 31 and 34, with torus level <27 ft and torus pressure < 3.0 psig enter EOP-4.1 Sect. 1 and Sect. 5. Since O2 levels are < 5.0% the containment is below the deflagration limit.

Explanation (Justification of Distractors):

b. Venting should be from the Torus and through the EVS.
c. Venting should be from the Torus and these levels are below the deflaration limit.
d. Purge should be into the Drywell and these levels are below the deflaration limit.

Technical Reference(s): EOP Bases, EOP-4.2

Proposed references to be provided to applicants during the examination:

EOPs without entry conditions

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.8	
	41.10	
	43.5	

Comments:

Question # SRO 27

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295001 AK1.03
	Importance Rating	4.1

† Knowledge of the operational implications of the following concepts as they apply to the PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Thermal Limits

Proposed Question:

The following plant conditions exist:

- Reactor power 90%
- Reactor Recirc Pumps (RRP) 11, 12, 13, and 14 operating
- RRP 15:
  - IDLE
  - Suction valve open, Discharge bypass valve open
  - Flow instrument is valved out

Which one of the following actions will permit reactor power to be raised to 100% power?

a. Isolate the idle loop discharge valve and lock open the associated motor breaker.

b. Perform an APRM gain adjustment and lower the trip setpoints for all APRMs by 1%.

c. Confirm that the idle loop temperature is within 17°F of one of the operating RCS loop temperatures.

d. Verify power/flow relationship, APLHGR and MCPR within the limits of the Core Operating Limits Report.

Proposed Answer: d.

Explanation (Justification of Distractors):

a. The idle loop is not required to be isolated. Power can be raised to 100% with these conditions after checking P/F and thermal limits. If the loop was required to be isolated the suction and discharge bypass would also be required to be closed.

b. This is a requirement when only in 3 loop operation and the idle loops are not required to be isolated.

c. This is a requirement that must be met to startup an idle RCS loop.

Technical Reference(s): N1-OP-1, Rev 42, Section H.4.0
T.S. 3.1.7e

Proposed references to be provided to applicants during the examination:

None.

Learning Objective: 01-OPS-001-202-1-01, EO-7d,

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge 1
Comprehension or Analysis

10 CFR Part 55 Content: 43. (b) items 2 and 5

Comments:

Question # RO 15 SRO 28

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295002 AK2.02	295002 AK2.02
	Importance Rating	3.1	3.2
Knowledge of the interrelations between LOSS OF MAIN CONDENSER VACUUM and the following: Main Turbine.			

Proposed Question:

The plant is at **40% power** with Circulating Water Pumps #11 and #12 in operation. The ATC RO notices a degrading Main Condenser vacuum and reports vacuum is degrading at the rate of 1 inch HGA per minute. The following annunciator is received:

- CONDENSER VACUUM BELOW 24" HG

Assume that NO additional operator actions are taken. Which one of the following describes the scram signal that will scram the reactor if Main Condenser vacuum continues to degrade at the current rate?

a. APRM High

b. Main Turbine Trip

c. Reactor High Pressure

d. Main Steam Isolation Valves Close

Proposed Answer: c. Vacuum trip #2 trips the Turbine Bypass Valves at 10" Hg, reactor pressure will rise to the trip setpoint in less than 3 minutes, which is the amount of time it will take to reach the MSIV isolation at 7" HG.

Explanation (Justification of Distractors):

a. Power will rise because of the loss of feedwater heating and eventually the pressure rise, but at 40% power the power rise will not reach the scram setpoint.

b. The main turbine trip scram is bypassed below 45% reactor power

d. MSIV isolation occurs 3 minutes after the bypass valves close.

Technical Reference(s):	N1-ARP-A1, 3-4, 3-5 N1-OP-31, B.3.0	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	2
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 17 SRO 29

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295004 K1.02	295004 K1.02
	Importance Rating	3.2	3.4

Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Redundant D.C. power supplies: Plant Specific
PRA: Loss of 125 VDC

Proposed Question:

The plant is operating at 75% power when a loss of power on Battery Board 12 occurs.

Per N1-OP-47A, offnormal procedures for loss of battery boards, which one of the following describes a required action to align alternate power? RB 7/21/00

a. Transfer EDG 103 to Control Board Battery Board 11.

b. Transfer DC Valve Board 12 to Battery Board 14.

c. Transfer MG 167 loads to the maintenance supply.

d. Transfer RPS UPS 162A-B to the bypass transformer.

Proposed Answer: a.

Explanation (Justification of Distractors):
b. DC Valve Board 12 alternate supply is Battery Board 11, not Battery Board 14.
c. This action is required for a loss of Battery Board 11, not for a loss of Battery Board 12.
d. This action is required but for RPS UPS 172A-B, not for RPS UPS 162A-B.

Technical Reference(s):	N1-OP-47A, Section H.9.0, H.10, H,11 N1-OP-47A, Attachment 3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 1

10 CFR Part 55 Content:

Comments:

Question # RO 1 SRO 30

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	2
	K/A #	295005 AK2.07	295005 AK2.07
	Importance Rating	3.6	3.7

Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Reactor Pressure Control

Proposed Question:

The plant is in a startup and the turbine generator has just been synchronized to the grid by closing R915. As generator load is being raised and the bypass valves **JUST START** to close, operators in the switchyard report excessive arcing on the middle phase of MOD SW 18.

The CRS directs tripping of R915. Which one of the following will occur when R915 is tripped?

a. The Turbine will immediately trip, the Reactor will scram and ERVs will open to control RPV pressure.

b. The Turbine will NOT immediately trip, the Reactor will scram, and ERVs will open to control RPV pressure.

c. The Turbine will NOT trip, the Reactor will NOT scram and Bypass Valves will open to control RPV pressure.

d. The Turbine will immediately trip, the Reactor will NOT scram and Bypass Valves will open to control RPV pressure.

Proposed Answer: c. The turbine will not trip because the breaker trip itself does not cause a turbine trip and a turbine trip below 45% power does not cause a scram.

Explanation (Justification of Distractors):

a. The turbine will not trip and a turbine trip below 45% power does not cause a scram. ERVS will not open.

b. The reactor will not scram and the ERVs will not open

d. The turbine will not trip.

Technical Reference(s): 01-OPS-001-245-1-01
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

None

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.8	

Comments:

Question # RO 18 SRO 31

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295008 AA1.02	295008 AA1.02
	Importance Rating	3.3	3.3

Ability to predict and/or monitor changes in parameters associated with operating the HIGH REACTOR WATER LEVEL controls including: Reactor Water Cleanup (ability to drain): plant-specific.

Proposed Question:

Given the following conditions:

- The reactor has scrammed from 100% power
- Feedwater (FW) system has responded as designed.
- RPV water level is 83 inches and rising slowly.

Per plant operating procedures, which one of the following describes how to prevent an automatic trip of the FW Pumps?

a. Adjust motor-driven FWP bypass valves.

b. Remove the operating CRD pump from service.

c. Reject to the main condenser using the cleanup system.

d. Position the FWP High Level Bypass switch to BYPASS.

Proposed Answer: c.

Explanation (Justification of Distractors):
a. Will not maintain level below the high level trip. Only permitted during startup.
b. There is no guidance to trip the CRD pump.
d. Only permitted after a high level trip to reset the trip and permit a FWP start.

Technical Reference(s):	N1-OP-3, Section H.3.0 N1-ARP-F2, 3-3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7, 45.6	

Comments:

Question # SRO 32

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295012 AA2.02
	Importance Rating	4.1

Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell Pressure

Proposed Question:

The plant was at 100% power when a steam leak in containment required inserting a manual scram:

- Bulk Drywell temperature is 151°F and rising slowly
- Drywell pressure is 8 psig and rising slowly
- Torus Water Temperature is 86°F and steady
- RPV level is 95" and rising slowly

Which one of the following describes the required emergency actions at this time?

a. Vent the primary containment through the RBEVS.

b. Evaluate the usability of RPV water level instruments.

c. ~~Initiate Containment Sprays~~ and align some flow to the Torus. PS 7/21/05
Spray the Containment

d. Override the isolation signal and align RBCLC flow to the Drywell.

Proposed Answer: b.
Per N1-EOP-4, step DWT-1, drywell temperature affects RPV water level indication requiring that Detail A is checked. Detail A is an evaluation of the ability to use RPV water level instruments.

Explanation (Justification of Distractors):
a. Drywell pressure is too high to vent the containment through RBEVS. This action is used before drywell pressure reaches 3.5 psig.
c. Containment sprays are not required until Torus pressure is above 13 psig. For these conditions, Torus pressure is less than drywell pressure.

d. No containment isolation signal was received. The leak is greater than the capacity of the drywell cooling system.

Technical Reference(s): N1-EOP-4, DWT-1

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	55.43 (b) item 5	

Comments:

Question # SRO 33

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295018 AK1.01
	Importance Rating	3.6

Knowledge of the operational implications of the following concepts as they apply to the PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Effects on Component/System Operation
PRA: Respond to TBCLC pump trip.

Proposed Question:

The plant is operating at 100% power when the operating TBCLC pump trips. The standby TBCLC pump CANNOT be started.

In accordance with N1-SOP-19, TBCLC Failure, which one of the following actions is required?

a. Reduce reactor power below the capability of the shaft-driven FW pump and remove the motor-driven FW pump from service.

b. Reduce reactor power when temperature alarms are received, isolate RWCU, and perform a normal unit shutdown to cold shutdown.

c. Reduce reactor power without entering the restricted zone and control RPV level per the actions for HPCI use with a loss of instrument air.

d. Reduce reactor power without entering the restricted zone, place house service loads on the reserve supply, and scram the reactor.

Proposed Answer: d. The unit must be removed form service because of the sustained loss of TBCLC. A unit trip is required prior to restoring TBCLC.

Explanation (Justification of Distractors):

a. The shaft-driven FW pump is affected, not the motor-driven FW pumps.
b. RWCU is not cooled by TBCLC, rather RBCLC. If instrument air is affected, RBCLC TCV (70-137) fails as is and is controlled manually per N1-OP-11.
c. This action is not an approved per N1-SOP-19 and would not be required

until after the unit is removed from service.

Technical Reference(s): N1-SOP-19, Rev 02

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 1
10 CFR Part 55 Content:	10CFR55.43 (b) item 5	

Comments:

Question # RO 24 SRO 34

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295019 2.4.4	295019 2.4.4
	Importance Rating	4.0	4.3

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.
PRA: Respond to a loss of instrument air.

Proposed Question:

According to N1-SOP-6, Instrument Air Failure, which one of the following describes a condition that requires the reactor to be scrammed?

a. Any control rod drifts into the core.

b. Two or more accumulator faults occur.

c. Scram Air Header pressure drops to 60 psig.

d. Air Systems Cross-tie Valve 94-19 (HAS-BV) fails to open.

Proposed Answer: c.

Explanation (Justification of Distractors):
a. Scram is required for a rod drifting out of the core, not into the core.
b. Not a requirement for a scram on loss of air
d. 94-19 must be verified Open, but failure to open the valve does NOT require a scram

Technical Reference(s): SOP-6, Table 6.1
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:		
Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.10	
	43.2	
	45.6	

Comments:

Not counted as SRO only knowledge

Question # RO 25 SRO 35

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295020 2.1.20	295020 2.1.20
	Importance Rating	4.3	4.2
Ability to execute procedure steps.			

Proposed Question:

With the plant in Cold Shutdown, a Primary Containment Isolation occurred when an operator inadvertently depressed the Manual Containment Isolation pushbuttons. Actual plant parameters prior to and after the isolation were normal.

Which one of the following describes what is required to reset this containment isolation?

a. Verify all containment isolation valves closed, then depress the scram reset pushbutton on the E panel.

b. Depress the 4 high DW pressure reset pushbuttons on the M panel then depress the scram reset pushbutton on the E panel.

c. Confirm all the containment isolation valves are closed and that the control switches for the TIP ball valves on the J panel are in the closed position. PB 7/21/05

d. Ensure the TIP ball valve control switches on the J panel are in the closed position then depress the 4 high DW pressure reset pushbuttons on the M panel.

Proposed Answer: c. Per SOP-17 attached and Dwg. C-19859-C, SH 13

Explanation (Justification of Distractors):

a. Annunciator response procedures state reset RPS channels 11 and 12, this is not required to reset the isolations
b. The four high DW pushbuttons are only required if a high drywell condition caused the isolation, the test pushbuttons do not trip these relays. The scram reset pushbutton does not effect the reset.
d. The four high DW pushbuttons are only required if a high drywell condition

caused the isolation, the test pushbuttons do not trip these relays.

Technical Reference(s): SOP-17, Vessel/Containment Isolation, Dwg. 19859-C, SH 13, N1-ARP-F-1 and F-4
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10 43.5 45.12	

Comments:

Question # SRO 36

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295021
		2.4.9
	Importance Rating	3.9
Knowledge of low power/shutdown implications in accident (e.g., LOCA or loss of RHR) mitigation strategies.		

Proposed Question:

The following conditions exist entering RFO 15:

- The reactor is in cold shutdown with RPV head vents open
- The reactor has been shutdown for 48 hours
- SDC: 11 and 12 in service 13 is marked up
- RRP: 13 in service 11, 12, 14, 15 are off and isolated
- SFP: 11 in service 12 is off

- RPV water level (wide range) 18.4 feet
- RPV water temp 130 °F
- SDC inlet temp (TR 38-146) 130 °F
- RCS 13 suction temp (CPT A-435) 130 °F
- SFP temp 90 °F
- RBCLC temp (TI-70-23C) 80 °F

A loss of SDC system 12 occurs. SDC system 11 is still operating. Assume **NO** operator actions are taken. Per N1-ODG-11, Shutdown Operations Protection Guideline, which one of the following is the approximate time (in hours) the reactor will remain in cold shutdown?

a. 1.0 hours

b. 2.7 hours

c. 4.0 hours

d. 10.5 hours

Proposed Answer: b. The correct calculation is 2.71 hours.

