UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

March 24, 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 2 REACTOR OPERATOR AND SENIOR REACTOR OPERATOR INITIAL EXAMINATION REPORT NO. 05000410/1999301

Dear Mr. Mueller:

This report transmits the results of the subject operator licensing examinations conducted by the NRC during the period of February 11 through February 17, 2000 at your facility. These examinations addressed areas important to public health and safety and were developed and administered using the guidelines of NUREG-1021, Revision 8, "Examination Standards for Power Reactors". All candidates passed all portions of the examinations.

During the week of January 17, 2000, while NRC was onsite for exam preparation, the NRC inspectors reviewed some training issues relating to the exam that arose last year. The inspection findings and exam performance observations were discussed with Mr. L. Pisano and other members of your staff via telephone conference call on March 1, 2000.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document 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,

Richard J. Conte

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

Docket No. 05000410
License No. NPF-69

Enclosure: Initial Examination Report No. 05000410/1999301
w/Attachments 1, 2, and 3

cc w/encl; w/Attachments 1-3:
L. 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
and Development Authority

Distribution w/encl and w/Attachments 1-3:
DRS Master Exam File
PUBLIC
Nuclear Safety Information Center (NSIC)

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Region I Docket Room (with concurrences)
NRC Resident Inspector
H. Miller, RA/J. Wiggins, DRA
M. Evans, DRP
W. Cook, DRP
R. Junod, DRP
W. Lanning, DRS
B. Holian, DRS
J. Williams, Chief Examiner, DRS
V. Curley, DRS (OL Facility File)
DRS File

Distribution w/encl; w/o Attachments 1-3: **(VIA E-MAIL)**
J. Shea, RI EDO Coordinator
G. Hunegs - Nine Mile Point
E. Adensam, NRR
P. Tam, NRR
W. Scott, NRR (Inspection Reports Only)
J. Wilcox, NRR
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OFFICE	RI/DRS		RI/DRP		RI/DRS			
NAME	JWilliams		MEvans		RConte			
DATE	3/14/00		3/24/00		3/24/00			

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NRR-079

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ML003695175

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	05000410
License No:	NPF-69
Report No:	05000410/1999301
Licensee:	Niagara Mohawk Power Corporation P.O. Box 63 Lycoming, NY 13093
Facility:	Nine Mile Point Unit 2
Location:	Scriba, New York
Dates:	January 18-21, 2000 (Onsite exam prep and inspection) February 11- 17, 2000 (Exam administration) February 21-March 1, 2000 (Exam grading)
Chief Examiner:	J. H. Williams, Senior Operations Engineer
Examiners:	Joseph M. D'Antonio, Operations Engineer Carl E. Sisco, Operations Engineer
Approved By:	Richard J. Conte, Chief Operational Safety Branch Division of Reactor Safety

EXECUTIVE SUMMARY

Nine Mile Point Unit 2
Examination Report No. 05000410/1999301

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The as given examination, met the guidance of NUREG 1021. The facility submitted one post-exam comment (see Attachments 1 and 2).

A potential exam integrity issue arose during the exam preparation phase. The issue was reviewed by the inspectors and it was determined that no exam compromise occurred.

The cause of the facility requested NRC exam delay was evaluated. It was determined that appropriate actions were defined by the facility to correct the problem.

The cause of the poor performance on the generic fundamentals exam (GFE) was determined by the facility and appropriate corrective actions were defined. The facility concluded that they were ineffective in selecting, preparing, and evaluating students during the training on fundamentals.

LORT exam performance was evaluated. The high LORT annual exam failure rates for both units were evaluated and appropriate corrective actions defined.

Two inspector follow up items **(IFI 99-09-03 & 04)** were reviewed and closed in this report.

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05 Operator Training and Qualifications

05.1 NRC Initial Operator Exams and Related Training Issues

a. Scope

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- Poor performance on the generic fundamentals exam (GFE) conducted in April 1999.
- NRC exam delay requested by the facility in November 1999.
- Potential exam compromise reported to the NRC in December 1999.
- High failure rates on annual tests in the licensed operator requalification training (LORT) programs of both units.

b. Observations and Findings

Grading and Results

The results of the initial operator exams are summarized below:

	RO Pass	RO Fail	SRO Pass	SRO Fail
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Attachment 1 provides the NRC staff resolution of the facility post-examination comment.

Attachment 2 provides the facility's post-examination comment.

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The facility prepared an operating test which was planned to be given to 12 applicants over a seven day period, however, only nine applicants took the exam, which covered four days. This resulted in the preparation of more walk-through exam material than was used.

Written Test Administration and Performance

The facility performed an analysis of questions missed on the written exam for generic and individual weaknesses. There were 12 questions that were missed by 50 percent or more of the applicants. These questions' subject areas were discussed with the applicants. The NRC examiners had no comments with respect to the facility actions.

As a result of the facility post-exam analysis, one question was provided to the NRC for evaluation and resolution. The licensee's comment is detailed in Attachment 2 of this report. The NRC resolution of this comment is discussed in Attachment 1.

Operating Test Administration and Performance

The applicants demonstrated good communications and teamwork skills during the simulator exercises for both the routine and emergency portions of the exercise. Good self-checking techniques and control board knowledge was also demonstrated. Briefings were routinely conducted by the candidates when in the senior reactor operator position. The briefings were well controlled and ensured that all personnel knew the plant (simulator) status.

Potential Exam Compromise

In December 1999, the facility reported to NRC that a potential exam compromise had occurred, in that personnel on the security agreement had signed candidate's qualification manuals and had possibly provided training to the candidates.

The NRC inspectors reviewed DER 2-1999-4014 and associated root cause evaluation on this issue. The issue was also discussed with facility personnel. It was determined that the individuals on the security agreement did not realize that no training related contact was allowed with the candidates. They believed that they were only restricted from divulging exam information and coaching candidates in the areas where they had exam knowledge. The facility's investigation concluded that no training had taken place in the exam subject areas by the personnel on the security agreement.

The root cause of the event was determined to be "policy/guidance not well understood". The facility revised their procedures to clarify and strengthen exam security requirements.

The NRC inspectors found the facility investigation to be thorough and agreed with the facility that an exam compromise had not occurred. The corrective actions taken by the facility appeared to be reasonable.

NRC Exam Delay Issue

On November 1, 1999, a delay in the NRC examination administration was requested by the facility because a number of tasks in the initial license operator training program were not properly trained and/or evaluated on, and a number of tasks in the qualification manual did not have the proper standards of performance.

The facility determined that lack of management oversight during the initial development of license class training materials and poorly understood lesson plan development expectations resulted in the improper training. Untimely review of the task standards was identified as the cause of using out of date performance standards.

Based upon discussions with facility personnel and a review of the corrective actions identified in DER C-1999-3864 the inspectors determined that the facility had adequately addressed these problems. The inspectors noted that the effectiveness of these corrective actions could only be determined by future performance.

(Closed) Inspector follow up item **(IFI 99-09-04)** was opened for NRC staff to review the exam delay issues and determine if any impacts on the LORT program existed. The exam delay issues were determined to be uniquely associated with the initial license training materials and the NRC inspectors' review did not identify any adverse impacts on the LORT program. This item is closed.

Performance on the Generic Fundamentals Exam (GFE) in April 1999

Nine Mile Point Unit 1 reactor operator trainees had an abnormally high GFE failure rate in April of 1999. The GFE results indicated a major weakness in the area of reactor theory. DER C-1999-1156 and associated root cause evaluation was written to address the high failure rate problem. The facility concluded that they were ineffective in selecting, preparing, and evaluating students during the training on fundamentals. Corrective actions included adjustments to all five elements of the SAT based training program.

The inspectors discussed the issue with facility personnel and reviewed the DER, root cause evaluation, and associated corrective actions and determined that the facility's actions appeared reasonable.

High LORT Failure Rates

High failure rates in certain areas for both units were reported by the facility. For Unit 1, three (2 staff crews and 1 operating crew) of eight crews failed the simulator portion of the annual operating test. For Unit 2, six of ten SRO certified instructors failed their annual written exam required by the facility program. The instructors, while not licensed, are a key part of the SAT based training program.

The inspectors reviewed DERs (DER 1-1999-4145 for Unit 1 crew failures and DER 2-1999-4187 for SRO certified instructor failures) and associated documentation and discussed the problems with facility personnel.

Each crew that failed was removed from licensed duties and remediated before returning to licensed duties.

A root cause evaluation was completed for the high failure rate for the Unit 2 SRO certified instructors. The root cause of the poor exam performance was determined to be a poorly defined training program, including evaluation practices. The facility also determined that corrective actions from a similar event in March 1997 were not adequate. Corrective actions have been defined to improve the instructor training program, which includes the evaluation process.

The inspectors noted that licensed operator performance on the Unit 2 annual operating exam and biannual written exam was satisfactory and showed no weaknesses with respect to poor instructor knowledge.

(Closed) Inspector follow up item **(IFI 99-09-03)** was opened for NRC staff to review the results of the Unit 2 annual requalification exams to determine if any problem areas exist in LORT training effectiveness. The inspectors did not identify any notable training effectiveness problems associated with the Unit 2 requalification exam results. This review did not look at individual exam question performance, but rather the overall pass/fail rate. This item is closed.

c. Conclusions

Two RO applicants and seven instant SRO applicants were administered initial licensing exams. All applicants successfully passed all portions of the exam. The applicants were well prepared for the exam.