Explanation (Justification of Distractors):

a. Calculated as 1.02 when using the wrong SDC Constant. Used SDC constant for 2 loops rather than 1.

c. Calculated as 4.04 when using the wrong line #2 data on line #82. Used 90°F rather than 130°F.

d. Calculated as 10.45 when using the wrong Thermal Capacity. Used line #71 rather than line #72.

Technical Reference(s): N1-ODG-11, Rev 11, Attachment 2

Proposed references to be provided to applicants during the examination:

N1-ODG-11, Rev 11, Attachment 2
Provide a calculator to each candidate.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	3
10 CFR Part 55 Content:	43.5.(b) item 5	

Comments:

Question # SRO 37

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295022 AK3.01
	Importance Rating	3.9
Knowledge of the reasons for the following responses as they apply to LOSS OF CRD PUMPS: Reactor Scram		

Proposed Question:

Given the following conditions:

- Reactor Power is 100%
- "12" CRD pump is NOT available for operation
- "11" CRD pump trips and CANNOT be restarted
- F3 1-5, CRD CHARGING WTR PRESS HI/LO, alarms

Per the Alarm Response Procedures (ARPs), which one of the following conditions requires a reactor scram?

a. Twenty minutes after the alarm is received one CRD accumulator trouble alarm is received and a CRD pump is still not operating.

b. Twenty minutes after the alarm is received one CRD high temperature alarm is received and a CRD pump is still not operating.

c. Two or more CRD accumulator trouble alarms are received and are concurrent with each other at anytime after the alarm is received.

d. Two or more CRD high temperature alarms are received and are concurrent with each other at anytime after the alarm is received.

Proposed Answer: a. If one or more accumulator trouble alarms is received while no CRD pump is operating THEN restart at least one CRD pump within 20 minutes and insert at least one withdrawn control rod at least one notch to verify CRD restoration OR insert a manual reactor scram.

Explanation (Justification of Distractors):

b. There are no requirements to insert a reactor scram for CRD high temperatures.
c. The ARP requirement to insert a reactor scram is based on the conditions being present 20 minutes following the loss of CRD and no CRD pump has been restored to operation.
d. There are no requirements to insert a reactor scram for CRD high temperatures.

Technical Reference(s):	N1-ARP-F3, Rev 03, 1-5 N1-ARP-F3, Rev 03, 1-2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	10CFR55.43. (b) 5 10CFR55.45.6	

Comments:

Question # RO 28 SRO 38

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295028 EA1.01	295028 EA1.01
	Importance Rating	3.8	3.9
Ability to operate and/or monitor the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell Spray.			

Proposed Question:

During a startup an electrical fire in the drywell has raised drywell temperature and has necessitated a reactor scram. The following conditions exist:

- Drywell temperature is 298°F and rising.
- Drywell pressure is 4 psig and rising slowly.
- Torus temperature 80°F and steady
- Torus Pressure is 1.3 psig and rising slowly
- RPV pressure is 875 psig and steady.
- RPV level is 75 inches and steady.

Which one of the following actions is required per the Emergency Operating Procedures?

a. Initiate drywell sprays.

b. Perform an RPV blowdown.

c. Secure all available drywell cooling fans.

d. Perform containment venting from the drywell.

Proposed Answer: b. Drywell temperature cannot be maintained below 300° F, You can't spray the drywell because of the Containment Spray Initiation Limit, but a blowdown is required

Explanation (Justification of Distractors):

a. Conditions are outside Figure 1: Containment Spray Initiation Limit
c. Since you cannot spray the drywell the drywell coolers should not shutdown.
d. Contingency Action PCP-2 directs the operators to step 17 and away from venting (EOP-1, Att. 10) venting can only be performed with the containment below 3.5 psig.

Technical Reference(s): EOP-4, Primary Containment Control

Proposed references to be provided to applicants during the examination:

All EOPs with the entry conditions removed

Learning Objective: O1-OPS-006-344-1-04 EO 3.0, 4.0

Question Source: Bank No.
Modified Bank #
New — New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis — 2

10 CFR Part 55 Content: 41.7
45.6

Comments:

Question # RO 29 SRO 39

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295029 EK3.02	295029 EK3.02
	Importance Rating	3.6	4.0
Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL WATER LEVEL: Lowering Suppression Pool Water Level			

Proposed Question:

Following a plant transient caused by a feedwater leak in the Drywell, Torus Water level begins to rise. Torus water level continues to rise, reaches 13.6 feet and CANNOT be lowered.

Which one of the following states the action required per the Emergency Operating Procedures and the reasons for that action?

a. An RPV Blowdown is required to protect the integrity of the Primary Containment.

b. Commence a normal plant shutdown and cooldown to limit Torus level rise from external sources.

c. Terminate external injection sources even if adequate core cooling is challenged, to limit Torus level rise.

d. Rapidly depressurize the RPV using the Bypass Valves to prevent exceeding ERV Tailpipe Level Limit.

Proposed Answer: a.

Explanation (Justification of Distractors):

b. EOP-4, step TL-2 requires a scram, not a normal plant shutdown.
c. External injection sources are permitted, if needed for core cooling. (TL-2)
d. Entry into EOP-8 for RPV Blowdown is required. Depressurization through Bypass Valves is not permitted.

Technical Reference(s): N1-ODP-PRO-0305 EOP BASES page 188 and 189

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:	O1-OPS-006-344-1-04 EO 3.0, 4.0	
Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # SRO 40

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295032 EK1.03
	Importance Rating	3.9

Knowledge of the operational implications of the following concepts as they apply to the HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: Secondary Containment Leakage Detection

Proposed Question:

The plant is at power when the following occur:

- A leak occurs in the Reactor Water Cleanup System
- Cleanup CANNOT be isolated
- Cleanup Pump area temperature is 191°F and rising
- Cleanup Pump area radiation level is 22 mrem/hr and steady
- Reactor Building Exhaust area radiation level is 7 mrem/hr and steady
- Pyrometer readings in the reactor building have NOT been taken

Which one of the following describes the required actions if NO other secondary containment area temperatures, radiation levels, or water levels are in alarm?

a. Scram the reactor. An RPV blowdown is not required.

b. Scram the reactor and then perform an RPV Blowdown.

c. Begin a plant shutdown within ten hours per Tech Specs.

d. Operate area coolers and the reactor building ventilation system.

Proposed Answer: a. A scram is required before an area is above Max Safe. *Note: The cleanup pumps are in a general area, not in an enclosed room.*

Explanation (Justification of Distractors):

b. Not required until a second area is above Max Safe.

c. Technical Specifications 3.2.7, Reactor Coolant Isolation Valves requires a shutdown within one hour, not ten hours. The plant must be in cold shutdown within 10 hours.

d. Although this step applies, emergency ventilation is required at this radiation level. Reactor Building ventilation is isolated and there is no guidance to override the isolation signal.

Technical Reference(s): N1-EOP-5
Technical Specifications 3.2.7

Proposed references to be provided to applicants during the examination:

EOPs with entry conditions removed.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	43 (b) items 2 and 5	

Comments:

Question #		RO 31	SRO 41

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295033 EK3.02	295033 EK3.02
	Importance Rating	3.5	3.6
Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT ARE RADIATION LEVELS: Reactor SCRAM			

Proposed Question:

The plant is operating at 100% power with the following indications:

- Core Plate dp instrument dPR/FR-32-259 (G-panel) indicates downscale
- CRD cooling and drive water pressure (F-panel) indicate upscale

An AO in the Reactor Building reports hearing a loud hissing sound on the north west side of the 237' level and the area is filling with steam. Over several minutes, the local area radiation monitor, NORTH INSTR ROOM, RB 237 (#28) pegs high (10^3 mr/hr).

Radiation Protection personnel are dispatched to the area with portable monitors. They report they are unable to approach the area due to steam and radiation levels in excess of 6 R/hr at the north east stairwell.

Radiation levels and temperatures are slowly rising throughout the reactor building. Which one of the following Emergency Operating Procedure actions is required?

a. Shift Reactor Building ventilation fans to fast speed and continue to monitor reactor building temperatures and radiation levels.

b. Start a controlled shutdown in accordance with OP-43A, Section G.

c. Scram the reactor and enter EOP-2, RPV Control.

d. Scram the reactor and initiate an RPV Blowdown.

Proposed Answer: c. Per EOP-5, a primary system (core d/p instrument line) has ruptured in the secondary containment and cannot be isolated. Radiation levels are approaching a maximum safe operating level, the reactor should be maximum safe operating level, the reactor should be scrammed and EOP-2 entered.

Explanation (Justification of Distractors):

a. Radiation level is above the alarm setpoint and a primary system is discharging into the secondary containment and cannot be isolated more action is required.
b. The override statement for a primary system is discharging into the secondary containment and cannot be isolated directs the operators to scram the reactor before any area exceeds max safe.
d. Only one area is known to be high at this time, the intent is to scram the reactor and enter EOP-2, if further degradation occurs EOP-2 will direct depressurizing with the bypass valves before a blowdown is required.

Technical Reference(s): EOP-5. EOP-2, N1-ODP-PRO-0305
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 3
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # SRO 42

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295036 EA2.01
	Importance Rating	3.2
Ability to determine and interpret the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL: Operability of Components Within the Affected Area		

Proposed Question:

The plant is operating at 80% power when the following occur:

- H-2 2-1, R BLDG FL DR SUMPS 11-16 AREA WTR LVL LEVEL HIGH alarms
- The AO dispatched to investigate reports:
    - Water level in the NW compartment is 6 feet above the floor surface and rising.
    - Water is traveling from the NW compartment through an electrical conduit into the NE compartment and has covered that floor with 1 inch of water.
- It is determined that the leak is from the Torus and is not isolable.
- Torus level is 10.6 feet and slowly lowering.

Per the EOPs, which one of the following describes the required action and the reason for that action **IF** water level in the rooms continue to rise?

b. Shutdown if the NE Compartment water level is above 203 feet elev. because equipment required for safe shutdown is threatened.

c. Within one hour initiate an orderly shutdown because Containment Spray Pumps 111 and 121 are inoperative.

c. Scram the reactor when the NW Compartment level is at 203 feet elev. to comply with EOP-5, Secondary Containment Control.

d. Scram the reactor while sufficient level still exists in the Torus to comply with EOP-4, Primary Containment Control.

Proposed Answer: a. Holding at step SC-6. Waiting for a second area to reach max safe before starting the plant shutdown.

Explanation (Justification of Distractors):

b. A shutdown is not required for these pumps being inoperative.
c. Primary system is not discharging into the reactor building so a scram is not required.
d. Torus level does not require a scram, EOP entry level has not been reached. Attempts should be made to make up to torus level and determine how far torus level will lower before equalizing with the corner rooms.

Technical Reference(s): N1-EOP-5, Secondary Containment Control
EOP Bases, N1-ODP-PRO-0305
N1-ARP-H2, 2-1

Proposed references to be provided to applicants during the examination:

N1-ARP-H2, 2-1

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	43.5 45.13	

Comments:

Question # RO 32 SRO 43

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	600000 2.4.27	600000 2.4.27
	Importance Rating	3.0	3.5
Knowledge of fire in the plant procedure.			

Proposed Question:

An electrical fire is burning in Battery Room 12. The fire brigade is assembling. Plant controls remain normal. Which one of the following instrument precautions is required?

a. Monitor instruments from RPS Ch. 12 and ignore RPS Ch. 11.

b. Monitor reactor pressure indicator 36-31A and ignore indicator 36-32A.

c. Monitor the instrumentation for EC 121 and EC 122 and ignore 111 and 112.

d. Monitor the idle CTSP 121 Disc. Press and ignore torus level indication.

Proposed Answer: b. per table 9.3

Explanation (Justification of Distractors):

a. RPS instruments for Ch. 11 are reliable, but this could be confusing on the table.
c. Water level instrumentation for EC 121/122 is NOT reliable.
d. The Cont. Spray Pump Disc. Pressure is only used if a fire is occurring in FA-1

Technical Reference(s): N1-SOP-9
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

SOP-9, FIRE IN PLANT, Flowchart

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.10	
	43.5	
	45.13	

Comments:

Question # RO 39 SRO 44

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	202002 A2.05	202002 A2.05
	Importance Rating	3.1	3.1

Ability to (a) predict the impacts of the following on the RECIRCULATION FLOW CONTROL SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Scoop Tube Lockup: BWR-2, 3, 4

Proposed Question:

The plant is at 85% power when the following are observed:

- F2-2-1, REACT RECIRC M-G SET 11 annunciator alarms
- Red light above the RRMG SCOOP AIR FAILURE LOCK RESET pushbutton for M-G Set 11 is ON

Which one of the following describes the cause of the indications above and the actions required to adjust Recirculation Pump 11 flow?

a. The scoop tube has locked on a loss of air. Adjust speed using the speed controller at the F panel.

b. The scoop tube has locked on a loss of air. Station a licensed operator at the scoop tube to adjust speed.

c. The scoop tube has locked on a loss of speed control signal. Adjust speed using the speed controller at the F panel.

d. The scoop tube has locked on a loss of speed control signal. Station a licensed operator at the scoop tube to adjust speed.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Speed cannot be adjusted using the speed controller at the F Panel.

c. A loss of air caused the scoop tube lock. Speed cannot be adjusted using the speed controller at the F Panel.

d. A loss of air caused the scoop tube lock.

Technical Reference(s): N1-ARP-F2, 2-1
N1-OP-1, H.6.0
DWG C-19423-C
DWG C-22006-C

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2

10 CFR Part 55 Content:

Comments:

Question # RO 40 SRO 45

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	206000 A4.14	206000 A4.14
	Importance Rating	4.2	4.1
Ability to manually operate and/or monitor in the control room: System auto start control.			

Proposed Question:

The plant is operating at 100% power with feedwater pump (FWP) 11 in STANDBY. The following events occur:

At time = 0	FWP 12 Trips
At time = 10 seconds	Reactor scrams on low level
At time = 15 seconds	Main Turbine trips

Which one of the following describes when the FWP 11 will receive the start signal and the value at which RPV level will be controlled following the scram?

FWP 11 will start when ...

a. low level reactor scram signal is received and controls RPV level at 72 inches as FWP 13 coasts down.

b. low level reactor scram signal is received and controls RPV level at 65 inches as FWP 13 coasts down.

c. turbine trip signal is received and controls RPV level at 72 inches as FWP 13 coasts down.

d. turbine trip signal is received and controls RPV level at 65 inches as FWP 13 coasts down.

Proposed Answer: b. The reactor scram signal on low RPV level (53") signals the motor-driven FW pump to start. This is normally a backup signal to the turbine trip signal but occurs first for the conditions provided. Level control for FWP 11 is automatically set to +65" and will take control when FWP 13 output is reduced, during the HPCI mode of operation.

Explanation (Justification of Distractors):

a. FWP 11 will control at 65 inches in the HPCI mode.
c. The HPCI start signal occurs on low level, since the turbine trip signal is given at T = 15 seconds.
d. The HPCI start signal occurs on low level, since the turbine trip signal is given at T = 15 seconds.

Technical Reference(s): N1-OP-16, Section B.2.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.5 to 45.8	

Comments:

Question # RO 41 SRO 46

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	207000 K3.01	207000 K3.01
	Importance Rating	4.2	4.3

Knowledge of the effect that a loss or malfunction of the ISOLATION (EMERGENCY) CONDENSER will have on the following: Reactor Pressure control during conditions in which the reactor vessel is isolated: BWR-2,3

Proposed Question: (low steam line pressure in RUN) A07/21 Loo

Following a reactor scram and MSIV isolation, you manually initiate EC 12 for pressure control. When initiated EC 12 isolates on high steam flow.

The following conditions exist:

- All rods have inserted
- EC 11 is isolated for maintenance
- RPV level is 98 inches and stable
- RPV pressure is 1000 psig and rising
- Torus level is 7.6 feet and stable

Which one of the following actions is required to control reactor pressure?

a. Immediately place one or more ERV Control switches to OPEN and control RPV pressure below 965 psig.

b. Manually Open MSIV drains as necessary to control pressure below 1070 psig to prevent automatic ERV actuation.

c. Place EMERG COOLING CHANNEL 12 isolation bypass keylock switch to BYPASS and manually initiate EC 12.

d. Use N1-EOP-1, Attachment 2, to bypass the MSIV isolation, then reopen the MSIVs and open the Turbine Bypass Valves.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. Torus level is too low (<8') ERVs should not be opened.
b. MSIVs are isolated and the drains are downstream of the isolation.
d. EOP 1, Att 2 only isolates the low-low level isolation and is used during a failure to scram.

Technical Reference(s): N1-OP-13, Page 5
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

EOPs with entry conditions removed

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.4	

Comments:

Question # RO 42 SRO 47

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	207000 K4.05	207000 K4.05
	Importance Rating	4.0	4.2
Knowledge of ISOLATION (EMERGENCY) CONDENSER design feature(s) and or interlock(s) which provide for the following: Detection of Tube Bundle Leak: BWR2, 3			

Proposed Question:

The reactor is operating at 100% power when the following annunciators alarm:

- K1 2-3, EMER COND 111-112 LEVEL HIGH-LOW
- K1 3-3, EMER COND 111-112 SHELL TEMP HIGH
- K1 1-2, EMER COND VENT 11 RAD MONITOR

Investigation reveals that annunciator K1 2-3 alarmed on high level.

Which one of the following describes the cause of the alarms on Emergency Condenser Loop 11?

a. Condensate return piping is leaking.

b. Several condenser tubes have ruptured.

c. Level control valve (60-18) has failed open.

d. Condensate return valve (39-05) is open.

Proposed Answer: b. The radiation monitor alarm indicates a leak in the condenser tubes. The other failures identified are indicated by some of the annunciators provided in addition to others not provided, however, only the tube leak will cause annunciator K1 1-2 to alarm.

Explanation (Justification of Distractors):
See the explanation above for the answer.

Technical Reference(s):	N1-OP-13, Rev 30, Section B N1-ARP-K1, Rev 03, 1-2, 1-3, 2-3, 3-3, 4-2, 4-3

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	10CFR55.41.7	

Comments:

Question # RO 43 SRO 48

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209001 K1.10	209001 K1.10
	Importance Rating	3.7	3.8

Knowledge of physical connections and/or cause-effect relationships between LOW PRESSURE CORE SPRAY SYSTEM and the following: Emergency Generators.

Proposed Question:

Which one of the following describes the Core Spray System pump start timing sequence upon receipt of a core spray initiation signal from both RPS channels?

	0 sec	***7 sec***	***13 sec***	***20 sec***
a.	Core Spray 111 & 112	Core Spray 121 & 122	CS Topping 111 & 112	CS Topping 121 & 122
b.	Core Spray 111 & 121	Core Spray 112 & 122	CS Topping 111 & 121	CS Topping 112 & 122
c.	Core Spray 111 & 112	CS Topping 111 & 112	Core Spray 121 & 122	CS Topping 121 & 122
d.	Core Spray 111 & 121	CS Topping 111 & 121	Core Spray 112 & 122	CS Topping 112 & 122

Proposed Answer: c.

T=0, CS pumps 111 and 112 start.
T=7, CS topping pumps 111 and 112 start.
T=13, CS pumps 121 and 122 start.
T=20, CS topping pumps 121 and 122 start.

Explanation (Justification of Distractors):
See the explanation for the answer above.

Technical Reference(s):	N1-OP-45, Rev 24, Section B

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	41.8	
	45.7	

Comments:

Question # RO 44 SRO 49

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209001 K2.01	209001 K2.01
	Importance Rating	3.7	3.8
Knowledge of electrical power supplies to the following: pump power.			

Proposed Question:

During an automatic Core Spray (CS) initiation which one of the following describes the response of the Core Spray Topping pump 111 if the Core Spray pump 111 breaker trips immediately after it closes?

a. The pump will NOT start.

b. The pump starts but trips after 7 seconds on low suction pressure.

c. The pump starts and runs but does not inject and must be tripped by the operator.

d. The pump starts and runs but will NOT inject until RPV pressure is less than 50 psig.

Proposed Answer: a. The breaker will trip immediately on starting because the core spray pump power supply breaker is NOT closed (a/b contacts in the core spray pump breaker are part of the closing interlocks on the topping pump breaker).

Explanation (Justification of Distractors):

b. The pump does not start and there are no low suction trips on these pumps.
c. The pump will not start.
d. The pump will not start and would not pump without the core spray pump to pump water up to the topping pump, the topping pump does not have any suction.

Technical Reference(s): (Attach if not previously provided)	01-OPS-001-209-1-01 N1-ARP-K2, 1-5 P&ID C-19410-C

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 45 SRO 50

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	211000 A1.02	211000 A1.02
	Importance Rating	3.8	3.9

Ability to predict and/or monitor changes in parameters associated with operating the STANDBY LIQUID CONTROL SYSTEM controls including: Explosive Valve Indication.

PRA: Inject poison solution into the reactor.

Proposed Question:

Following a loss of offsite power, the reactor fails to scram and only PB 102 is powered. EDG 103 cannot be started. The following conditions are observed for the Liquid Poison system:

At control room panel K:

- System 11 explosive valve continuity light is OFF
- System 12 explosive valve continuity light is ON

AT panel 1S-65 in the Auxiliary Control Room:

- System 11 explosive valve continuity meter indicates "0" amps
- System 12 explosive valve continuity meter indicates "0.15" amps

When directed to initiate boron injection, which one of the following describes the method to be used?

a. Start Liquid Poison system 11.

b. Start Liquid Poison system 12.

c. Align the hydro pump for boron injection.

d. Align the RWCU system for boron injection.

Proposed Answer: a. System 11 will start because there is power to the pump and because the discharges are cross-connected before the explosive valves, so either valve fired will permit flow.

Explanation (Justification of Distractors):

b. System 12 will not start because there is no power to liquid poison pump.
c. Although using the hydro pump will work, its use is not permitted until boron injection using the liquid poison system is not successful.
d. Even though power is lost to the RWCU pumps electrical power can be aligned, however, its use is not permitted until boron injection using the liquid poison system is not successful. Use of the hydro pump is preferred.

Technical Reference(s): Attachment 1 of 01-OPS-001-211-1-01
P & ID

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.5
45.5

Comments:

Question # RO 46 SRO 51

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	212000 K4.01	212000 K4.01
	Importance Rating	3.4	3.6
Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and or interlock(s) which provide for the following: System Redundancy and Reliability. ***PRA: Transfer RPS to alternate supply.***			

Proposed Question:

The plant is at 100% power. Battery 11 will be removed from service for some maintenance and will be returned to service within 8 hours.

Which one of the following describes the action required to maintain power to the for the Reactor Protection System BEFORE removing Battery 11 from service?

a. Transfer the RPS loads to the standby UPS.

b. Remove the SBC DC OUTPUT BREAKER trip fuses.

c. Align Power Board 11 DC supply switches to Battery Board 12.

d. Place RPS UPS on transformer bypass and shutdown the UPS.

Proposed Answer: d.

Explanation (Justification of Distractors):
a. This action does not maintain power to the RPS system.
b. Although permitted, this step is not performed to maintain power to the RPS system.
c. This action aligns DC control power to system loads. It does not maintain power to the RPS system.

Technical Reference(s):	N1-OP-47A, H.9.0 N1-OP-40, F.6.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 47 SRO 52

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	212000 K6.01	212000 K6.01
	Importance Rating	3.6	3.8
Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR PROTECTION SYSTEM: AC Electrical Distribution			

Proposed Question:

The plant is operating at 100% power. UPS 172 A is in service when its inverter fails and its output goes to zero. Which one of the following describes the effect on RPS 12 Logic power?

a. It will be powered from UPS 172 B with no loss of power.

b. It will be powered from 125 VDC BB 12 with no loss of power.

c. It will be powered ~~directly~~ from PB 17 Section B with no loss of power. delete this word 6/21/ST

d. It will lose power and must be manually transferred to UPS 172 B.

Proposed Answer: c. Power is automatically transferred to the Bypass Stepdown Transformer on a loss of the inverter.

Explanation (Justification of Distractors):

a. This requires a manual transfer and loss of bus RPS Logic power
b. The DC power cannot power the logic because the inverter has failed.
d. Logic power will NOT be lost because the Bypass will pick up the logic.

Technical Reference(s): N1-OP-40 and 01-OPS-001-212-1-01
(Attach if not previously provided)

Learning Objective:		
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.7	

Comments:

Question # RO 50 SRO 53

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	215004 2.1.7	215004 2.1.7
	Importance Rating	3.7	4.4

Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.

Proposed Question:

During a reactor startup with the reactor close to criticality the following events occur:

- Control rod 22-15 is withdrawn from position 08 to 12.
- During control rod movement all SRM count rates remain at 4×10^4 cps.
- SRM period indication remains at infinite.

Which one of the following is the cause of this indication?

a. Control rod movement is in a low flux area for these conditions.

b. The SRM detectors have been withdrawn too far out of the core.

c. This control rod is uncoupled from its control rod drive and is stuck.

d. This control rod is too far from any SRM for its motion to be detected.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. The control rod is in an area where it will have a significant effect on flux.

b. This would not prevent an indicated flux change from occurring. 4×10^4 cps is well within the required value for detection of changes.

d. This control rod is right next to the SRM. Any rod movement near criticality would be detected by at least one SRM detector.

Technical Reference(s): N1-OP-5, H.3.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	43.5, 45.12, 45.13	

Comments:

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Question # RO 52 SRO 54

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	215005 2.4.10	215005 2.4.10
	Importance Rating	3.0	3.1
Knowledge of annunciator response procedures.			

Proposed Question:

The plant is operating at 98% power with 65 Mlb/hr core flow with Recirculation Pump 13 shutdown and unisolated. A partial loss of extraction steam occurs causing power to rise to the APRM Upscale Rod Block setpoint. The following annunciators have alarmed:

- F2, 1-6, APRM 11-14
- F3, 1-1, APRM 15-18
- F3, 4-4, ROD BLOCK

Which one of the following actions is required?

a. Immediately manually scram the reactor and enter SOP-1, Reactor Scram.

b. Insert cram rods to lower power to between 80% and 100% of rated power, per the ARP.

c. Lower recirc flow to bring power within the Minimum Allowable Feedwater Temperature of OP-16, Feedwater System.

d. Reduce power to 90% by lowering recirc flow and inserting cram rods to stay within the allowable band of the Power to Flow Operating Map.

Proposed Answer: c. Per the ARP, the power to flow curve is checked, for 4 loop operation, but operation to 100% is allowed as long as the secured recirc pump is not isolated. Entry into SOP-2 is required, which requires entry into OP-16, Section H. It directs lowering power to within the

Minimum Allowable Feedwater Temperature.

Explanation (Justification of Distractors):

a. This is not required for this region of the power/flow curves, 4 recirc pumps are running and there is no mention of THI, SOP-2 and OP-16 do not require it either, the ARP would require it only if the APRMs were INOP.

b. We are not in the restricted zone of the power to flow map so inserting cram rods is not required and the ARP does not require it.

d. The power to flow map does not require the power reduction as long as the idle loop is isolated.

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

N1-ARP-F2 and F3
N1-SOP-2
Power to flow curves for 5, 4 and 3 loop operation
OP-16, Attachment 4

Proposed references to be provided to applicants during the examination:

Power to flow curves for 5, 4 and 3 loop operation

Learning Objective:

Question Source:

Bank No.
Modified Bank #
New New

Question History:

Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:

Memory of Fundamental Knowledge
Comprehension or Analysis 3

10 CFR Part 55 Content:

41.10
43.5
45.13

Comments:

Question # RO 53 SRO 55

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	216000 A3.01	216000 A3.01
	Importance Rating	3.4	3.4

Ability to monitor automatic operations of the NUCLEAR BOILER Instrumentation including: Relationship between meter/recorder readings and actual parameter values: Plant-Specific.