The as-given examination met the guidance of NUREG 1021. The facility submitted one post-exam comment (see Attachments 1 and 2).

A potential exam integrity issue arose during the exam preparation phase. The issue was reviewed by the inspectors and it was determined that no exam compromise occurred.

The cause of the facility requested NRC exam delay was evaluated. It was determined that appropriate actions were defined by the facility to correct the problem.

The cause of the poor performance on the GFE was determined by the facility and appropriate corrective actions were defined. The facility concluded that they were ineffective in selecting, preparing, and evaluating students during the training on fundamentals.

LORT exam performance was evaluated. The high LORT annual exam failure rates for both units were evaluated and appropriate corrective actions defined.

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X1 Exit Meeting Summary

On March 1, 2000 the Chief Examiner discussed exam observations and inspection results with members of the facility staff and management via telephone. The results of the NRC exam were given to the licensee at that time.

The NRC examiners also expressed their appreciation for the cooperation and assistance that was provided during both the preparation and exam week by the facility's examination team.

Since there were no NRC identified discrepancies between the simulator and the plant, none were discussed at the exit meeting or in this report.

Attachments:
1. NRC Resolution of Facility Comments
2. Facility Comments on the Written Examination
3. RO and SRO Written Exam w/Answer Key

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S. Reininghaus	General Supervisor, Operations Training
D. Bosnic	Unit 2 Operations Manager
J. Bobka	Unit 2 Requal Supervisor
E. Bowles	Contractor
P. Ballard	Contractor
J. Ringwald	Supervisor Site Licensing

NRC

J. Williams	Senior Operations Engineer
J. D'Antonio	Operations Engineer
C. Sisco	Operations Engineer

DRS Master
EXAM File

March 24, 2000

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/RA/

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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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J. Wilcox, NRR
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OFFICE	RI/DRS		RI/DRP		RI/DRS			
NAME	JWilliams		MEvans		RConte			
DATE	3/ /00		3/ /00		3/ /00			

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NRR-079

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

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License No:	NPF-69
Report No:	05000410/1999301
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Facility:	Nine Mile Point Unit 2
Location:	Scriba, New York
Dates:	January 18-21, 2000 (Onsite exam prep and inspection) February 11- 17, 2000 (Exam administration) February 21-March 1, 2000 (Exam grading)
Chief Examiner:	J. H. Williams, Senior Operations Engineer
Examiners:	Joseph M. D'Antonio, Operations Engineer Carl E. Sisco, Operations Engineer
Approved By:	Richard J. Conte, Chief Operational Safety Branch Division of Reactor Safety

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E. Bowles	Contractor
P. Ballard	Contractor
J. Ringwald	Supervisor Site Licensing

NRC

J. Williams	Senior Operations Engineer
J. D'Antonio	Operations Engineer
C. Sisco	Operations Engineer

ATTACHMENT 1

RESOLUTION OF POST-EXAM WRITTEN EXAMINATION COMMENT

Question RO 78 and SRO 76

During power operation, fuel failures have caused the following conditions:

- Process Radiation Monitor **2OFG-RU13A** has exceeded its **High** Setpoint
- Process Radiation Monitor **2OFG-RU13B** has exceeded its **Alert** Setpoint

Which one of the following describes the expected Offgas System flow indications on 2CEC*PNL8551?

	Train "A" Flow (SCFM)	Train "B" Flow (SCFM)
a	0	36
b	36	0
c	18	18
d	0	0

Answer given as "d" but "c" is the correct answer.

Facility Comment

Change the correct answer from "d" to "c". The alarm response procedure, which was the basis for the answer was revised after the question was written to indicate that both radiation monitors needed to be at the alert level for Offgas System isolation.

NRC Resolution

Accept the facility comment and change the correct answer to "c"

ATTACHMENT 2

LICENSEE'S POST-EXAMINATION COMMENT

ATTACHMENT 9: TEST ITEM APPROVAL/MODIFICATION FOR EXAM BANK

1. Submitted by: P. BALLARD
2. Department: OPS TRAINING
3. Date: 2/17/00

Exam Bank Question Number NRC QUESTION (NOT IN BANK YET)

R078
SR076

4. ■ New Question ■ Impacts Question Grading ☐ Question Enhancement
5. Problem Statement (if impacts question grading):

The question has the wrong answer. The correct answer is "c".

6. Disposition Assigned To: P. BALLARD / E. BOWLES
7. Question: SEE ATTACHED
8. Answer: SEE ATTACHED
9. References:
   - Lesson Plan #:
   - Objective #:
   - Reference(s): N2-ARP-01, 851326
10. Disposition: Change answer to "c". SEE ATTACHED
11. Approvals:

Technical Consistency with Learning Objectives, Clarity, and Format:

[signature] / 2/17/00
Technical Verifier / Date

[signature] / 2/18/00
General Supervisor Training / Date

/
Unit 2 Radiation Protection Manager / Date
(GET Rad. Worker and Respiratory Items only)

LC2 99-01 NRC Initial Written Examination
Post-Examination Comments

Applicant Level:	☑ RO	☑ SRO

Applicant Name: N/A	☐ Chwalek	☐ Downs	☐ Fregeau
	☐ Jones	☐ Orzell	☐ Restuccio
	☐ Richardson	☐ Russell	☐ Strahley

Question Type:	☑ Common	☐ RO only	☐ SRO only

Question #: RO 78 (enter number, if SRO only enter N/A)
SRO 76 (enter number, if RO only enter N/A)

Answer: (circle the answer key response) A B C D

Reference: (enter the answer key reference below)
N2-ARP-01, 2CEC*PNL851 #326

Comment: (enter the comment below)
The question has the wrong answer. the correct answer is "c".

Recommendation: (The grader is encouraged to discuss the matter with the NRC Chief Examiner before proceeding with the grading)
☑ Change the correct answer. ☐ Do NOT change the correct answer.
☐ Accept two correct answers. ☐ Delete the question
☐ Make clarifications to the question.

Changes / clarifications made to examination: (provide a description)
Changed the correct answer from "d" to "c".

Reference(s) to support change / clarification made to examination:
N2-ARP-01, 2CEC*PNL851 #326

Justification for rejection of an applicant's comment:
N/A

Proctor: ☑ Change made in INK on the master examination copy
Edwin W. Bowles
Print Name
Edwin W. Bowles 2/17/00
Signature Date

RO 78	SRO 76	*Tier 2 Group 2* *K/A 271000, A3.02 - Ability to monitor automatic operations of the Offgas system including: system flows.* 9 of 9 applicants missed the question. 2 RO and 7 SRO applicants selected "c". Plant references were reviewed and BOTH monitors are required to cause the system isolation. The plant procedure referenced for this question was changed in October 1999 to reflect the correct logic configuration. The correct answer is answer "c". The question will be improved by changing the correct answer from "d" to "c".

Question # RO 78 SRO 76

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	271000 A3.02	271000 A3.02
	Importance Rating	2.9	2.8

Ability to monitor automatic operations of the Offgas system including: System flows.

Proposed Question:

During power operation, fuel failures have caused the following conditions:

- Process Radiation Monitor **2OFG-RU13A** has exceeded its **High** Setpoint
- Process Radiation Monitor **2OFG-RU13B** has exceeded its **Alert** Setpoint

Which one of the following describes the expected Offgas System flow indications on 2CEC*PNL851?

	Train "A" Flow (SCFM)	Train "B" Flow (SCFM)
a.	0	36
b.	36	0
c.	18	18
d.	0	0

Proposed Answer: d.

Explanation (Justification of Distractors):

a. b. c. There should NOT be any flow through either Offgas Trains because RU13A **or** B monitor reaching a High setpoint should Close the Offgas Outlet Valve, AOV-103, and Trip the Offgas Pumps.

Technical Reference(s): N2-ARP-01, Rev 00, Ann 851253
02-OPS-001-271-2-01, OFFGAS SYSTEM, Fig 4

Proposed references to be provided to applicants during the examination:

None.

Learning Objective: O2-OPS-001-271-2-01, EO-8

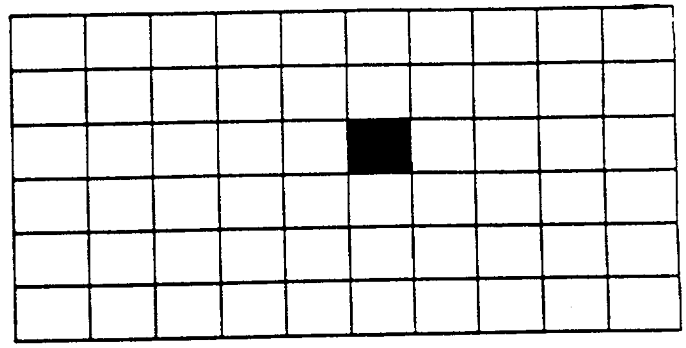
Question Source:	Bank # Modified Bank # *New*	 NEW
Question History:	Previous NRC Exam Previous Test / Quiz	NEW NEW
Question Cognitive Level:	Memory of Fundamental Knowledge Comprehension or Analysis	1
10CFR Part 55 Content:	55.41.7 55.45.7	

Comments:

Reflash: NO 2CEC*PNL851 851326

OFF GAS
RADIATION
HIGH

326



Computer Point	Printout	Source	Setpoint
OFGRC05	OFFGAS RADIATION	2OFG-RU13A OR 2OFG-RU13B	≥ 2.0 μCi/cc*

* Alarm point subject to change in accordance with Offsite Dose Calculation Manual.

Automatic Response

- Closes 2OFG-AOV103, OFFGAS EXHAUST TO MAIN STACK.
- Trips 2OFG-P1A AND 2OFG-P1B, VACUUM PUMP VP-1A AND VP-1B.

Operator Actions

1. Verify the automatic response.
2. Enter N2-SOP-17, FUEL FAILURE OR HIGH ACTIVITY IN RX COOLANT OR OFFGAS.

Possible Causes

- Fuel damage
- Resin intrusion into the Reactor Vessel
- Intrusion of organic compounds into the Reactor Vessel
- Improper valve lineup OR bad radiation monitor

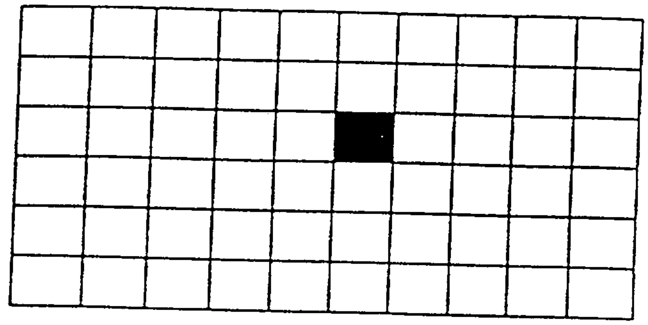
References

- N2-OP-42
- N2-SOP-17

Reflash: NO   2CEC*PNL851   851326

OFF GAS
RADIATION
HIGH

326



Computer Point	Printout	Source	Setpoint
OFGRC05	OFFGAS RADIATION	2OFG-RU13A OR 2OFG-RU13B	~~≥ 2.0 µCi/cc*~~ ≥ 1.86E+1 µci/cc* ≥ 1.97E+1 µci/cc

10-15-99

* Alarm point subject to change in accordance with Offsite Dose Calculation Manual.

Automatic Response (HIGH RADIATION SENSED BY 2OFG-RU13A AND 2OFG-RU13B)

- Closes 2OFG-AOV103, OFFGAS EXHAUST TO MAIN STACK.
- Trips 2OFG-P1A AND 2OFG-P1B, VACUUM PUMP VP-1A AND VP-1B.

Operator Actions

1. Verify the automatic response.
2. Enter N2-SOP-17, FUEL FAILURE OR HIGH ACTIVITY IN RX COOLANT OR OFFGAS.

Possible Causes

- Fuel damage
- Resin intrusion into the Reactor Vessel
- Intrusion of organic compounds into the Reactor Vessel
- Improper valve lineup OR bad radiation monitor

References

- N2-OP-42
- N2-SOP-17

ATTACHMENT 3

RO and SRO WRITTEN EXAMS W/ANSWER KEY

Question # RO 1 SRO 30

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295005 2.1.33	295005 2.1.33
	Importance Rating	3.4	4.0

Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

Proposed Question:

While operating at 100% power an electrical transient in the 345 KV Scriba Switchyard caused a full load reject at NMP2. After the initial actions were taken the STA determined the reactor was shutdown by the Alternate Rod Insertion function of RRCS.

Which one of the following states the safety significance of this event?

a. A reactivity anomaly has occurred.

b. An engineered safety feature has failed to actuate.

c. The Generator output breakers R-925 and R-230 failed to trip open.

d. Control Valve fast closure failed and the turbine tripped on overspeed.

Proposed Answer: b.

Question # RO 2 SRO 3

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295006 AA2.06	295006 AA2.06
	Importance Rating	3.7	3.8

Ability to determine and/or interpret the following as they apply to SCRAM: Cause of reactor SCRAM.

Proposed Question:

The following plant conditions exist:

- The plant is operating at 100% power.
- An operator initiated scram becomes necessary.
- The reactor mode switch is taken from RUN to SHUTDOWN.
- All plant protective systems respond as designed.

Select the FIRST Reactor Protection System scram signal generated.

a. IRM Upscale Trip

b. APRM Flow Biased

c. Mode Switch in SHUTDOWN

d. APRM Upscale Neutron Flux (Setdown)

Proposed Answer: d. Leaving the RUN position places the 15% APRM scram in the circuit, since the reactor is at 100% power the reactor scrams on APRM Upscale.

Question # RO 3 SRO 5

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295007 AK3.03	295007 AK3.03
	Importance Rating	3.4	3.5

Knowledge of the reasons for the following responses as they apply to High Reactor Pressure: RCIC operation: Plant-Specific.

Proposed Question:

The EOP's have been entered following a plant trip due to an inadvertent containment isolation. The following conditions exist:

- Group 1 isolation signal has occurred.
- Group 8 isolation signal has occurred.
- Drywell pressure is 1.71 psig.
- RPV pressure is 1050 psig and rising.

Which one of the following systems is used for reactor pressure control?

a. Turbine Bypass Valves

b. Main Steam Line Drains

c. Reactor Core Isolation Cooling

d. Steam Condensing mode of RHR

Proposed Answer: c. RPV CONTROL, Step P-5, RCIC is an alternate system that can be used.

Question # RO 4 SRO 7

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	Generic 295009 2.4.4	Generic 295009 2.4.4
	Importance Rating	4.0	4.3

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

Proposed Question:

Lightning strikes have caused a permanent loss of lines 5 and 6. Following a scram the Emergency Diesel Generator (EDG) status is:

- EDG 101 running, EMER SWGR ACB 101-1 will NOT close.
- EDG 102 running, EMERG DIESEL GEN2 OUTPUT BREAKER 102-1 is closed
- EDG 103 will NOT start

Which one of the following describes the SOP(s) entered and immediate actions performed for these conditions?

a. Enter N2-SOP-03, LOSS OF AC POWER and cross-connect buses 101 and 103.

b. Enter N2-SOP-01, STATION BLACKOUT, trip EDGs 101 and 102 and recover off-site power.

c. Enter N2-SOP-03, LOSS OF AC POWER, Shutdown EDGs 101 and 102, then enter N2-SOP-01, STATION BLACKOUT.

d. Enter N2-SOP-01, STATION BLACKOUT, trip EDG 101 then cross-connect buses 102 and 103 and enter N2-SOP-03, LOSS OF AC POWER.

Proposed Answer: c. Entry into N2-SOP-01 is directed by N2-SOP-03 after EDG 102 is tripped.

Question # RO 5 SRO 8

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295010 AA1.02	295010 AA1.02
	Importance Rating	3.6	3.6

Ability to operate and/or monitor the following as they apply to high drywell pressure: Drywell floor and equipment drain sumps.

Proposed Question:

The unit is operating at 80% power. The last drywell floor drain pump to operate was pump 2DFR-P1A. Both the 2DFR-P1A and 2DFR-P1B pump control switches are in the NORMAL-AFTER-STOP position. The following annunciators are received:

- 873111, DRWL FLR DRN TANK 1 LEVEL HI-HI
- 603140, DRYWELL PRESSURE HIGH/LOW

Which one of the following describes the status of the Drywell Floor Drain System as drywell pressure rises from 0.75 psig to 1.8 psig?

a. **Both** the P1A and P1B pumps will be off and remain off.

b. **Only** the P1B pump will pump the sump until the system isolates.

c. **Both** the P1A and P1B pumps will pump the sump until the system isolates.

d. **Only** the P1B pump will pump the sump and it will continue to pump until manually stopped.

Proposed Answer: c.

RO 6 SRO 10

Question #

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295014 AA1.02	295014 AA1.03
	Importance Rating	3.6	3.8

Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION: Recirculation flow control system

Proposed Question:

During a power ascension the reactor is at 82% power while raising power with Recirculation Flow. The operator is attempting to manually open the Recirculation Loop "A" FCV with the 602 Panel Flow Controller, but is unable because the servo valve at the HPU is stuck. After numerous attempts to open the FCV, the servo valve becomes free and rapidly moves to the open position and sticks there. The FCV begins to fully open.

Which one of the following actions will remedy this situation?

a. Startup the standby HPU.

b. Secure and isolate the HPU.

c. Place the Loop Controller in AUTO and close the FCV.

d. Lower the Loop Controller in MANUAL until the FCV is closed.

Proposed Answer: b.

Question # RO 7 SRO 11

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295015 AK2.11	295015 AK2.11
	Importance Rating	3.5	3.7

Knowledge of the interrelations between INCOMPLETE SCRAM and the following: Instrument Air

Proposed Question:

During a reactor startup a Scram Discharge Volume (SDV) High Level Scram occurred. The following conditions exist:

- 53% of the control rods remain in the core at various positions
- Some movement was observed on all control rods
- Scram solenoid power lights are OFF
- Scram Valves have been verified Open at the HCUs

Based on these conditions EOP-6, Attachment 14, directs manually initiating additional scrams. Which one of the following is the basis for this action?

a. Allows additional scrams at lower reactor pressures.

b. Provides another scram to totally vent the scram air header.

c. Closes the scram valves to allow recovery of the CRD pumps.

d. Resets the scram to establish air to the SDV vent and drain valves.