Proposed Question:

The plant is operating at 100% power when a recirculation pump trips. Assuming NO operator action, which one of the following describes how the recirculation pump trip will effect total core flow indication including why?

a. No effect, as flow lowers in the tripped loop it's input to the flow summer lowers also.

b. No effect, when the recirculation MG set breaker opens the loop flow signal is blocked from the flow summer.

c. Core flow will indicate higher than actual if there is reverse flow in the loop, because the flow summer will add this flow.

d. Core flow will indicate lower than actual because the summer will divide the four (4) operating loop flows by the five (5) inputs.

Proposed Answer: c. The flow is measured by determining the d/p across a venturi to determine flow. The d/p will exist if the flow is backward in the loop, but this flow will be flow from the under core area back to the annulus (negative flow). The only way to prevent this is to valve out the flow instrument or block reverse flow through the loop.

Explanation (Justification of Distractors):

a. When flow reverses in the loop, the summer will continue to add this flow which does effect total core flow measurement.
b. Core flow is effected and there is no relationship between the loop flow instrument and the MG set breaker.
d. Core flow will not read lower, it will in all cases have five inputs, but with reverse flow in the loop one input will be a incorrect indication of flow.

Technical Reference(s): N1-OP-1, Section
01-OPS-001-202-1-01, Figure 1

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions blank.

Learning Objective:

Question Source:

Bank No.		
Modified Bank #	New	
New		

Question History:

Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:

Memory of Fundamental Knowledge		
Comprehension or Analysis	2	

10 CFR Part 55 Content:

Comments:

Question # RO 54 SRO 56

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	216000 K6.03	216000 K6.03
	Importance Rating	2.8	3.4

Knowledge of the effect that a loss or malfunction of the following will have on the NUCLEAR BOILER INSTRUMENTATION SYSTEM: Temperature Compensation: Plant-Specific

Proposed Question:

During a loss of coolant accident (LOCA), the Fuel Zone RPV level DIGITAL INDICATOR DISPLAYS are flashing. Which one of the following is the cause?

a. Actual reactor water level is below the top of active fuel.

b. Reference Leg temperature is greater than saturation temperature for RPV pressure.

c. Lowering RPV pressure is causing boiling in the variable leg of the level instruments.

d. Core spray injection is causing a large ΔT between the variable and reference legs.

Proposed Answer: b. If reference leg temperature is greater than TSAT for the RPV then reference leg flashing will be indicated because the temperature compensation (clamped legs) will not be effective.

Explanation (Justification of Distractors):

a. The operator must determine the actual water level is above or below TAF using the fuel zone water level correction curve in the EOPs (Detail X).

c. This condition would be indicative of RPV level and is not associated with the flashing displays.

d. A large ΔT would not indicate reference leg flashing, or cause this flashing display

Technical Reference(s): N1-ODP-PRO-0305, EOP Bases, Fuel Zone restrictions. ARP F1 (2-8)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7, 45.7	

Comments:

Question # RO 55 SRO 57

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	218000 K5.01	218000 K5.01
	Importance Rating	3.8	3.8
Knowledge of the operational implications of the following concepts as they apply to the AUTOMATIC DEPRESSURIZATION SYSTEM: ADS logic operation.			

Proposed Question:

With the plant operating at 100% power I&C reports:

"The 2-1 relay in the 11-1 ADS logic circuit is burned-out and will not perform its intended safety function."

No other ADS circuitry problems exist.

Subsequently, a transient occurs and the signals to initiate ADS are just met.

Assuming that the ADS initiation signals remain valid (are sustained), which one of the following states the effect on ADS system?

a. The secondary valves will be opened when the initiation signal has been present for 111 seconds.

b. The secondary valves will be opened when the initiation signal has been present for 115.5 seconds.

c. The primary valves will be opened when the initiation signal has been present for 111 seconds.

d. The primary valves will be opened when the initiation signal has been present for 115.5 seconds.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. The secondary valves will not open.
b. The secondary valves will not open.
d. The primary valves will open when the initiation signal has been present for 111 seconds (4.5 seconds sooner than indicated).

Technical Reference(s):	DWG C-19859-C, Sheets 18, 18A, 24 and 24A. P&ID C-18015-C

Proposed references to be provided to applicants during the examination:

DWG C-19859-C, Sheets 18, 18A, 24 and 24A.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.5	
	45.3	

Comments:

Question # RO 56 SRO 58

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	223001 A4.03	223001 A4.03
	Importance Rating	3.4	3.4
Ability to manually operate and/or monitor in the control room: Air dilution valves to drywell and suppression pool: Plant-Specific.			

Proposed Question:

Drywell pressure is 3.8 psig. If the only OVERRIDE action taken is to position the CAD Channel 11 and 12 RPS Bypass Switches to BYPASS, which one of the following drywell vents paths can be established?

a. Vent using the Reactor Building Ventilation System.

b. Vent using the Drywell and Torus Vent and Purge Fan.

c. Vent to Emergency Ventilation System using 201.1-09, 11, 14, 16, POST-LOCA VENT valves.

d. Vent to Emergency Ventilation System using 201-31 and 201-32, DW N_2 VENT AND PURGE ISOLATION valves.

Proposed Answer: c.

Explanation (Justification of Distractors):
a, b, d – isolation signals prevent use.

Technical Reference(s): (Attach if not previously provided)	N1-ARP-F3, 3-5 C-19859-C, 3, 6, 20

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7, 45.6, 45.7	

Comments:

Question #		RO 57	SRO 59
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	223002 A1.02	223002 A1.02
	Importance Rating	3.7	3.7

Ability to predict and/or monitor changes in parameters associated with operating the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF controls including: Valve closures

Proposed Question:

Given the following conditions:

At time = 0 seconds

- Reactor at 100% power
- Steam line 12 ruptures at Turbine Stop and Control Valve Manifold

At time = 9 seconds

- Reactor scram on MSIV closure

At time = 90 seconds

- Reactor water level steady at 52" on the Narrow Range after dropping to 22" before turning.

At time = 180 seconds you are walking down the control room panels. Beside the MSIVs which one of the following sets of valves do you expect to find isolated?

a. Cleanup supply and return
SDV vents and drains
Emergency Condenser return

b. Drywell Vent and Purge
Emergency Condenser vents and drains
Cleanup supply and return

c. Reactor Sample valves
Drywell Vent and Purge
Emergency Condenser return

d. Emergency Condenser vents and drains
SDV vents and drains
Reactor Sample valves

Proposed Answer: d. Per SOP-17, these are the valves that are expected to isolate on Hi Stm flow

Explanation (Justification of Distractors):

a. Emergency condenser return valves do not close
b. Drywell vent and purge are containment isolation valves and do not isolate for these conditions.
c. Emergency condenser return valves do not close

Technical Reference(s): SOP-17, Vessel/Containment Isolation
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.5	
	45.5	

Comments:

Question # RO 71 SRO 60

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	226001 A1.06	226001 A1.06
	Importance Rating	3.2	3.2

Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE controls including: System flow.

Proposed Question:

Following a LOCA, the SSS directs the alignment of Containment Spray Raw Water (CSRW) pump 111 to Core Spray Loop 11. After starting CSRW Pump 111 and obtaining the desired flowrate, the following are observed:

- Reactor pressure is 270 psig and lowering due to plant cooldown
- CSRW Pump 111 amperage is 79 amps

Per N1-EOP-1, Attachment 5, Containment Spray Raw Water to Core Spray, which one of the following is a consequence for these conditions and what action is required to be taken?

The lowering reactor pressure...

a. causes a rise in the CSRW pump flow and motor amperage. To avoid damage to the CSRW pump motor, throttle **open** the CSRW Pump discharge valve.

b. causes a rise in the CSRW pump flow and motor amperage. To avoid damage to the CSRW pump motor, throttle **closed** the CSRW Pump discharge valve.

c. causes the CSRW pump flow and motor amperage to lower. To avoid CSRW pump overheating, throttle **open** the CSRW Pump discharge valve.

d. causes the CSRW pump flow and motor amperage to lower. To avoid CSRW pump overheating, throttle **closed** the CSRW Pump discharge valve.

Proposed Answer: b. Monitor CSRW Pump 111 motor amps and if load exceeds 76 amps, throttle the pump discharge valve closed to reduce load below 76 amps. If load is not reduced motor damage can occur.

Explanation (Justification of Distractors):
a. Discharge valve is throttled closed, not open.
c. Flow and motor amps will rise, not lower. Concern is motor damage.
d. Flow and motor amps will rise, not lower. Concern is motor damage.

Technical Reference(s): N1-EOP-1, Rev 03, Attachment 5

Proposed references to be provided to applicants during the examination:

None.

Learning Objective: 01-OPS-001-226-1-01, EO-9

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge 1
Comprehension or Analysis

10 CFR Part 55 Content: 41.5, 45.5

Comments:

Question # RO 58 SRO 61

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	1	1
	K/A #	239002 A4.01	239002 A4.01
	Importance Rating	4.4	4.4
Ability to manually operate and/or monitor in the control room: SRVs.			
PRA: Manually operate ERVs.			

Proposed Question:

The plant is at 80% power.

- F2-4-1, MAIN STM LINE ELECTROMATIC RELIEF VALVE OPEN annunciator alarms.

Per the Annunciator Response Procedures, which one of the following describes the indications used to CONFIRM which ERV is open?

	BLUE valve indicating light	*RED acoustic monitor light*	*Valve Monitor Panel 1S49*	*ERV Tailpipe temperature*
a.	Off	On	high flow	red
b.	On	Off	alarm light on	red
c.	Off	On	high flow	rising
d.	On	Off	alarm light on	rising

Proposed Answer: c.

Blue valve indicating light is OFF. Red acoustic monitor light (ERV open) is ON. Valve Monitor Panel 1S49, alarm light is ON but high flow must be determined by reading the signal level on the acceleration meter to confirm the ERV is open. ERV tailpipe temperature on process computer is rising.

Explanation (Justification of Distractors):

a. Tailpipe temperature red light is not a valid indication.

b. Blue light is off. Red acoustic monitor light is On. Cannot use only the alarm light, tailpipe temperature red is not a valid indication.

d. Blue light is off. Cannot use only the alarm light.

Technical Reference(s): N1-ARP-F2, 4-1, 4-5

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7 45.5 to 45.8	

Comments:

Question # RO 62 SRO 62

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	259002 K4.12	259002 K4.12
	Importance Rating	3.5	3.4

Knowledge of REACTOR WATER LEVEL CONTROL SYSTEM design feature(s) and or interlock(s) which provide for the following: Manual and automatic control of the system.

Proposed Question:

The plant is operating at 100% power with:

- FWP 13 in AUTO (3 element control)
- FWP 11 in MANUAL (carrying 1.6×10^6 lbm/hr)

An Instrument and Control Technician inadvertently places the FW VALVE SEQ COMP MOD to START. Which one of the following describes the effect on #13 Feedpump Flow Control Valve (FCV)?

#13 Feedpump FCV will...

a. stroke open.

b. stroke closed.

c. remain as is, can be operated using the M/A station in MANUAL.

d. remain as is, can only be operated by an operator at the valve.

Proposed Answer: b.

Explanation (Justification of Distractors):
a. The FCVs will close, not open.
c. The FCV will close and cannot be operated
d. The FCV will close and cannot be operated

Technical Reference(s): N1-OP-16, B.1.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 61 SRO 63

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	259002 A3.02	259002 A3.02
	Importance Rating	3.4	3.4
Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including: Changes in reactor water level.			

Proposed Question:

Given the following conditions:

- Reactor power is steady at 100%
- Reactor water level is +74 inches
- Reactor Water Level Control System is in 3-element control
- Channel 11 Narrow Range GEMAC is selected
- Channel 11 Wide Range Pressure is selected

One (1) of the two (2) Reactor Water Level Control System steam flow SIGNALS fails to zero.

Assuming no operator action is taken, which one of the following describes the result of this failure?

a. Reactor scram on a main turbine trip signal.

b. Reactor scram on a reactor water level trip signal.

c. No reactor scram, reactor water level is stable at a lower level.

d. No reactor scram, reactor water level is stable at a higher level

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Reactor water level will lower.
c. Reactor water level will lower, but the magnitude of the RPV level change will cause level to lower below +55" (reactor scram trip setpoint).
d. Reactor water level will lower.

Technical Reference(s):	C-23076-C C-23077-C, Sheets 1-6 N1-ARP-H3, 4-6

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.7 45.7	

Comments:

Question # RO 63 SRO 64

Examination Outline Cross-Reference	Level	RO	RO
	Tier #	2	2
	Group #	3	1
	K/A #	261000 A.2.11	261000 A.2.11
	Importance Rating	3.2	3.3

Ability to (a) predict the impacts of the following on the REACTOR BUILDING EMERGENCY VENTILATION SYSTEM and (b) based on those predictions, use procedures to control, or mitigate the consequences of those abnormal abnormal operations: high drywell pressure.

Proposed Question:

Twenty-five (25) minutes following a large break loss of coolant accident, the Control Room "E" Operator reports that NO manual alignment changes have been made to the Reactor Building Emergency Ventilation System (RBEVS).

Which one of the following describes the concern with the RBEVS and the required action to be taken within five (5) minutes?

Design requirements will be exceeded because of ...

a. inlet humidity. Secure one of the two trains.

b. inlet temperature. Secure one of the two trains.

c. inlet humidity. Throttle outlet from one of the two trains.

d. inlet temperature. Throttle outlet from one of the two trains.

Proposed Answer: a. To ensure the 10 kw heater can reduce inlet humidity to within design requirements, one train of RBEVS must be secured within 30 minutes if the RBEVS automatically isolates.