Proposed Answer: d. Eliminates the hydraulic lock by opening the SDV vent and drain valves to drain the SDV.

RO 8 SRO 12

Question #

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295015 AA1.02	295015 AA1.02
	Importance Rating	4.0	4.2

Ability to operate and/or monitor the following as they apply to Incomplete Scram: RPS

Proposed Question:

The plant is operating at 100% power when a failure of an RPS relay occurs causing the following conditions to exist on the 2CEC*PNL603:

- Only 3 out of 4 solenoid lights are **ON** for the "A" RPS Trip System
- All 4 solenoid lights for the "B" RPS Trip System are **ON**

Which one of the following describes the control rod movement, if any, that results from an RPS "B" System trip?

a. All control rods will insert.

b. No control rods will insert.

c. One quarter of the control rods will insert.

d. Three quarters of the control rods will insert.

Proposed Answer: c.

Question # RO 9 SRO 16

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295024 EK3.04	295024 EK3.04
	Importance Rating	3.7	4.1

Knowledge of the reasons for the following responses as they apply to high drywell pressure: emergency depressurization.

Proposed Question:

A reactor scram due to a LOCA has occurred. The following conditions exist:

• Reactor pressure	400 psig
• Reactor water level (actual) 0 inches	stable
• Drywell pressure	16 psig
• Drywell temperature	250°F
• Suppression chamber pressure	17 psig
• Suppression pool temperature	135°F
• Suppression pool water level	201 feet

Which one of the following is assured by performing an RPV Blowdown under the current plant conditions?

a. Ensure the suppression chamber design temperature is not exceeded.

b. Ensure that steam does not accumulate in the suppression chamber air space.

c. Ensure that containment vent valves can be opened and closed to reject heat from and to vent the containment.

d. Ensure opening an SRV will not result in exceeding the capability of the SRV tail pipe, quencher, or associated supports.

Proposed Answer: b.

RO 10 SRO 17

Question #

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	2
	K/A #	295025 EK1.05	295025 EK1.05
	Importance Rating	4.4	4.7

Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Exceeding Safety Limits.

Proposed Question:

During the conduct of N2-OSP-RPV-@002, REACTOR PRESSURE VESSEL AND ALL CLASS 1 SYSTEMS LEAKAGE TEST, reactor pressure is raised to 1375 psig.

Which one of the following describes the safety significance of this event?

a. The reactor pressure vessel warranty has been voided.

b. A Technical Specification safety limit has been exceeded.

c. Conditions exist that are outside of the station safety analysis.

d. Violates the thermal limits in the Core Operating Limits Report.

Proposed Answer: b. 1325 psig in the steam dome safety limit has been violated

Question # RO 11 SRO 22

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295031 EK2.08	295031 EK2.08
	Importance Rating	4.2	4.3

Knowledge of the interrelations between reactor low water level and the following: Automatic depressurization system.

Proposed Question:

A LOCA has occurred and NO operator action has been taken. The following conditions have been present for 2 minutes:

- RPV level indicates -100 inches on the Fuel Zone range
- Reactor pressure is 300 psig
- Drywell pressure is 22 psig

Assume ALL equipment operates as designed. Which one of the following describes the current status of the ADS valves, and the actions necessary to close or maintain them closed?

The ADS valves are ...

a. **open.**
Div. I and Div. II DISABLE key lock switches placed in ON.

b. **closed.**
Div. I and Div. II DISABLE key lock switches placed in ON.

c. **closed.**
Div. I and Div. II SEAL-IN RESET pushbuttons depressed every 90 seconds.

d. **open.**
Div. I and Div. II DISABLE key lock switches placed in ON <u>and then</u> Div. I and Div. II SEAL-IN RESET pushbuttons are depressed.

Proposed Answer: d.

Question #		RO 12	SRO 24

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295037 EK1.02	295037 EK1.02
	Importance Rating	4.1	4.3

Knowledge of the operational implications of the following concepts as they apply to scram condition present and reactor power above APRM downscale or unknown: Reactor water level effects on reactor power.

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 –10 inches
- Reactor power 3%
- Reactor pressure 1000 psig and lowering slowly
- Suppression pool temperature 120°F and rising slowly
- Suppression pool level 200.6 feet and steady
- 2 SRVs are open
- Control rod insertion has NOT been established
- SLS failed to inject and CANNOT be started
- No alternate boron system is injecting

When APRM's are downscale, RPV injection is re-established. One (1) minute later reactor water level has risen to +30 inches. Which one of the following describes the effects of this change and the required operator actions?

a. Terminate and prevent injection except for boron, CRD, and RCIC because reactor power has risen to above 4%.

b. Perform an RPV Blowdown because the suppression pool has exceeded the Heat Capacity Temperature Limit.

c. Lower level using the preferred ATWS systems to the assigned reactor water level band to suppress power oscillations.

d. Assign a new level band and maintain reactor water level between +30 inches and –45 inches using alternate ATWS systems for improved control.

Proposed Answer: a.

Question # RO 13 SRO 26

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	500000 EK1.01	500000 EK1.01
	Importance Rating	3.3	3.9

Knowledge of the operational implications of the following concepts as they apply to high containment hydrogen concentrations: Containment integrity.

Proposed Question:

A LOCA has occurred and the following conditions exist:

- Drywell H2 concentration is 7%
- Suppression Chamber H2 concentration is 4%

- Drywell O2 concentration is 4%
- Suppression chamber O2 concentration is 6%

In accordance with the EOPs, which one of the following describes the Primary Containment H2/O2 deflagration limit status and required actions?

The Primary Containment H2/O2 concentration is ...

a. **below** the deflagration limit. A Reactor scram and emergency depressurization is required.

b. **below** the deflagration limit. A Reactor scram and emergency depressurization is **NOT** required.

c. **above** the deflagration limit. A Reactor scram and emergency depressurization is required.

d. **above** the deflagration limit. A Reactor scram and emergency depressurization is **NOT** required.

Proposed Answer: c.

Question # RO 14 SRO 27

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295001 AA2.01	295001 AA2.01
	Importance Rating	3.5	3.8

Ability to determine and/or interpret the following as they apply to partial or complete loss of forced core flow circulation: Power/flow map.

Proposed Question:

The plant is operating at 85% power above the 100% rod line. A fault occurs causing a trip of the "A" RCS pump.

- The resulting core flow is 44 x 10^6 lbm/hr.

In accordance with N2-SOP-29, Sudden Reduction in Core Flow, which one of the following is the required immediate actions?

a. Raise recirc flow to at least 50 x 10^6 lbm/hr in accordance with N2-SOP-29.

b. Place the Reactor Mode Switch in Shutdown and follow the actions of N2-SOP-101C.

c. Monitor APRMs and LPRMs for indication of thermal hydraulic oscillations and scram the reactor if oscillations exist.

d. Reduce power to less than 70%, Notify I&C Dept. & Reactor Engineering, verify RCS pump A speed is zero and shut FCV 17A.

Proposed Answer: b.

Question # RO 15 SRO 28

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	295002 AA1.07	295002 AA1.07
	Importance Rating	3.1	2.9

Ability to operate and/or monitor the following as they apply to a LOSS OF MAIN CONDENSER VACUUM: condenser circulating water system

Proposed Question:

With the plant operation at 100% power the following conditions exist:

- Circulating Water Pumps "A", "B", "C", "E", "F" are in operation.
- Circulating Water Pump "C" TRIPs on Electric Fault.

Which one of the following immediate actions are required?

a. Scram and trip the Main Turbine.

b. Verify Circulating Water system in Mode 1.

c. Immediately re-start the tripped Circulating Water Pump.

d. Confirm delta vacuum between any two condensers is <4" Hg.

Proposed Answer: a.

Question #		RO 16	SRO 1
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295003 AK2.03	295003 AK2.03
	Importance Rating	3.7	3.9

Knowledge of the interrelations between Partial or Complete Loss of A.C. power and the following: A.C. electrical distribution system.

Proposed Question:

The plant is operating at 100% power with the normal AC distribution lineup. An overcurrent condition occurs on the **Reserve Transformer B** resulting in actuation of its protective relaying.

Which one of the following states the plant AC busses immediately de-energized as a result of the automatic fault isolation?

a. 2ENS*SWG103 (Div. II)

b. 2ENS*SWG101 (Div. I)

c. 2ENS*SWG103 (Div. II) and 2NPS-SWG003

d. 2ENS*SWG101 and 2ENS*SWG102 (Div. I & III)

Proposed Answer: a.

Question # RO 17 SRO 29

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295004 AK1.02	295004 AK1.02
	Importance Rating	3.2	3.2

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

Proposed Question:

The plant is operating at 75% power when a fault in the Division I 125 VDC Battery, 2BYS*BAT2A, causes the following:

- Battery Breaker to Division I DC Switchgear, 2BYS*SWG002A, trips **OPEN**.
- Charger 2BYS*CHGR2A1, Output Breaker to Division I DC Switchgear, 2BYS*SWG002A, trips **OPEN**.

What is the effect on plant operation **and** what must be done to restore power to the Division I 125 VDC Bus or loads?

a. Immediate scram is required, DC power can be restored using the standby charger.

b. Orderly plant shutdown is required until DC power can be restored using the standby charger.

c. Orderly plant shutdown is required, DC power can **NOT** be restored until the battery is available.

d. Stop all activity that could result in a plant trip, DC power can **NOT** be restored until the battery is available.

Proposed Answer: a. Plant must be scrammed because both recirculation pumps tripped (SOP-29 and SOP-4)). Power can be restored by placing the alternate charger in service (SOP-4).

Question # RO 18 SRO 31

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295008 AK1.03	295008 AK1.03
	Importance Rating	3.2	3.2

Knowledge of the operational implications of the following concepts as they apply to high reactor water level: Feed flow / steam flow mismatch.

Proposed Question:

Given the following conditions:

- Reactor power is steady at **50%**
- Reactor water level is 182 inches
- Reactor Vessel Level Control System is in 3-element control
- Reactor level detector channel "A" is selected

The Channel "B" feedwater flow **SIGNAL** fails to ZERO.

Which one of the following describes the result?

a. Scram on Main Turbine trip.

b. Scram on reactor water level trip.

c. Reactor water level stabilizes at a lower level.

d. Reactor water level stabilizes at a higher level.

Proposed Answer: d.

Question # RO 19 SRO 32

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295012 AK2.01	295012 AK2.01
	Importance Rating	3.4	3.5

Knowledge of the interrelations between high drywell temperature and the following: Drywell ventilation.

Proposed Question:

The plant is operating at rated power: Drywell temperature is 140°F and slowly rising.

Which one of the following actions is required to stabilize drywell temperature?

a. Align service water to the drywell unit coolers.

b. Start the standby RPV top head area unit cooler.

c. Align alternate drywell cooling to the drywell unit coolers.

d. Throttle open CCP outlet valves to the DRS unit coolers.

Proposed Answer: b.

Question # RO 20 SRO 9

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295013 AK3.01	295013 AK3.01
	Importance Rating	3.6	3.8

Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL TEMPERATURE: suppression pool cooling operation.

Proposed Question:

A steam line break has occurred in the Primary Containment. During the scram **several control rods failed to fully insert**. The following conditions exist:

- RPV Level is 167 inches
- RPV Pressure is 420 psig
- Drywell Pressure is 7.0 psig
- Drywell Temperature is 180°F
- Suppression Chamber Pressure is 2 psig
- Suppression Pool Temperature is 106°F

Which one of the following Residual Heat Removal System lineups is to be directed for these conditions?

a. System "A" and "B" in suppression pool cooling.

b. System "A" in suppression pool cooling with "B" in LPCI.

c. System "A" and "B" in drywell and suppression chamber spray.

d. System "A" in suppression pool cooling and "B" in drywell spray.

Proposed Answer: a. N2-EOP-PC directs starting all available suppression pool cooling.

Question # RO 21

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295016 AA1.03
	Importance Rating	3.0

Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT: RPIS

Proposed Question:

A rapidly spreading fire forced evacuation of the control room. During the evacuation it was **NOT** possible to verify **ALL RODS IN**. Which of the following methods is available to determine control rod positions?

a. Demand an OD-7 at the remote computer.

b. Verify all HCU accumulator pressures less than 860 psig.

c. Perform continuity checks at the RPIS termination cabinets.

d. Determine ALL RODS IN at the RWM Computer Display Chassis.

Proposed Answer: a.

Question # RO 22

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295017 AA2.01
	Importance Rating	2.9

Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE: off-site release rate: plant specific.

Proposed Question:

The plant is in Mode 5 unloading the reactor core in preparation for refueling. A tornado strikes the site and several of the Reactor Building blowout panels on the refueling floor are torn free and fall from the building.

Which one of the following describes the type of release and the release path from the Refuel Floor?

a. Monitored release from the secondary containment only.

b. Unmonitored release from the secondary containment only.

c. Monitored release from the primary and secondary containment.

d. Unmonitored release from the primary and secondary containment.

Proposed Answer: d.

Question # RO 23 SRO 33

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295018 AK3.07	295018 AK3.07
	Importance Rating	3.1	3.2

Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF CCW: cross connecting with backup systems.

Proposed Question:

During a long term loss of Reactor Building Closed Loop Cooling Water (CCP) which one of the following lists the loads that can be cooled by backup systems to CCP?

a. RHR Pump Seal Coolers and Spent Fuel Pool Cooling

b. Reactor Building Drain Coolers and RHR Motor Coolers

c. Reactor Building Ventilation and CRD Pump Seal Coolers

d. CRD Pump Seal and Oil Coolers and Recirc Pump Motor Coolers

Proposed Answer: a.

Question # RO 24 SRO 34

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295019 2.4.48	295019 2.4.48
	Importance Rating	3.5	3.8

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 following annunciators are in alarm:

- 851229, INSTR AIR SYSTEM TROUBLE
- 851218, INST AIR RCVR TK 3 PRESS LOW
- 851208, INST AIR RCVR TK 2 PRESS LOW
- 851239, SER AIR SYS 2IAS-AOV171 CLOSED

The Compressor Selector Switch is in position, **CAB**

Which one of the following states those Air Compressors that will be operating for these conditions?

a. C and A operating, B off

b. C and B operating, A off

c. A and B operating, C off

d. C, A and B operating

Proposed Answer: d. The Lag Compressors starts at 100 psig, the Backup starts at 85 psig. The Inst Air RCVR #2 alarm comes in and the Service Air isolation valve AOV171 closes at 85 psig so all three compressors should be running.

Question # RO 25

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295020 2.4.11
	Importance Rating	3.4
Knowledge of abnormal condition procedures.		

Proposed Question:

A relay failure caused a Division I Group 8 isolation. Which one of the following Special Operating Procedures (SOP) is required to be entered?

a. N2-SOP-11, Loss of Service Water.

b. N2-SOP-60, Loss of Drywell Cooling.

c. N2-SOP-13, Total Loss of CCP System.

d. N2-SOP-30, Control Rod Drive Failures.

Proposed Answer: b.

Question # RO 26

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295022 AA2.02
	Importance Rating	3.3

Ability to determine and/or interpret the following as they apply to LOSS OF CRD PUMPS: CRD system status.

Proposed Question:

The plant is operating at 100% power. Several annunciators have been received in the last few minutes, including:

- 603309, CRD PUMP 1A SUCTION PRESS LOW
- 603308, CRD PUMP 1A/1B AUTO TRIP
- 603446, CRD PUMP DISCH HEADER PRESSURE LOW
- 603311, CRD CHARGING WTR PRESSURE LOW
- 603441, ROD DRIVE ACCUMULATOR TROUBLE

A check of the full core display on P603 indicates 6 (six) amber accumulator lights for fully withdrawn control rods are **ON**.

Which one of the following actions is required **FIRST**, by N2-SOP-30, Control Rod Drive Failures?

a. Start the standby CRD pump then restore the CRD system.

b. Reduce recirculation flow to minimum and scram the reactor.

c. Dispatch an operator to the accumulators to determine pressure.

d. Declare associated control rods inoperable and enter Technical Specifications LCO.

Proposed Answer: c. Accumulator pressure must be locally verified >940 psig.

Question # RO 27 SRO 37

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295028 EK1.01	295028 EK1.01
	Importance Rating	3.5	3.7

Knowledge of the operational implications of the following concepts as they apply to high drywell temperature: reactor water level measurement.

Proposed Question:

A leak into the primary containment atmosphere has developed. As drywell temperatures rise, which one of the following describes the effect on the indicated reactor water level compared to the actual reactor water level?

a. Indicated level is lower on all level instruments.

b. Indicated level is higher on all level instruments.

c. Indicated level is lower on narrow range instruments and higher on all other instruments.

d. Indicated level is lower on wide range instruments and higher on all other instruments.

Proposed Answer: b.

Question # RO 28 SRO 21

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295030 EK3.06	295030 EK3.06
	Importance Rating	3.6	3.8

Knowledge of the reasons for the following responses as they apply to low suppression pool water level: Reactor scram.

Proposed Question:

Which one of the following is the reason for requiring a plant shutdown and RPV blowdown if suppression pool water level CANNOT be maintained above elevation 192 feet?

a. Protect the primary containment from over pressurization if a LOCA occurs.

b. Prevent the loss of HPCS and RCIC as injection sources due to loss of NPSH.

c. Protect the primary containment from excessive upward pressure on the drywell floor if drywell sprays are initiated.

d. Prevent exceeding suppression chamber downcomer design differential pressures if suppression chamber sprays are initiated.

Proposed Answer: a.

Question # RO 29

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295033 EK3.04
	Importance Rating	4.0

Knowledge of the reasons for the following responses as they apply HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS: personnel evacuation.