Explanation (Justification of Distractors):
b, c, d – see justification above.

Technical Reference(s):	N1-OP-10, H.2.2 and associated Note N1-OP-10, D.7.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.5, 45.6	

Comments:

Question # RO 75 SRO 65

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	262001 K2.01	262001 K2.01
	Importance Rating	3.3	3.6

Knowledge of electrical power supplies to the following: Off-site sources of power.

Proposed Question:

The plant is at 100% power with the motor-operated disconnect (MOD 8106) between Line 1 (*South Oswego No. 1)* and Line 4 (*NMP-Fitzpatrick No. 4)* open. A loss of off-site power occurs.

Which one of the following describes the 115 KV distribution system response and the effect on the High Pressure Coolant Injection (HPCI) system availability?

a. The Bennett's Bridge Station will energize Line 4, but the *"R40"* breaker will NOT close. The HPCI system is NOT available.

b. The *"R10"* and *"R40"* breakers will NOT trip. The Bennett's Bridge Station Output Breakers open and remain open. The HPCI system is NOT available.

c. The Bennett's Bridge Station will energize transformer *"T101S"* and its associated power boards. The HPCI system is available but some components are locked out.

d. The Bennett's Bridge Station will energize the Fitzpatrick switchyard restoring power to transformers *"T101N"* and *"T101S."* The entire HPCI system is available.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. The R40 breaker will re-close and HPCI will be available with some components will be locked out.

b. The R10 and R40 breakers will open and then re-close when power is restored to *"NMP-Fitzpatrick No. 4"*.

d. Power is not restored to T101N and PB101, PB102, and PB11 remain deenergized. Not all HPCI components are available because of electrical lockouts.

Technical Reference(s): N1-OP-16, Rev 26, Section B
N1-OP-33A, Rev 19, Section B, Attachment 1 and 2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective: 01-OPS-001-259-1-01, EO-8, EO-9, 17f
01-OPS-001-262-1-01, EO-8

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 2

10 CFR Part 55 Content: 41.7

Comments:

Question # RO 64 SRO 66

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	264000 A2.10	264000 A2.10
	Importance Rating	3.9	4.2

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 operation: LOCA.

PB101 4160V AUX FEEDER 103 SUPPLY BKR

PB 2/21/00

Proposed Question:

Emergency Diesel Generator (EDG) 102 has been started and loaded to 2580 KW for the monthly surveillance when a LOCA and resulting reactor scram on high drywell pressure occurs. Two (2) minutes following the LOCA, ALL offsite sources are lost and Breakers R1013 and R1012 trip.

PB 101 4160V FEEDER 102 SUPPLY BKR

Which one of the following describes the effect the above conditions will have on EDG102 and 4160 PB 102?

a. EDG 102 engine and output breaker will **NOT** trip. EDG 102 will remain connected to PB 102.

b. EDG 102 output breaker will trip when offsite power is lost. EDG 102 is **NOT** available until the Diesel Generator over current lockout relay (86DG-2) is manually reset.

c. EDG 102 engine and output breaker will trip when the high drywell pressure signal is received. EDG 102 will automatically start and re-connect to PB 102 when all offsite power is lost.

d. EDG 102 output breaker will trip when the high drywell pressure signal is received. EDG 102 output breaker will close when PB 102 is de-energized during the loss of offsite power.

Proposed Answer: a. EDG 102 output breaker, R1022, will remain closed during the scram, there are no trip signals present with this condition and the breaker trips are blocked by the energizing of the Core Spray logic. The EDG will continue to power PB 102 when all off-site power is lost

Explanation (Justification of Distractors):

b. EDG breaker does not trip on loss of offsite power, if voltage lowers on the bus after the loss of power, the lockout relay 86-16, will energize and shed loads on the PB.
c. EDG engine and output breaker will not trip on a LOCA
d. EDG output breaker will not trip on a LOCA

Technical Reference(s): N1-OP-45, Sect. B
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.5	
	45.6	

Comments:

Question # RO 68 SRO 67

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	205000 K6.03	205000 K6.03
	Importance Rating	3.1	3.2

Knowledge of the effect that a loss or malfunction of the following will have on the SHUTDOWN COOLING SYSTEM: Recirculation System

Proposed Question:

The plant is shutdown with the Shutdown Cooling system operating.
NO Reactor Recirculation Pumps (RRP) are operating.

Per N1-OP-4 Offnormal Section H.1.0, Shutdown Cooling Without Reactor Recirculation Pumps, which one of the following describes the required RPV level and RRP loop valve configuration in this mode of shutdown cooling?

a. RPV level is above the main steam line nozzles. All loop suction valves are closed.

b. Reactor vessel and reactor cavity flooded. All loop discharge and discharge bypass valves are closed.

c. RPV level is above the RPV flange. Loop 15 suction valve, and loop 14 discharge and discharge bypass valves, are closed.

d. RPV level is above the steam separator. The suction, discharge, and discharge bypass valves for loop 11, 12, <u>or</u> 13 are open.

Proposed Answer: a. With no RRP running, vessel level is maintained above the Main Steam Line nozzles and all RRP loop suction OR discharge and discharge bypass valves closed to prevent thermal stratification. The Shutdown Cooling System suction is from the suction piping of RRP loop 14 and returns to the reactor vessel through the discharge piping of RRP loop 15. This information is provided to support the credibility of distractor "c" and "d".

Explanation (Justification of Distractors):

b. RPV level is only required to be above the Main Steam Line nozzles.
c. RPV level is only required to be above the Main Steam Line nozzles. All loop suction OR discharge and discharge bypass valves must be closed.
d. RPV level is required to be above the Main Steam Line nozzles. All loop suction OR discharge and discharge bypass valves must be closed.

Technical Reference(s): N1-OP-4, Rev 21, Section H.1.0.

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-205-1-01, EO-4b, EO-6	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7, 45.7	

Comments:

Question # RO 70 SRO 68

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	219000 K3.01	219000 K3.01
	Importance Rating	3.9	4.1

Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS/ SUPPRESSION POOL COOLING MODE will have on the following: Suppression pool temperature control.

Actual Nine Mile 1 event

Proposed Question:

Following a stuck open ERV you are directed to place Containment Spray System 121 in Torus Cooling using EOP-1, Attachment 16. The test valves are aligned as follows:

80-40, CONT SPRAY BYPASS BV 111.....................CLOSED
80-41, CONT SPRAY BYPASS BV 121.....................OPEN
80-44, CONT SPRAY BYPASS BV 112.....................CLOSED
80-45, CONT SPRAY BYPASS BV 111.....................CLOSED
80-118, CONT SPRAY TEST TO TORUS FCV...........CLOSED

When the operator attempts to position 80-118, they inadvertently open 80-40. The Containment Spray pump #121 is then started. Which of the following describes the effect of this lineup on Torus cooling?

a. It is effected because Containment Spray Pump 121 discharge will spray the drywell through containment spray loop #111.

b. It is effected because the Containment Spray System discharge into the torus is adjacent to Containment Spray Pump 121 suction.

c. It is NOT effected because a check valve is installed in the test line to prevent flow between Containment Spray loop 121 and loop 111.

d. It is NOT effected because flow through 80-40, CONT SPRAY BYPASS BV 111 flows into the Torus through Containment Spray Loop 111.

Proposed Answer: a. The 80-40 control switch is located directly below the control switch for 80-118, Opening 80-40 with 80-118 closed directs Cont. Spray pump 121 flow into the drywell sprays through loop 111.

Explanation (Justification of Distractors):

b. The Cont. Spray discharge is near the suction for 112 and 122 Cont. Spray pumps
c. Flow in to Cont. Spray loop 111 enters the drywell.
d. ThE check valve prevents flow into Cont. Spray loop during containment spray lineups, NOT torus cooling lineups.

Technical Reference(s): EOP-1, Attachment 16, Torus Cooling
(Attach if not previously provided) P&ID C-18012C, Sh 2

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.4	

Comments:

Question # RO 73 SRO 69

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	230000 K1.05	230000 K1.05
	Importance Rating	3.2	3.3
Knowledge of physical connections and/or cause-effect relationships between RHR/LPCI: TORUS SPRAY MODE and the following: A.C. electrical.			

Proposed Question:

During full power operations with the Containment Spray system in a normal standby lineup a large break LOCA occurs.

Which one of the following describes how the loss of PB 102 <u>or</u> PB 103 would effect Containment Spray?

a. Insufficient spray flow would exist because only one pump in each loop would discharge into the primary <u>and</u> secondary loops providing 50% flow in each.

b. Insufficient spray flow would exist because one pump would be required to provide a water seal while the other would discharge into either the primary <u>or</u> secondary loops.

c. Sufficient spray flow would exist because two 50% capacity pumps would discharge into either the primary <u>or</u> secondary loop providing 100% design flow in that loop.

d. Sufficient spray flow would exist because two pumps would be operating with only one required to provide full sprays from the primary <u>and</u> secondary loop.

Proposed Answer: d. Each containment spray pump is rated for 100% flow an open cross-tie valve on loops 111 and 122 insure that either of these pumps operating will supply the other header (Pumps 111 and 112 – supplied by PB 102 feeds the primary loop, Pumps 121 and 122 supplied by PB 103 feeds the secondary loop). Therefore either of the pumps into two loops would provide full rated spray flow.

Explanation (Justification of Distractors):

a. Each pump is rated at 100% of the required containment spray flow
b. Each pump is rated at 100% of the required containment spray flow and would discharge into both loops.
c. Each pump is rated at 100% , and they would spray into both loops (open cross-ties)

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

N1-OP-14, Section B
P&ID C-18012-C. Sheet 2

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.2 to 41.9	
	45.7 to 45.8	

Comments:

Question # RO 72 SRO 70

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	230000 A1.10	230000 A1.10
	Importance Rating	3.7	3.7
Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: TORUS SPRAY MODE controls including: System lineup.			

Proposed Question:

Following a LOCA and rupture of the Torus it becomes necessary to spray the containment. With the Containment Spray pumps NOT available which one of the following lineups is directed by EOP-1, Attachment 17?

a. Use one containment spray raw water pump per loop to spray through loops 11 and 12.

b. Use two containment spray raw water pumps per loop to spray through loops 111 and 122.

c. Line up the fire system to loops 111 and 122 and start the diesel fire pump or the electric fire pump.

d. Line up fire system to loop 11 and 12 and start the electric and diesel fire pumps or the unit 2 fire pump.

Proposed Answer: a. Per EOP-1, Att. 17, use one raw water pump per loop, the loops are cross connected so although the cross ties are physically to loops 111 and 122, spray water enters both loops (111and 121, 112 and 122)

Explanation (Justification of Distractors):
b. Only one pump per loop is used (with its' discharge valve throttled)
c. Fire system is not used for containment spray, only containment flooding.
d. Fire system is not used for containment spray, only containment flooding.

Technical Reference(s): N1-EOP-1, Attachment 17

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.5, 45.5	

Comments:

Question # RO 85 SRO 71

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	3	2
	K/A #	234000 A4.02	234000 A4.02
	Importance Rating	3.4	3.7
Ability to manually operate and/or monitor in the control room: Control rod drive system.			

Proposed Question:

The reactor core is being reloaded. Conditions are as follows:

- Reactor Mode Switch is in the REFUEL position
- All control rods are fully inserted into the reactor core

Step 19: removal and transfer of a fuel assembly to the fuel pool. The fuel assembly has been unlatched in the fuel pool.
Step 20: transfer of a fuel assembly to the reactor core. The fuel assembly has just been latched in the fuel pool. The main hoist has NOT been raised.

Which one of the following describes when the Rod Block Monitor Panel REFUEL INTERLOCK indicator lights during the performance of **Step 20**?

a. LIGHTS when the main hoist is raised to the Normal-Up position in the fuel pool.

b. LIGHTS when the main hoist is Normal-Up and the refuel bridge is moved over the reactor core.

c. LIGHTS when the refuel bridge is over the reactor core and the main hoist is lowered from Normal-Up position.

d. LIGHTS when the fuel assembly is lowered into the reactor core and the main hoist load lowers below 400 psig.

Proposed Answer: b.

Explanation (Justification of Distractors):
a. The refuel bridge must be over the reactor core.
c. This is correct if the main hoist is not loaded.
d. The indications are that the HOIST LOADED light clears and then the SLACK

CABLE light turns on at the refuel bridge interlock display. Not a rod block.

Technical Reference(s): N1-OP-34, H.4.0 (note)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7	
	45.6, 45.6, 45.7, 45.8	

Comments:

Question # RO 60 SRO 72

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	2
	K/A #	259001 K6.03	259001 K6.03
	Importance Rating	2.9	3.1

Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR FEEDWATER SYSTEM: A.C. electrical power.

Proposed Question:

The plant is operating at 100% power.

- A loss of offsite power occurs
- A HPCI initiation signal is received
- Feedwater Booster Pump (FBP) 13 fails to start when power is restored to PB 11 and PB 12

Which one of the following describes the response of FBP 11?

a. FBP 11 will NOT start automatically and CANNOT be started manually.

b. FBP 11 will automatically start provided its control switch is NOT in PULL-TO-LOCK.

c. FBP 11 will NOT automatically start, but can be manually started after the bus low voltage relay is reset.

d. FBP 11 will automatically start after its control switch is positioned to TRIP and returned to NEUTRAL.

Proposed Answer: d. When power is restored to PB 11 and PB 12, FBP 11 will not start until its control switch is placed in either TRIP or CLOSE to reset the BP11X relay and allow low discharge header to auto-start the pump.

Explanation (Justification of Distractors):

a. Pump will not auto-start, but it can be manually started.
b. Pump will not auto start in any breaker position because the auto start circuit has been defeated.
c. There is no need to reset the flag (at the breaker). The FBP circuit must be reset by placing its control switch in TRIP or CLOSE.