Proposed Question:

While operating at 89% power the following events occur:

- 851244, REACTOR BLDG AREA RADN MON ACTIVATED.
- The annunciator is confirmed to be caused by a **red** high alarm on 2RMS-RE105, TIP EQUIP AREA.
- It is confirmed there are **NO** known activities being performed in the TIP area.

Procedure EPIP-EPP-21, RADIATION EMERGENCIES has been entered. A radiation emergency area evacuation of the TIP area is announced.

Which one of the following is the basis for this announcement?

a. Prevents the spread of contamination.

b. Directs Radiation Protection to the TIP area.

c. Initiates an accountability of personnel in the area.

d. Lowers radiation exposures to personnel in the area.

Proposed Answer: d.

Question # RO 30 SRO 40

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	295034 2.4.17	295034 2.4.17
	Importance Rating	3.1	3.8
Knowledge of EOP terms and definitions.			

Proposed Question:

A plant transient has occurred resulting in the following conditions:

- Reactor Building General Area El 261 (E31-N638A at panel P632) temperature is 250°F
- N2-EOP-SC, Secondary Containment Control is being executed
- RPV pressure is stable at 50 psig

Based on the above conditions, which one of the following is the concern with Reactor Building temperature at 250°F?

a. Entry into the E-plan and declaration of a Site Area Emergency is required.

b. Personnel safety or equipment important to safety is directly threatened.

c. Some RPV water level instruments are unusable because saturation conditions have been exceeded.

d. A primary system is discharging into the reactor building and an RPV blowdown is required.

Proposed Answer: b.

Question # RO 31

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	295038 EK2.05
	Importance Rating	3.7

† Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Site emergency plan.

Proposed Question:

Which one of the following events requires the declaration of an emergency event classification?

a. A fire is reported in the site warehouse.

b. Loss of Line 5 or 6 with a loss of the associated EDG.

c. A radioactivity release with a site boundary TEDE of 15 mr/hr.

d. A reactor scram where RPV water level lowers to 100 inches.

Proposed Answer: c.

Question # RO 32

Examination Outline Cross-Reference	Level	RO
	Tier #	1
	Group #	2
	K/A #	600000 AA1.08
	Importance Rating	2.7

Ability to operate and/or monitor the following as they apply to plant fire on site: Fire fighting equipment used on each class of fire.

Proposed Question:

Which one of the following describes the response of the fire protection system if the fire detection system senses a fire in zone 333XL, DIV 1 SWGR ROOM?

a. Deluge system actuated and the fixed foam system pump is operating.

b. Fire computer prints an alarm tape 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.

Question # RO 33 SRO 36

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	3	2
	K/A #	295021 AK2.04	295021 AK2.04
	Importance Rating	3.0	3.1

Knowledge of the interrelations between LOSS OF SHUTDOWN COOLING and the following: component cooling water systems: plant specific.

Proposed Question:

The plant is making preparations to startup following refueling outage. The following conditions exist:

- The Residual Heat Removal system is **NOT** available.
- The main condenser is **NOT** available.
- The reactor has been shutdown for 10 weeks.

Because of the low core decay heat load that exists, the decision is made to use Alternate Decay Heat Removal. Which one of the following systems will be used in this lineup?

a. Safety Relief Valves

b. Condensate/Feedwater

c. Main Steam Line Drains

d. Reactor Building Closed Loop Cooling Water

Proposed Answer: d. Used to cool the Non-Regen H/X when WCS is lined up to recirculate reactor coolant.

Question # RO 34 SRO 15

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	295023 AA1.07	295023 AA1.07
	Importance Rating	3.6	3.6

Ability to operate and monitor the following as they apply to REFUELING ACCIDENTS: Standby Gas Treatment/FRVS

Proposed Question:

The plant is in a refueling outage when a design bases DROPPED FUEL ASSEMBLY ACCIDENT occurs. Standby Gas Treatment (GTS) Train "A" is maintaining Secondary Containment integrity.

Which one of the following describes the consequence of this accident on GTS Train "A" operation?

a. GTS Fan breaker trips.

b. Clogging of the HEPA filter.

c. High charcoal adsorber temperatures.

d. Moisture builds up in the filters and adsorbers.

Proposed Answer: c.

Question # RO 35 SRO 41

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	3	2
	K/A #	295035 EK3.02	295035 EK3.02
	Importance Rating	3.3	3.5

Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: secondary containment ventilation response.

Proposed Question:

During full power operation a sudden cold spell causes Reactor Building Differential Pressure to lower from –0.47 in WG to –0.35 in WG. Which one of the following actions is required to restore Reactor Building Differential Pressure to the same value that existed before the cold spell?

a. Throttle closed Manual Supply Damper 2HVR-DMPV72.

b. Secure one of the Reactor Building Supply Fans, FN 1A(B,C).

c. Start a second Above Refueling Floor Exhaust Fan, FN 5A(B).

d. Manually close Vent Supply Air Recirc Dampers 2HVR-MOD17A/B

Proposed Answer: a. Closing DMP72 allow less air into the reactor building making it more negative.

Question # RO 36 SRO 42

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	1	1
	Group #	3	2
	K/A #	295036 EA2.03	295036 EA2.03
	Importance Rating	3.4	3.8

Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL: Cause of the high water level.

Proposed Question:

Following a LOCA, the following plant conditions exist:

- CRD is maximized for RPV injection
- RHR loops "A" and "B" are in suppression pool cooling
- SFC is maintaining fuel pool temperature
- WCS is being used for RPV pressure control

If a Reactor Building sump reaches the **High-High level** setpoint and cannot be restored and maintained below the High-High level, which one of the following systems is to be isolated first.

a. CRD

b. ~~LPCI~~ RHR EWB 2/11/00

c. SFC

d. WCS

Proposed Answer: c.

Question # RO 37 SRO 67

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	2
	K/A #	201001 K2.05	201001 K2.05
	Importance Rating	4.5	4.5

Knowledge of electrical power supplies to the following: Alternate rod insertion valve solenoids: Plant-Specific.

Proposed Question:

Which one of the following statements describes how a total loss of power from Div. I 125 VDC will effect the automatic initiation of Alternate Rod Insertion (ARI) during an RRCS initiation?

	Div I Actuates	Div II Actuates	Number of ARI valves that open
a.	No	Yes	4
b.	Yes	No	8
c.	Yes	Yes	4
d.	Yes	Yes	8

Proposed Answer: a. ARI valves are energized to Open and the Logic is energized to actuate. Loss of power will prevent activation of Div I and failure of it's four valves to Open.

Question # RO 38

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	201001 A1.03
	Importance Rating	2.9

Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD DRIVE HYDRAULIC SYSTEM controls including: CRD system flow.

Proposed Question:

The plant is operating at 60% power with the Control Rod Drive (CRD) Flow Controller in **AUTO** set for 63 gpm. Which one of the following describes how the CRD Flow Control Valve responds to a reactor scram?

a. Opens then partially closes to control flow as the SDV is pressurized.

b. Opens then partially closes to control flow to recharge the accumulators.

c. Closes then partially opens to control flow when the scram is reset.

d. Closes then partially opens to control flow when control rods reach position "00".

Proposed Answer: c.

Question # RO 39 SRO 68

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	2
	K/A #	201002 A2.04	201002 A2.04
	Importance Rating	3.2	3.1

Ability to (a) predict the impacts of the following on the reactor manual control system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Control rod block.

Proposed Question:

A reactor startup is in progress with thermal power below the LPSP. The RWM and RSCS are both OPERABLE.

The next step requires that a control rod be moved from position 12 (Bank insert limit) to position 24 (Bank withdraw limit). When the control rod is positioned, its final position is 26 because of a double-notch.

Regarding ONLY the RWM, which one of the following describes the actions necessary to return the control rod to its bank withdraw limit (position 24)?

a. Bypass the RWM, then return the control rod to position 24.

b. Using the insert pushbutton, returns the control rod to position 24.

c. Bypass the control rod in the RWM, then return it to position 24.

d. Using the RWM enter a substitute control rod position, then return it to position 24.

Proposed Answer: b.

Question # RO 40 SRO 44

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	202002 A3.01	202002 A3.01
	Importance Rating	3.6	3.4

Ability to monitor automatic operations of the recirculation flow control system including: Flow control valve operation.

Proposed Question:

The plant is operating at 100% power. A shutdown of the "B" Recirculation Flow Control Valve Hydraulic Power Unit occurs. The following conditions currently exist:

- Total Core Flow 107.5 mlbs/hr
- Jet Pump Loop "A" Flow 53.5 mlbs/hr
- Jet Pump Loop "B" Flow 54.0 mlbs/hr
- FCV "A" 83% Open
- FCV "B" 84% Open

Which one of the following limits will be challenged if **NO** operator action is taken?

a. Rated core flow

b. Rated reactor power

c. Recirculation pump amperes

d. Jet pump loop flow mismatch

Proposed Answer: d.

Question # RO 41 SRO 45

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	203000 K5.01	203000 K5.01
	Importance Rating	2.7	2.9

Knowledge of the operational implications of the following concepts as they apply to RHR/LPCI INJECTION MODE: testable check valve operation.

Proposed Question:

Which one of the following methods is used to **confirm** RPV injection flow during an automatic LPCI injection using RHR "A"?

a. Injection Valve RHS*MOV24A opens.

b. Minimum Flow Valve RHS*MOV4A opens.

c. Testable Check Valve RHS*AOV16A opens.

d. RPV pressure lowers to within 130 psid of RHR pressure.

Proposed Answer: c.

Question # RO 42 SRO 46

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209001 K1.02	209001 K1.02
	Importance Rating	3.4	3.4

Knowledge of the physical connections and/or cause effect relationships between LOW PRESSURE CORE SPRAY and the following: Suppression Pool

Proposed Question:

The plant is operating at 100% power. RHS*MOV30A, RHR A/LPCS RTN TO SUPPR POOL ISOL MOV is determined to be closed. How would this effect the Low Pressure Core Spray (LPCS) during a high drywell pressure condition (1.68 psig)?

a. After initiation the LPCS pump may overheat because there is no low flow protection.

b. Initiation of "A" RHR will cause reverse flow through the LPCS pump prior to it receiving a start signal.

c. LPCS initiation will NOT comply with design analysis flow because the minimum flow valve remains open.

d. Initiation of "A" RHR pump will pressurize the LPCS piping giving an ADS permissive signal even if LPCS pump did NOT start.

Proposed Answer: a. The minimum flow line is isolated

Question # RO 43 SRO 47

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209001 K1.09	209001 K1.09
	Importance Rating	3.2	3.4

Knowledge of the physical connections and/or cause-effect relationships between low pressure core spray and the following: Nuclear boiler instrumentation.

Proposed Question:

The plant is operating at 60% power. A high drywell pressure causes a reactor scram. Plant conditions are as follow:

• RPV level	165 inches rising slowly
• RPV pressure	1005 psig and stable
• Drywell pressure	2.3 psig
• Turb. bypass valves	available

Which one of the following describes the Low Pressure Core Spray (CSL) system status?

a. Pump shutdown in the standby lineup.

b. Pump shutdown with injection valve open.

c. Pump running with the injection valve open.

d. Pump running with the injection valve closed.

Proposed Answer: d.

Question # RO 44 SRO 48

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	209002 A1.03	209002 A1.03
	Importance Rating		

Ability to predict and/or monitor changes in the parameters associated with operating the high pressure core spray system (HPCS) controls including: Reactor water level.

Proposed Question:

Following a loss of feedwater, High Pressure Core Spray (HPCS) initiated on low reactor water level. When reactor water level is at 190 inches indicated, the operator closes CSH*MOV107, PMP 1 INJECTION VLV, and an AMBER light above the control switch lights.

Subsequently, when RPV water level lowers to 140 inches CSH*MOV107, PMP 1 INJECTION VLV, control switch is placed to OPEN.

Assuming no other HPCS controls are operated, which one of the following describes the reactor water level response?

a. Rises to 202.3 inches and then lowers.

b. Lowers to 108.8 inches and then rises.

c. Rises to 202.3 inches and continues to rise.

d. Lowers to 108.8 inches and continues to lower.

Proposed Answer: a.

Question # RO 45 SRO 49

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	211000 K4.08	211000 K4.08
	Importance Rating	4.2	4.2

Knowledge of SLC System design feature(s) and/or interlocks which provide for system initiation upon operation of SLC control switch.

Proposed Question:

During an ATWS, manual initiation of SLC system B is required due to an automatic SLC start failure. The keylock switch for Standby Liquid Control (SLC) pump "B" is turned to the PUMP "B" RUN position. The following system status is observed at P601:

- SLC Pump "B" Suction valve opens
- SLC Pump "B" starts.

Which one of the following additional system responses will occur as a result of the PUMP "B" control switch movement?

a. Only the "B" squib valve fires, only WCS INBD isolation valve closes.

b. Both "A" and "B" squib valves fire, only WCS OUTBD isolation valve closes.

c. Only the "B" squib valve fires, both WCS INBD and OUTBD isolation valves close.

d. Both "A" and "B" squib valves fire, both WCS INBD and OUTBD isolation valves close.

Proposed Answer: a. Pump B switch fires only the B squib valve and sends an isolation signal to the WCS inboard containment isolation valve.

Question # RO 46 SRO 50

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	212000 K4.07	212000 K4.07
	Importance Rating	4.1	4.1

Knowledge of REACTOR PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Manual system activation trip

Proposed Question:

During a reactor startup Intermediate Range Monitors (IRM) "C" and "G" become inoperative without causing an RPS trip. It has been decided to continue the startup while I&C makes repairs. You are directed to MANUALLY TRIP the associated RPS trip channel.

In accordance with N2-SOP-97, Reactor Protection System Failures, which one of the following methods is used to place the RPS channel in the tripped condition?

a. Arm and depress the A2 Manual Scram Pushbutton.

b. Arm and depress the B2 Manual Scram Pushbutton.

c. Place "C" or "G" IRM drawer mode switch in Standby.

d. Place both "C" and "G" IRM drawers mode switches in Standby.

Proposed Answer: a. C and G IRM channels provide trip signals to the A2 RPS logic trip system.

Question #		RO 47
Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	215003 K5.03
	Importance Rating	3.0

Knowledge of the operational implications of the following concepts as they apply to INTERMEDIATE RANGE MONITOR (IRM) SYSTEM: changing detector position

Proposed Question:

The Mode Switch is in STARTUP. Control rods are being withdrawn.

- The reactor has just been declared critical
- All IRM's are on Range 1

The "A" Intermediate Range Monitor detector fully withdraws from the core.

Which one of the following describes the plant response?

a. Half Scram caused by IRM downscale.

b. Half Scram caused by IRM inoperative.

c. Control Rod Block caused by IRM downscale.

d. Control Rod Block caused by IRM detector position.

Proposed Answer: d. Detector NOT fully inserted causes a rod block, not a scram

Question # RO 48

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	215004 K2.01
	Importance Rating	2.6

Knowledge of the electrical power supplies to the following:
SRM channels/detectors.

Proposed Question:

The plant is in Cold Shutdown, following a Refueling outage. The RPS shorting links are removed.

Which one of the following describes the effect of de-energizing 24/48 VDC Panel 2BWS-PNL300B on Neutron Monitoring System (NMS) and Reactor Protection System (RPS)?

a. Only a half scram because of the power loss to some SRMs.

b. Only a half scram because of the power loss to some IRMs.

c. A full scram occurs because of the power loss to some SRMs.

d. RPS is energized because the battery charger supplies the NMS.

Proposed Answer: c.

Question # RO 49 SRO 51

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	215004 K3.02	215004 K3.02
	Importance Rating	3.4	3..4

Knowledge of the effect that a loss or malfunction of the source range monitor (SRM) system will have on the following: Reactor manual control: plant-specific.

Proposed Question:

A reactor startup is in progress. All Intermediate Range Monitors (IRMs) are on range 2 <u>except</u> IRM "B" which is on range 3. The Source Range Monitor (SRM) detectors are being withdrawn.

Which one of the following describes the response if SRM "C" count rate lowers to 70 cps while it is being withdrawn?

a. A half scram on RPS "A" occurs.

b. A control rod block is generated.

c. SRM "C" downscale light turns on.

d. SRM "C" detector drive will deenergize.

Proposed Answer: b.

		RO 50	SRO 52

Question #

		RO	SRO
Examination Outline Cross-Reference	Level	2	2
	Tier #	1	1
	Group #	215005	215005
	K/A #	K1.14	K1.14
	Importance Rating	2.8	2.9

Knowledge and the physical connections and/or cause-effect relationships between Average Power Range Monitor / Local Power Range Monitor System and the following: Reactor vessel.

Proposed Question:

To be considered operable, each APRM is required to have a minimum total number of LPRM inputs as well as a minimum number of operable LPRM inputs from each detector level.

Which one of the following describes the basis for this requirement?

a. Ensure the APRM will provide a good representation of average core power.

b. Ensure the APRM averaging circuit has enough inputs to provide valid 3D Monicore calculations.

c. Ensure the combined LPRM signals will provide on scale readings, even at lower power levels.

d. Ensure the combined LPRM signals will provide automatic protection to prevent exceeding local thermal limits.

Proposed Answer: a.

Question # RO 51

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

Ability to monitor automatic operation of the nuclear boiler instrumentation including the following: Relationship between the meter/recorder readings and actual parameter values. Plant specific.

Proposed Question:

During conduct of the EOPs, the following parameters exist:

- Reactor pressure 40 psig
- Drywell pressure 8 psig
- Drywell temperature (highest) 250°F
- Suppression Pool temperature 105°F
- Rx Building temperature (highest) 150°F

If actual reactor water level is at the top of active fuel (TAF), which one of the following describes the status of RPV level instrumentation?

a. No level instruments are available.

b. Fuel Zone level instruments are available.

c. Wide Range level instruments are available.

d. Upset Range level instruments are available.

Proposed Answer: b.

Question # RO 52 SRO 53

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	216000 K3.01	216000 K3.01
	Importance Rating	4.0	4.3

Knowledge of the effect that a loss or malfunction of the NUCLEAR BOILER INSTRUMENTATION will have on the following: Reactor Protection System

Proposed Question:

The plant is at 100% power with reactor water level transmitter, **B22-N680A**, (RPS Narrow Range) failed downscale.