Technical Reference(s): N1-OP-16, Rev 26, Section B.
01-OPS-001-259-1-01

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	2
10 CFR Part 55 Content:	41.7 45.7	

Comments:

Question # RO 76 SRO 73

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	262002 K4.01	262002 K4.01
	Importance Rating	3.1	3.4

Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and or interlock(s) which provide for the following: Transfer from preferred power to alternate power supplies.

Proposed Question:

The reactor is in cold shutdown with a normal electrical lineup when AC power is lost to PB 12. With NO OPERATOR ACTIONS, which ONE of the following AC power supplies would supply the RPS scram trip solenoid valves following this loss of power?

	Rx Trip System 11	Rx Trip System 12
a.	None	PB 141C
b.	I&C Bus 130	PB 131A
c.	PB141A	I&C Bus 130
d.	PB131A	None

Proposed Answer: d. The transfer of power supplies is manual. When power is lost to PB 12 power is also lost to RPS MG Set 141, which is powered by PB 141C (via PB12). Power to RPS MG Set 131 is un-affected so RPS 11 is un-affected.

Explanation (Justification of Distractors):

a. PB 131 is un-affected so RPS 11 is un-affected, PB 141C is de-energized
b. RPS 11 is powered from PB 131A which can not supply RPS 12
c. RPS 11 is powered from PB 131A, Powering RPS 12 from I&C 130 requires a manual transfer.

Technical Reference(s): (Attach if not previously provided)	N1-OP-40 N1-OP-48, Sect. H.4.0, H.5.0 N1-OP-30, Sect. B

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 77 SRO 74

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	2	2
	Group #	2	2
	K/A #	263000 K2.01	263000 K2.01
	Importance Rating	3.1	3.4
Knowledge of electrical power supplies to the following: Major D.C. loads.			

Proposed Question:

Which one of the following describes a plant effect from a loss of power to Battery Board 11?

a. PB 101 feeder breakers R1011 and R1014 "A" Panel controls and trip protection will NOT function.

b. EC 11 Condensate Return Valve control switch in the Control Room still functions although its valve position indication is NOT available.

c. ERV 111, 112, and 113 control switches at the F Panel still function but these ERVs will NOT open for an ADS actuation.

d. EDG 102 Output Breaker R1022 still functions from the Control Room but breaker position indication is NOT available.

Proposed Answer: b. Only the valve position indication is lost. The valve will still operate from the K Panel.

Explanation (Justification of Distractors):
a. These valves are powered from Battery Board 12.
c. RV 111, 112, and 113 control at the F Panel is lost, and the valves will NOT function in the automatic pressure relief mode or the ADS mode.
d. Breaker will NOT function from the Control Room, its control power is lost.

Technical Reference(s): N1-OP-47A, Attachment 4 (Loss of BB 11/12)

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	

Comments:

Question # RO 78 SRO 75

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	271000 A2.04	271000 A2.04
	Importance Rating	3.7	4.1
Ability to (a) predict the impacts of the following on the OFFGAS SYSTEM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Offgas system high radiation.			

Proposed Question:

The plant is operating a 100% power when fuel element failures cause high radiation in the main steam lines and condenser. Which one of the following is the **most direct** path for this radiation to the plant stack?

a. Steam Jet Air Ejectors

b. Off-Gas Vacuum Pumps

c. Off-Gas Sample Pumps

d. Steam Packing Exhausters

Proposed Answer: d. All the other components have filters or discharge into the 30 minute holdup, the SPEs take steam and air directly from the turbine glands and discharge through a 1.75 minute holdup directly to the plant stack.

Explanation (Justification of Distractors):

a. Air ejectors discharge through the off-gas system, where gases and particulate radioactive material are removed, it is not direct to the stack.

b. Off-gas vacuum pumps take a suction from the off gas system, the 30 minute holdup, charcoal absorbers and recombiners would significantly reduce any radiation, this is not direct to the stack.

c. The Off-Gas sample pumps discharge into the 30 minute holdup.

Technical Reference(s):	N1-ARP-H1, 1-8 01-OPS-001-255-1-01	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.5 45.6	

Comments:

Question # RO 79 SRO 76

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	272000 K4.02	272000 K4.02
	Importance Rating	3.7	4.1

Knowledge of RADIATION MONITORING System design feature(s) and or interlock(s) which provide for the following: Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded.

Proposed Question:

During an airborne radiation condition in the secondary containment the Reactor Building Ventilation (RBV) Radiation Monitor, RN07A5, reaches 5 mr/hr.

Which one of the following describes how this will effect the Reactor Building Ventilation and the Emergency Ventilation (EV) systems?

a. RBV shuts down and both EV systems 11 and 12 start.

b. Only when the RBV Radiation Monitor, RN07B5, reaches 5 mr/hr will the RBV shutdown and the EV systems start.

c. RBV shuts down and EV systems 11 starts. When RBV Radiation Monitor, RN07B5 reaches 5 mr/hr EV system 12 starts.

d. Only if the second RBV Radiation Monitor, RN07B5, reaches its' high level trip <u>or</u> fails downscale (0.1 mr/hr) will RBV shutdown and the EV systems start.

Proposed Answer: a. When either Rad Monitor reaches 5 mr/hr Reactor Building Ventilation will shutdown and both Emergency Ventilation systems will start.

Explanation (Justification of Distractors):

b. A second high radiation is not required, one will cause the trip and auto start. Off-Gas requires two.
c. Both EVS trains start on a single monitor.

d. A second monitor is not required for this function

Technical Reference(s): N1-ARP-L1 (4-3)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	

10 CFR Part 55 Content: 41.7

Comments:

Question # RO 80 SRO 77

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	286000 K5.04	286000 K5.04
	Importance Rating	2.9	2.9

Knowledge of the operational implications of the following concepts as they apply to the FIRE PROTECTION SYSTEM: Valve operation.

Proposed Question:

The Fire Detection System senses a fire in Hazard C-2123, Power Board Room 102. The following Alarm Detection Zones are received at the Main Fire Control Panel:

- DX-2123A
- DX-2123B

Which one of the following describes the response of the Fire Protection system?

a. Deluge system actuated and the fixed foam system pump is operating.

b. Deluge system actuated and the motor-driven fire pump is running.

c. Local horn and light actuate, and after 30 seconds carbon dioxide is discharged.

d. Local alarm and strobe light actuate after halon flow is detected in the zone discharge line.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. This area has CO2 fire suppression. Foam suppression systems are for the Main turbine island and lube oil areas.

b. This area has CO2 fire suppression. Water suppression system are throughout the plant but not in electrical areas.

d. This area has CO2 fire suppression. Halon suppression systems are in electronic equipment areas such as the auxiliary control room, EC isolation valve room, Security Alarm Station, Security CPU/Equipment Room, RSSB

Control Room, and RSSB Electrical Equipment Room.
Technical Reference(s): N1-OP-21C, Section b

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.5, 45.3	

Comments:

Question # RO 81 SRO 78

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	290003 A3.01	290003 A3.01
	Importance Rating	3.3	3.5

Ability to monitor automatic operations of the CONTROL ROOM HVAC including: Initiation / reconfiguration.

Proposed Question:

Which one of the following describes how the control room ventilation system will respond to a temperature of 205°F in the steam tunnel?

a. There will be no effect unless outside air contamination rises above 168 cpm.

b. There will be no effect unless the temperature occurs with a high steam flow signal.

c. The normal outside air supply will isolate and air will be redirected through an emergency filtration system.

d. The outside air supply will isolate and Control Room ventilation will shift to recirculation mode with HEPA and charcoal filters.

Proposed Answer: c. High steam tunnel temp will isolate the normal supply to CR HVAC, and start and lineup emergency ventilation.

Explanation (Justification of Distractors):

a. Outside air >168 cpm will cause an automatic initiation of CR ventilation, but it is not needed, because high steam tunnel temperature will initiate it.

b. No confirmation signal is required, high steam flow will also cause CR HVAC to shift to emergency mode.

d. CR HVAC does not shift to recirculate, the outside air is filtered.

Technical Reference(s): N1-OP-49, sect. B
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	41.7	
	45.7	

Comments:

Question # RO 83 SRO 79

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	400000 K1.02	400000 K1.02
	Importance Rating	3.2	3.4
Knowledge of the physical connections and/or cause-effect relationships between CCWS and the following: Loads cooled by CCWS.			

Proposed Question:

The plant has been operating at 100% power for 75 days when the AO assigned to the turbine upper rounds reports that the Reactor Building Closed Loop Cooling (RBCLC) elevated drain is leaking a steady stream of water.

Which one of the following is the cause?

a. A high level in the Closed Loop Cooling Makeup Tank.

b. Tube leak in #13 Instrument Air Compressor heat exchanger.

c. A third RBCLC pump has been manually or automatically started.

d. Tube leak in Reactor Cleanup non-regenerative heat exchanger.

Proposed Answer: d. System pressure must be higher than the RBCLC pressure at the location of the leak. Cleanup NRHX is the only leak identified above that has ample pressure to cause in-leakage to the RBCLC system and cause leakage at the elevated drain in the turbine building (RBCLC cannot flow into the Makeup Tank because there are check valves on lines into RBCLC).

Explanation (Justification of Distractors):

a. The elevated drain is above the level for a high level in the tank.
b. This would leak into the TBCLC system.
c. The makeup tank and elevated relief are on the suction of the pumps and would not be effected by pump discharge pressure.

Technical Reference(s):	N1-OP-11, Section B P&ID C-18022-C (TBCLC) N1-ARP-H1, 4-4

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	41.2 to 41.9 45.7, 45.8	

Comments:

Question # RO 65 SRO 80

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	3
	K/A #	201003 A1.01	201003 A1.01
	Importance Rating	3.7	3.8
Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including: Reactor Power			

Proposed Question:

The plant is operating at 100% power near the end of cycle with all control rods fully withdrawn. The SCRAM INLET VALVE for control rod 22-23 opens.

Which one of the following describes the plant response over the next five (5) minutes, including why?

a. Reactor power will be downscale on APRMs. The reactor will scram due to high Scram Discharge Volume level.

b. Reactor power will remain at 100%. **NO** control rod motion occurs. **NO** leakage into the Scram Discharge Volume occurs.

c. Reactor power will be lower. The affected control rod will insert. **NO** leakage into the Scram Discharge Volume occurs.

d. Reactor power will be lower. The affected control rod will insert. Leakage into the Scram Discharge Volume occurs, but **NO** scram occurs.

Proposed Answer: c.

Explanation (Justification of Distractors):

a. A reactor scram will not occur. The SDV level will not change.
b. The control rod will insert into the core. A single control scram will reduce reactor power.
d. No leakage will occur into the SDV.

Technical Reference(s):	01-OPS-001-210-1-01

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.		
	Modified Bank #		
	New	New	
Question History:	Previous NRC Exam		
	Previous Test / Quiz		
Question Cognitive Level:	Memory of Fundamental Knowledge		
	Comprehension or Analysis		2
10 CFR Part 55 Content:	41.5		
	45.5		

Comments:

Question # SRO 81

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	3
	K/A #	233000 2.1.10
	Importance Rating	3.9
Knowledge of conditions and limitations in the facility license.		

Proposed Question: 141°F

With the Fuel Pool heat load normal, Fuel Pool temperature rises to ~~126~~°F during maintenance on the system. Which one of the following describes the concern with the Fuel Pool Filtering and Cooling System?

a. The licensing basis for the system is invalid.

b. The ion exchange capability of the filters is ineffective.

c. The cooling capability of both heat exchangers is exceeded.

d. The ability to control airborne radiation levels on the refuel floor has been lost.

Proposed Answer: a.

Explanation (Justification of Distractors):

b. The resin is not affected until higher temperatures (@ 150°F). Although the ion exchange capability may be slightly affected at this lower temperature, the capability is not ineffective.

c. The second heat exchanger could be used to lower temperature.

d. The system does not control refuel floor radiation levels.

Technical Reference(s): N1-OP-6, Rev 15, Section B, D.4, D.5

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	43.1 45.13	

Comments:

Question # RO 74 SRO 82

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	3
	K/A #	239001 A3.01	239001 A3.01
	Importance Rating	4.2	4.1

Ability to monitor automatic operations of the MAIN AND REHEAT STEAM SYSTEM including: Isolation of main steam system.

Proposed Question:

The plant is at 80% power. The 125 VDC Battery Board 11 and 12 power to the Main Steam Isolation Valves (MSIVs) is lost.

Which one of the following states the FINAL position of the inboard and outboard MSIVs due to this power loss?

	Inboard MSIV Position	Outboard MSIV Position
a.	Open	Open
b.	Closed	Open
c.	Open	Closed
d.	Closed	Closed

Proposed Answer: c. The inboard isolation valves (01-01 and 01-02) are AC powered from PB161B and PB 171B respectively. Upon loss of power, the inboard isolation valves fail AS IS. The outboard isolation (01-03 and 01-04) valves are air-operated but have dual solenoids powered from the 125VDC distribution system. Upon loss of power, the outboard isolation valves fail closed.

Explanation (Justification of Distractors):

a. Upon loss of power, the outboard isolation valves fail closed.
b. Upon loss of power, the inboard isolation valves fail AS IS. Upon loss of power, the outboard isolation valves fail closed.
d. Upon loss of power, the inboard isolation valves fail AS IS.

Technical Reference(s): N1-OP-47A, Rev 17, Section H.9.0, H.10.0

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:	01-OPS-001-239-1-01, EO-10a	
Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.7, 45.7	

Comments:

Question # SRO 83

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	3
	K/A #	Generic 2.1.12
	Importance Rating	4.0
Ability to apply technical specifications for a system.		

Proposed Question:

The plant is in a refueling outage. The following conditions exist:

- At 0800 on June 1, a core reload is started.
- At 0900 on June 1, #11 Reactor Building Emergency Ventilation System (RBEVS) is declared inoperable. It will be out of service for 6 days.
- At 0900 on June 5, it is discovered that the last performance of N1-ST-M8 for #12 RBEVS was 45 days ago.

Per Technical Specifications, which one of the following describes the required actions?

a. Initiate action to complete N1-ST-M8 for #12 RBEVS by 0900 on June 6 and movement of irradiated fuel may continue.

b. At 0900 on June 5, #12 RBEVS must be declared inoperable and core alterations must be stopped.

c. If N1-ST-M8 is not complete for #12 RBEVS by 2100 on June 7, then the movement of irradiated fuel must be stopped.

d. If #12 RBEVS is not in operation by 0800 on June 8, then core alterations must be stopped.

Proposed Answer: b. With one RBEVS system inoperable, core alterations may continue provided the other RBEVS is OPERABLE. With both RBEVS inoperable, core alterations must be suspended. When it is discovered that the monthly surveillance for the #12 RBEVS is beyond its surveillance interval (31 days plus 25% extension) it must be declared inoperable and core alterations must be stopped.

Explanation (Justification of Distractors):

a. There is no time allowance to not declare the equipment inoperable for a missed surveillance. When it is discovered that the monthly surveillance for the #12 RBEVS is beyond its interval (31 days plus 25% extension) it must be declared inoperable and core alterations must be stopped.

c. There are no provisions in Technical Specifications to delay declaring the equipment inoperable for a missed surveillance. This answer also uses the 36 hour completion time to place the plant in a condition where RBEVS is not required.

d. This answer also uses the 7 day completion time to place the OPERABLE RBEVS into operation to continue core alterations. There is no OPERABLE RBEVS to place into operation.

Technical Reference(s): Tech Spec 3.4.4

Proposed references to be provided to applicants during the examination:

EOPs with entry conditions blacked out.
Tech Spec 3.4.1 through 3.4.4 (all)

Learning Objective:

Question Source:	Bank No.		
	Modified Bank #		
	New	New	
Question History:	Previous NRC Exam		
	Previous Test / Quiz		
Question Cognitive Level:	Memory of Fundamental Knowledge		
	Comprehension or Analysis		2
10 CFR Part 55 Content:	43.2, 43.5, 43.6, 43.7		
	45.3		

Comments:

Question # RO 90 SRO 84

Examination Outline	Level	RO	SRO
Cross-Reference	Tier #	3	3
	Group #	3	2
	K/A #	2.1.2	2.1.2
	Importance Rating	3.0	4.0
Knowledge of operator responsibilities during all modes of plant operations			

Proposed Question:

During your shift the following events occur:

1. The emergency plan is entered because of a security-related event.
2. Work on replacing a safety related breaker is NOT completed before its' extended late date.
3. Before being used in a surveillance test a pressure gauge is determined to be out of calibration.
4. The plant enters a Technical Specification LCO because the acceptance criteria for a Surveillance Test are NOT met.

Per NIP-ECA-01, DEVIATION/EVENT REPORT, which two events require the initiation of a DER?

a. 1 and 2.

b. 2 and 4.

d. 3 and 1.

d. 4 and 3.

Proposed Answer: b.
Preventive maintenance activities not completed before late date or deferrred date require a DER. Test failures require a DER.
Explanation (Justification of Distractors):
a. Security related events are documented per Nuclear Security Procedures. They are exempt from this procedure.
c. Security related events are documented per Nuclear Security Procedures. They are exempt from this procedure. Out-of-calibration M&TE must have adversely or potentially adversely affected other plant equipment.
d. Security related events are documented, reported, and evaluated per

Nuclear Security Procedures. They are exempt from this procedure.

Technical Reference(s): NIP-ECA-01, Section 1.1, 1.2

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.10 45.13	

Comments:

Question # SRO 85

Examination Outline Cross-Reference	Level	SRO
	Tier #	
	Group #	
	K/A #	Generic 2.1.32
	Importance Rating	3.8
Ability to explain and apply system limits and precautions.		

Proposed Question:

Per the station reactivity management procedures and the Reactivity Control Book, which one of the following activities requires a Reactivity Brief prior to performance?

a. Adjusting APRM gain factors on all channels.

b. Adjusting RPV water level from +69" to +71".

c. Raising reactor power using recirc flow for power maintenance.

d. Lowering reactor power from 1845 to 1800 MWth using recirc flow.

Proposed Answer: d.

Explanation (Justification of Distractors):

a. Specifically not required per N1-OP-43A, and Attachment 2.
b. Specifically not required per N1-OP-43A, and Attachment 2.
c. GAP-OPS-05 states routine recirc flow changes per the CRC book needed to maintain the desired power level do not require a formal reactivity brief.

Technical Reference(s): N1-OP-43A, and Attachment 2.
Reactivity Controls Book

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New

Question History:	Previous NRC Exam
	Previous Test / Quiz

Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	

10 CFR Part 55 Content: 55.43.b. 5

Comments:

Question # SRO 86

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.1.7
	Importance Rating	4.4

Ability to evaluate plant performance and make operational judgements based on operating characteristics/ reactor behavior/ and instrument interpretation.

Proposed Question:

A reactor heat balance has been performed. You notice that the value for recirculation pump energy has **NOT** been included in the calculation.

The calculated reactor power from this heat balance was 1618 MW_{th}.

Following the heat balance the APRM gains were adjusted to reflect the new power level. The APRMs read 87.5% with their GAFs set at 1.0. Which one of the following is correct?

a. Actual power is greater than the indicated power.

b. The APRMs are reading higher than actual reactor power.

c. APRMs indicate true reactor power but the APRM scram setpoint is more conservative.

d. APRMs indicate true reactor power but the APRM scram setpoint is non-conservative.

Proposed Answer: b. Actual reactor power is equal to the energy that must be added to the water energy entering the core (feedwater energy + recirc pump energy) to produce the energy of the steam leaving the reactor. The calculated core power has less energy entering the core (it omits recirc pump heat). So the calculated power attributes the recirc pump heat to the core, it overstates core power. If the APRMs have been calibrated to this power they are indicating more than actual reactor power.

Explanation (Justification of Distractors):

a. The APRMs were calculated to a higher core power than actual so they read higher than actual power. Actual power id less than indicated.
c. The APRMs do not indicate true power, the loss of the recirc power in the heat balance effects more than the flow biased scram setpoint.
d. The APRMs do not indicate true power, the loss of the recirc power in the heat balance effects more than the flow biased scram setpoint.

Technical Reference(s): N1-REP-8, Core Thermal Power
(Attach if not previously provided)

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 3

10 CFR Part 55 Content: 43.1, 43.2
45.5, 45.12, 45.13

Comments:

Question # RO 91 SRO 87

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.1.29	Generic 2.1.29
	Importance Rating	3.4	3.3
Knowledge of how to conduct and verify valve lineups.			

Proposed Question:

In accordance with the Operations Manual, which one of the following set of conditions permit the independent verification of a valve to be waived, for a valve that will be repositioned during a valve lineup?

a. The valve requires the use of a ladder so that it is accessible.

b. The valve location will cause the verifier to receive a high dose.

c. The valve must be locked and is locked in position by the performer.

d. The valve area has an ambient temperature in excess of 95°F and high humidity.

Proposed Answer: b.

Explanation (Justification of Distractors):
a. Not a permitted waiver for independent verification.
c. Not a permitted waiver for independent verification.
d. Not a permitted waiver for independent verification.

Technical Reference(s):	Operations Manual, Section 3.10.3.e	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	10CFR55.41.10	
	10CFR55.45.1	
	10CFR55.45.12	

Comments:

Question # SRO 88

Examination Outline Cross-Reference	Level	
	Tier #	
	Group #	
	K/A #	Generic 2.1.23
	Importance Rating	4.0
Ability to perform specific system and integrated plant procedures during different modes on plant operation.		

Proposed Question:

The plant is at 100% power. The following Emergency Cooling (EC) System components become inoperable:

- 0800 on July 1: 05-05, EC VENT TO TORUS BV 11 declared inoperable.
- 0800 on July 6: 05-07, EC VENT TO TORUS BV 12 declared inoperable.

ASSUME that these EC valves CANNOT be restored to operable status. Which one of the following describes the LATEST time and date that the plant must be in Cold Shutdown?

a. 1800 on July 6.

b. 1800 on July 8.

c. 1800 on July 15.

d. 1800 on July 20.

Proposed Answer: ~~d~~ c error in typing EWS 7/26/00 corrected 7/27/00

Explanation (Justification of Distractors):

a. Based on declaring both EC systems (not just the torus vents) inoperable at the designated times permitting 10 hours to be in Cold Shutdown.

b. Based on declaring EC 11 system inoperable at 0800 on July 1 permitting 7 days to restore to operable status. If not restored within 7 days, then 10 hours is allowed to be on Cold Shutdown.

d. ~~c.~~ Based on the 30 days to restore the vent to operable status being changed to 14 days when the other vent is declared inoperable and applying the 14 days and then 10 hours to the time that EC 11 vent was declared inoperable.

Technical Reference(s): Technical Specification 3.1.3, d.1 and d.2

Proposed references to be provided to applicants during the examination:

Technical Specification 3.1.3 (ALL)

Learning Objective: 01-OPS-001-207-1-01, EO-3, EO-11

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	45.2, 45.6 43.2	

Comments: SRO only. Technical Specification application.

Question # RO 94 SRO 89

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.2.13	Generic 2.2.13
	Importance Rating	3.6	3.8
Knowledge of tagging and clearance procedures.			

Proposed Question:

Which one of the following describes the use of a CONTROL TAG posted on a control switch located in the Reactor Building?

a. To allow operation of a component that is not covered under station procedures.

b. To identify that a station employee with CSO permission can operate the control switch.

c. To provide protection to personnel or equipment when a component is undergoing maintenance.

d. To present instructions regarding the safe operation of a component as a result of an abnormal condition.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Control tags are not used for personnel protection and although they allow operation of the component they do not supplement procedures

c. Control tags are not used for personnel protection.

d. Control tags are not used to control abnormal conditions and resulting equipment operation.

Technical Reference(s): (Attach if not previously provided)	GAP-OPS-02, 3.14, Rev 10	

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	41.10 45.13	

Comments:

Question # RO 92 SRO 90

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.2.22	Generic 2.2.22
	Importance Rating	3.7	4.1
Knowledge of limiting conditions for operations and safety limits.			

Proposed Question:

The plant is operating at 25% with Feed Water Pump (FWP) 12 in service. A plant transient occurs resulting in the following conditions:

- FWP 12 trips and level lowers to 48" above TAF before a second feed pump is started and level is restored.
- The plant did not scram automatically but a manual scram was successfully inserted.
- No additional actions have been taken.

Which of the following correctly describes the Tech. Spec. concerns associated with this event?

a. A Limiting Safety System Setting and a Safety Limit were exceeded.

b. Neither a Safety Limit nor a Limiting Safety System Setting were exceeded.

c. A Safety Limit was exceeded but no Limiting Safety System Settings were exceeded.

d. A Limiting Safety System Setting was exceeded but no Safety Limits were exceeded.

Proposed Answer: a. LSSS 2.1.2.d scram at 53" and safety limit 2.1.1.c on failure to scram on expected signal were exceeded.

Explanation (Justification of Distractors):
b. LSSS and a Safety Limit were exceeded
c. LSSS and a Safety Limit were exceeded
d. LSSS and a Safety Limit were exceeded

Technical Reference(s): (Attach if not previously provided)	T.S. 2.1.1 and 2.1.2	

Proposed references to be provided to applicants during the examination:

N/A

Learning Objective:

Question Source:	Bank No.	New
	Modified Bank #	
	New	
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	
	Comprehension or Analysis	2
10 CFR Part 55 Content:	43.2	
	45.2	

Comments:

Question # SRO 91

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.2.17
	Importance Rating	3.5

Knowledge of the process for managing maintenance activities during power operations.

Proposed Question:

The unit is operating at 100% power. 115 KV switchyard maintenance is in progress and will be completed in 24 hours. Maintenance has also requested to work on one of the following this shift: **EDG 102, EC 11, ~~CS~~ Core Spray 12, Battery 11.** PB 7/21/00

To comply with GAP-PSH-03, Control of On-Line Work Activities, which one of the following can be approved for removal from service this shift without introducing a higher than usual risk?

a. Removal of EC 11 from service.

b. Removal of ~~CS~~ Core Spray 12 from service. PB 7/21/00

c. Removal of EDG 102 from service.

d. Removal of Battery 11 from service.

Proposed Answer: b.

Explanation (Justification of Distractors):
If plant activities introduce a higher than usual risk of an initiating event such as a loss of offsite power, SSCs that perform key safety functions such as diesel generators, emergency condensers,and batteries, should not be removed from service.

Technical Reference(s): GAP-PSH-03, Rev 02, 3.2.5 and 3.3.1.d

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	43.5	
	45.13	

Comments:

Question # SRO 92

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.2.11
	Importance Rating	3.4
Knowledge of the process for controlling temporary changes.		

Proposed Question:

A Type 1 change to N1-OP-43A, Reactivity Control, that does NOT alter the intent of the procedure is requested. Per Technical Specifications, which one of the following satisfies the approval requirements to implement the temporary change?

a. The GSO or the SSS approve the change.

b. The CSO and the ASSS approve the change.

c. The Manager of Operations or Plant Manager approve the change.

d. The SSS and a member of management staff approve the change.

Proposed Answer: d.

Explanation (Justification of Distractors):
The intent of the procedure is not altered. The change must be approved by at least two members of the unit management staff, at least one who holds a Senior Reactor Operator license on the unit affected.

The change is documented, reviewed, and approved within 14 days of implementation by the branch manager or higher levels of management. This is not required to answer the question because it only asks for the approvals to implement the change.

Explanation (Justification of Distractors):
a. Another member of management staff must also approve the change.
b. The CSO is not a member of management staff.
c. Two people must approve the change and one of the members of management staff must be a SRO on the unit.