Prior to removing the transmitter from service the equalizing valve for reactor water level transmitter, **B22-N680D**, (RPS Narrow Range) is fully opened by I&C.

Assume **NO** operator actions are taken. Which one of the following describes the effects of these failures?

a. The RFPs and the Main Turbine will trip.

b. Only a reactor low level alarm is received.

c. Only a reactor high level alarm is received.

d. A half scram is received on RPS trip system "A".

Proposed Answer: d. Half scram from A side level

Question #		RO 53	SRO 54
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	217000 K6.03	217000 K6.03
	Importance Rating	3.5	3.5

Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR CORE ISOLATION·COOLING (RCIC): Suppression Pool water supply.

Proposed Question:

The Reactor Core Isolation Cooling (RCIC) pump suction is lined up to the Suppression Pool. Following a loss of feedwater RCIC receives an initiation signal. Several seconds later a Suppression Pool low level occurs.

Which one of the following is the expected RCIC response?

a. RCIC initiates and injects. CST suction valve (MOV129) does **NOT** open.

b. RCIC initiates but pump discharge to the reactor (MOV126) does **NOT** open.

c. RCIC initiates then trips on low suction pressure when Suppression Pool suction valve (MOV136) closes.

d. RCIC initiates and injects. CST suction valve (MOV129) opens and Suppression Pool suction valve (MOV136) closes.

Proposed Answer: a. The only way to swap back to the CST suction is manually, RCIC stays lined up to the SP and injects

Question # RO 54

Examination Outline	Level	RO
Cross-Reference	Tier #	2
	Group #	1
	K/A #	217000 A4.09
	Importance Rating	3.7

Ability to manually operate and/or monitor in the control room System Pressure.

Proposed Question:

Following a scram Reactor Core Isolation Cooling (RCIC) was manually initiated and used for RPV level control. As RPV level rose to 180 inches, 2ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK was opened to control RCIC flow.

Currently the following conditions exist:

- RPV Pressure 880 psig
- RPV Level 121 inches
- RCIC Pump Discharge Pressure 520 psig
- RCIC Flow Controller is in MANUAL
- RCIC Flow 600 gpm

Which one of the following actions is necessary to raise RPV water level with RCIC?

a. Throttle open 2ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK.

b. Place Flow Controller in AUTO, then open 2ICS*MOV126, PMP 1 DISCH TO REACTOR.

c. Close 2ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK, then adjust RCIC speed with the Flow Controller.

d. Open 2ICS*MOV126, PMP 1 DISCH TO REACTOR and close 2ICS*FV108, TEST BYPASS TO CONDENSATE STOR TK.

Proposed Answer: c.

Question # RO 55 SRO 55

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	218000 K2.01	218000 K2.01
	Importance Rating	3.1	3.3

Knowledge of electrical power supplies to the following: ADS logic.

Proposed Question:

The unit is operating at 100% power. ALL high pressure and low pressure ECCS systems are in standby.

Div. 1 DC power from 2BYS*PNL201A is lost.

Which one of the following describes the ability of the SRVs to function in the pressure-relief mode and in the ADS mode?

a. **NO** SRVs will function in the pressure-relief mode. Actuation of Div. II ADS logic or placing the Div. II ADS valves key lock switches (Panel H13-P631) to open will open the ADS valves.

b. **NO** SRVs will function in the pressure-relief mode. Actuation of Div. II ADS logic opens the ADS valves. Placing the Div. II ADS valve key lock switches (PNL H13-P631) to open will NOT open the ADS valves.

c. **ALL** SRVs will function in the pressure-relief mode. Actuation of Div. II ADS logic or placing the Div. II ADS valve key lock switches (Panel H13-P631) to open will open the ADS valves.

d. **ALL** SRVs will function in the pressure-relief mode. Actuation of Div. II ADS logic opens the ADS valves. Placing the Div. II ADS valve key lock switches (Panel H13-P631) to open will NOT open the ADS valves.

Proposed Answer: a.

Question #		RO 56
Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	223001 K6.01
	Importance Rating	3.6

Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES: Drywell Cooling.

Proposed Question:

While operating at full power a loss of circuit 2DRSA04 trips all the drywell coolers. Which one of the following is the immediate concern within the primary containment?

a. Water level instruments become inaccurate causing a scram.

b. High temperatures at the drywell head require a manual scram.

c. The drywell overheats and pressure rises requiring a shutdown.

d. Recirculation pump motors overheat requiring a power reduction.

Proposed Answer: c.

Question # RO 57 SRO 56

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	223001 2.4.45	223001 2.4.45
	Importance Rating	3.3	3.6
Ability to prioritize and interpret the significance of each annunciator or alarm.			

Proposed Question:

The plant is operating at 100% power when the following annunciator is received:

- 602309, RWCU PUMP ROOM A TEMPERATURE HIGH

High temperature is confirmed. Assuming that all systems function as designed, which one of the following describes the primary containment response and the required operator actions?

a. Only group 7 isolates. Verify the running WCS pump trips.

b. Only group 6 isolates. Establish a leak path for WCS pump seals.

c. Group 6 and group 7 isolate. Manually scram the reactor per N2-SOP-101C, Reactor Scram.

d. Group 6 and group 7 isolate. Enter N2-EOP-SC, Secondary Containment Control.

Proposed Answer: d.

Question # RO 58

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	223002 2.1.32
	Importance Rating	3.4
Ability to explain and apply system limits and precautions.		

Proposed Question:

N2-OP-83, PRIMARY CONTAINMENT ISOLATION SYSTEM, contains the following precaution and limitation:

If a system isolation has occurred due to a valid signal, the problem must be determined and corrected prior to resetting or bypassing the isolation signal, unless directed to do otherwise by the Emergency Operating Procedures.

Which one of the following operator actions is allowed by this precaution?

a. Defeat RPV low pressure isolations to allow injection systems to operate following a LOCA.

b. Bypass drywell pressure isolations to use reactor water cleanup for RPV level control.

c. Reset and re-open the MSIVs to relieve RPV pressure when RPV Blowdown is anticipated.

d. Override the reactor building ventilation isolations to remove smoke from a fire in drywell.

Proposed Answer: a.

Question # RO 59 SRO 60

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	241000 K6.01	241000 K6.01
	Importance Rating	2.8	2.9

Knowledge of the effect that a loss or malfunction of the following will have on the Reactor Regulating System: A.C. electrical power.

Proposed Question:

Reactor startup in progress. The Main turbine has been rolled to 1800 rpm and is at set speed:

- SET SPEED light is on
- SPEED INCREASING light is off

Before the generator can be synchronized, 2VBB-UPS1A power to the Electro-Hydraulic Control (EHC) system is lost.

Which one of the following describes the effect on the Main Turbine and bypass valves?

a. Turbine trip with bypass valves open.

b. Turbine trip and bypass valves close.

c. Turbine is at 1800 rpm with the bypass valves closed.

d. Turbine is at 1800 rpm with bypass valves controlling pressure.

Proposed Answer: d.

Question #

		RO 60	SRO 73
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	2
	K/A #	259001 2.4.49	259001 2.4.49
	Importance Rating	4.0	4.0

Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Proposed Question:

The plant is operating at 80% power when one of the two operating Reactor Feedwater Pumps (RFP) trips. Which one of the following describes the immediate operator actions?

a. If recirculation pumps do not shift to slow speed, then scram the reactor.

b. If recirculation flow has not lowered automatically, then manually reduce Recirc flow.

c. Start the standby RFP and if level is NOT stable, then control RPV level in manual.

d. Perform the actions for a reactor scram and establish RPV level control using the running RFP.

Proposed Answer: b.

Question # RO 61

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	1
	K/A #	259002 K3.05
	Importance Rating	2.8

Knowledge of the effect that a loss or malfunction of the Reactor Water Level Control System will have on the following: Recirculation flow control system.

Proposed Question:

The unit is operating at 100% power when a failure of the FWCS causes reactor water level to rise and keep rising. NO operator action is taken.

Which one of the following describes the status of the RCS system pumps and flow control valves when plant conditions are stable?

a. Pumps are tripped with their FCVs in loop manual.

b. Pumps are in fast speed with their FCVs in the motion inhibit.

c. Pumps are at minimum speed with their FCVs at the 45% open.

d. Pumps are in slow speed with their FCVs at the 20% valve position.

Proposed Answer: d.

Question # RO 62 SRO 62

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	261000 A4.07	261000 A4.07
	Importance Rating	3.1	3.2

Ability to manually operate and/or monitor in the Control Room: system flow

Proposed Question:

Hi drywell pressure causes a trip of the Reactor Building Ventilation System. Both trains of Standby Gas Treatment (GTS) automatically start.

After verifying both trains of GTS are **NOT** required, Train "A" is left in service and Train "B" is shutdown by placing the Train "B" INITIATION control switch in **AUTO AFTER STOP**. The following conditions are observed:

- GTS*MOV1B, INLET FROM RX BLDG VENTILATION goes closed
- GTS*AOV2B, TRAIN B INLET VLV goes closed
- GTS*AOV3B, FAN 1B DISCHARGE ISOL VLV **fails to close**
- GTS*FN1B, SBGTS FAN stops

With the high drywell pressure condition still present, which one of the