Technical Reference(s):	Tech. Spec. 6.8.3	

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 1
10 CFR Part 55 Content:	43.3 45.12	

Comments:

Question # SRO 93

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.3.4
	Importance Rating	3.1
Knowledge of radiation exposure limits and contamination control / including permissible levels in excess of those authorized.		

Proposed Question:

Following a LOCA, it is necessary to authorize an emergency exposure for an individual who has volunteered to enter a very high radiation area to protect valuable property.

- The individual has an accumulated TEDE of 3200 mrem for the year.
- The TSC is NOT activated.

In accordance with EPIP-EPP-15, Emergency Health Physics Procedure, which one of the following describes the MAXIMUM permissible dose and approval requirement to receive the dose?

a. 10 rem approved by the Plant Manager.

b. 6.8 rem approved by the Plant Manager.

c. 10 rem approved by the Site Emergency Director.

d. 6.8 mrem approved by the Site Emergency Director.

Proposed Answer: c. Emergency exposure limits are exclusive of current occupational exposure, therefore, 10 rem is permitted. The SED approves emergency exposures, not the Plant Manager. The Plant Manager has final approval for exposure above the administrative limit (4000 mrem) but this approval requirement is not required in an emergency.

Explanation (Justification of Distractors):

a. The SED approves emergency exposures, not the Plant Manager.

b. Emergency exposure limits are exclusive of current occupational exposure, therefore, 10 rem is permitted. The SED approves emergency exposures, not the Plant Manager.

d. Emergency exposure limits are exclusive of current occupational exposure, therefore, 10 rem is permitted.

Technical Reference(s): EPP-EPIP-15, Attachment 1

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No.	
	Modified Bank #	
	New	New
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	43.3	
	45.10	

Comments:

Question # SRO 94

Examination Outline	Level	SRO
Cross-Reference	Tier #	-
	Group #	Generic
	K/A #	2.3.11
	Importance Rating	3.2
Ability to control radiation releases.		

Proposed Question:

The plant was at 100% power when a reactor scram occurred. The following conditions are present:

- RPV Level is +70" indicated on the Narrow Range instruments
- RPV Pressure is 760 psig
- EC 11 Shell temperature and level have rapidly risen
- EC 11 CANNOT be isolated
- Radiation Protection reports the projected integrated off-site dose rate is above the General Emergency action level

Which one of the following describes the required actions?

a. Perform an RPV blowdown.

b. Open all EC vents to the torus.

c. Rapidly depressurize the RPV using EC 12.

d. Evacuate all ERPAs within 10 miles of the site.

Proposed Answer: a. Rad Release EOP for GE and primary system discharging outside containment.

Explanation (Justification of Distractors):

b. The vents are on the main steam line to the EC. Opening the vents will be ineffective in reducing the release.
c. This is an appropriate action before the General Emergency level is reached. Once the General Emergency level is reached, the required action is to open 3 ERVs (RPV blowdown).
d. Only evacuate areas 2 miles around and 5 miles downwind and shelter all remaining areas.

Technical Reference(s): N1-EOP-6, Radioactivity Release Control

Proposed references to be provided to applicants during the examination:

All EOPs with the EOP entry conditions blacked out.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	43.b.4, 43.b.5 45.9, 45.10	

Comments:

Question # RO 96 SRO 95

Examination Outline	Level	-	-
Cross-Reference	Tier #	-	-
	Group #	Generic	Generic
	K/A #	2.3.10	2.3.10
	Importance Rating	2.9	3.3
Ability to perform procedures to reduce excessive levels of radiation and guard against radiation exposure.			

Proposed Question:

Which one of the following conditions allow leaving a Very High Radiation Area entryway OPEN?

a. Any time during EOP operations.

b. Whenever anyone is inside that area.

c. When the area is under direct surveillance.

d. Any time an Radiation Work Permit (RWP) is issued for entry.

Proposed Answer: c. Any time the entry is under direct surveillance so that entry is controlled (also while it's being used)

Explanation (Justification of Distractors):

a. EOPs do not allow relaxation of the locked requirements.
b. The area must still be locked to prevent anyone else, who may not be authorized to enter.
d. An RWP is always required for entry into this area, but it must be controlled (locked) to prevent un-authorized access.

Technical Reference(s): GAP-RPP-01, Attachment 1

Proposed references to be provided to applicants during the examination:

None

Learning Objective:		
Question Source:	Bank No.	
	Modified Bank #	
	New	NEW
Question History:	Previous NRC Exam	
	Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge	1
	Comprehension or Analysis	
10 CFR Part 55 Content:	10CFR55.43.4	
	10CFR55.45.10	
Comments:		

Question # RO 97 SRO 96

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.3.2	Generic 2.3.2
	Importance Rating	2.5	2.9
Knowledge of facility radiation ALARA requirements.			

Proposed Question:

In accordance with GAP-RPP-08, Control of High, Locked High, and Very High Radiation Areas:

When comparing requirements for a High Radiation Area to requirements for a <u>locked</u> High Radiation Area, which one of the following **ONLY** applies to the <u>locked</u> High Radiation Area?

a. SSS approval is required prior to key issue for entry.

b. The Control Room shall be contacted prior to entering the area.

c. A Specific RWP must be developed and issued prior to entering the area.

d. The RWP shall specify the maximum stay time and dose rates in the work area.

Proposed Answer: d.

Explanation (Justification of Distractors):

a. Radiation protection controls the keys.
b. Although the control room will be informed of the entry, this is not a requirement specific to either area.
c. This is an optional requirement for entry into both areas, however, a General RWP could be used for either area. A SRWP is required for entry into a Very High Radiation Area.

Technical Reference(s):	GAP-RPP-08, Rev 05, Section 3.3.1 Tech. Spec. 6.12

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 NEW
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	10CFR55.41.12 10CFR55.43.4 10CFR55.45.9 10CFR55.45.10	

Comments:

Question # RO 98 SRO 97

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	-	-
	K/A #	Generic 2.4.1	Generic 2.4.1
	Importance Rating	4.3	4.6
Knowledge of EOP entry conditions and immediate action steps			

Proposed Question:

During a startup with the plant operating at 29% power a spurious scram occurs. Given the following conditions:

- Reactor scrammed, seven rods at position 02, five at 04, all others at 00.
- MSIVs open
- RPV pressure 965 psig
- RPV level 61 inches
- Drywell temperature 144°F
- Torus water temperature 88°F
- Drwell pressure 3.2 psig
- Torus level 10.3 feet
- No indications of fuel damage
- All plant temperatures and radiation levels are normal.

Which one of the following states **all** the EOPs and/or SOPs the crew is required to enter because their entry conditions have been met?

a. SOP-1, REACTOR SCRAM, SOP-17 VESSEL/CONTAINMENT ISOLATION

b. EOP-2, RPV CONTROL, EOP-3 FAILURE TO SCRAM, EOP-4 CONTAINMENT CONTROL

c. EOP-4, PRIMARY CONTAINMENT CONTROL, SOP-1 REACTOR SCRAM, SOP-4, TURBINE TRIP

d. SOP-1 REACTOR SCRAM, SOP-4, TURBINE TRIP, SOP-17, VESSEL/CONTAINMENT ISOLATION

Proposed Answer: c. EOP-4 entered on high Torus Temperature (88°F versus 85°F, SOP-1 entered on a reactor scram occurring, SOP-4 entered on a turbine trip occurring.

Explanation (Justification of Distractors):

a. Does not include EOP-4 and SOP-4
b. Does not include SOP-1 or 4, There are no entry conditions for EOP-2 or EOP-3.
d. Does not include EOP-4, there are no entry conditions for SOP-17.

Technical Reference(s): EOPs 2,3,4, SOPs 1,4,17

Proposed references to be provided to applicants during the examination:

EOPs with the entry conditions removed

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 New
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	41.10 43.5 45.13	

Comments:

Question # RO 99 SRO 98

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	-	-
	K/A #	Generic 2.4.6	Generic 2.4.6
	Importance Rating	3.1	4.0
Knowledge of symptom based EOP mitigation strategies			

Proposed Question:

The plant was at 100% power when a manual reactor scram was inserted but many control rods failed to insert. Conditions are:

- The main turbine is online
- Liquid poison (LP) is initiated and injecting
- All RPV injection is prevented, except for CRD and LP
- RPV level is currently -66 inches indicated on Fuel Zone level
- Reactor Power is currently 11% and lowering slowly
- Reactor pressure is 960 psig
- Suppression pool temperature has risen to 114°F

When suppression pool temperature reached 114°F, the main condenser boot catastrophically failed. Per N1-EOP-3, FAILURE TO SCRAM, which one of the following describes the required EOP level control step (indicate the step number) to be performed at this time?

a. Go to point ⑧ and perform the actions of step L-7.

b. Go to point ⑨ and perform the actions of step L-8.

c. Re-enter at point ❻ and continue the current actions of step L-6.

d. Re-enter at point ❼ and continue the current actions of step L-6.

Proposed Answer: a.
Condenser boot failure causes a loss of vacuum and loss of the turbine and bypass valves, this will cause a pressure rise and subsequent ERV opening. This completes the requirements to enter ⑧.

Explanation (Justification of Distractors):

b. Must go through step L-8 or have been in EOP-8, RPV BLOWDOWN. Level has lowered to -66 inches and power is 11% so ⑧ had not been previously entered. EOP-8, has not been entered.

c. Overrides are continually evaluated, they are not re-entered, must go to ⑧.

d. Overrides are continually evaluated, they are not re-entered, must go to ⑧.

Technical Reference(s): EOP-3, FAILURE TO SCRAM
N1-ODP-PRO-0305, EOP/SAP TECHNICAL BASES

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source: Bank No.
Modified Bank #
New NEW

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level: Memory of Fundamental Knowledge
Comprehension or Analysis 3

10 CFR Part 55 Content: 10CFR55.41.10
10CFR55.45.12

Comments:

Question # RO 100 SRO 99

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	3	3
	Group #	-	-
	K/A #	Generic 2.4.13	Generic 2.4.13
	Importance Rating	3.3	3.9

Knowledge of crew roles and responsibilities during EOP flowchart use.

Proposed Question:

During EOP use it becomes necessary to depart from the EOP and NOT perform a required step to protect the public health and safety. Which one of the following conditions must be met to depart from the EOP?

a. The plant manager must approve the departure within 1 hour and at least one other operating procedure provides general guidance.

b. There is no other action that could be taken and a licensed senior reactor operator approves the departure before it's taken.

c. One member of plant management and a licensed senior reactor operator approve the change within 4 hours of the departure.

d. Two senior reactor operators approve the departure before it's taken and the action complies with the general requirements of the FSAR.

Proposed Answer: b.

Explanation (Justification of Distractors):

a. Plant manager is NOT required and the plant manager may NOT have the required SRO license, approval must be given before the action is taken.

c. The member of plant management is not required and approval must occur before the action is taken.

d. There can NOT be any action consistent with the condition that provides adequate protection immediately apparent and only one SRO is needed.

Technical Reference(s): GAP-OPS-01, Section 3.13.2.c

Proposed references to be provided to applicants during the examination:

None.

Learning Objective:

Question Source:	Bank No. Modified Bank # New	 NEW
Question History:	Previous NRC Exam Previous Test / Quiz	
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10 CFR Part 55 Content:	10CFR55.41.10 10CFR55.45.12	

Comments:

Question # SRO 100

Examination Outline Cross-Reference	Level Tier # Group # K/A #	 Generic 2.4.40
	Importance Rating	4.0
Knowledge of the SRO's responsibilities in emergency plan implementation.		

Proposed Question:

Note: Reactor water levels are <u>indicated</u>.
An ATWS is in progress. Following the actions to terminate and prevent all RPV injection the following conditions existed:

- Reactor water level –50 inches and stable
- Reactor power 3% and lowering
- Reactor pressure 900 psig and lowering slowly
- Torus water temperature 120°F and steady
- Torus level 10.8 feet and steady
- ERVs are closed
- Control rod insertion has NOT been established
- Liquid Poison failed to inject and CANNOT be started
- No alternate boron system is injecting

When APRM's are downscale, RPV injection is re-established and RPV level is being maintained between –50 and –84 inches. Which one of the following describes the required emergency plan event classification at this time?

a. Remain at the Alert classification.

b. Remain at the Site Area Emergency classification.

c. Reclassify the event from an Alert to a General Emergency.

d. Reclassify the event from a Site Area Emergency to an General Emergency.

Proposed Answer: b. Any RPS scram setpoint exceeded AND automatic and manual scrams fail to result in a control rod pattern which assures reactor shutdown under all conditions without boron AND EITHER reactor power >4% OR torus temp >110°F requires classification of a Site Area Emergency.

Explanation (Justification of Distractors):

a. Site Area Emergency is required because of the suppression pool temperature and the reactor power present prior to deliberately lowering RPV level to suppress reactor power.

c. The power excursion will require that RPV injection sources be terminated and prevented to lower level to suppress power. This power change will not cause the HCTL to be exceeded, which is required to declare a General Emergency. Additionally, there is no evidence that actions to lower reactor pressure or to lower torus temperature are not successful. If the candidate uses the incorrect curve (curve B) for torus water level when evaluating HCTL, they will determine that HCTL is exceeded and a General Emergency is required.

d. The power excursion will require that RPV injection sources be terminated and prevented to lower level to suppress power. This power change will not cause the HCTL to be exceeded, which is required to declare a General Emergency. The Site Area Emergency event classification criteria were met and still exist. Thus, the plant is still at the Site Area Emergency classification because of torus temperature and also because of the power excursion.

Technical Reference(s): Unit 1 Emergency Action Level Matrix 2.2.1, 2.2.2
EPIP-EPP-25, Section 3.1

Proposed references to be provided to applicants during the examination:

Unit 1 Emergency Action Level Matrix (EAL chart)

Learning Objective:

Question Source: Bank No.
Modified Bank #
New New

Question History: Previous NRC Exam
Previous Test / Quiz

Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	 2
10 CFR Part 55 Content:	43. (b) item 5 45.11	

Comments: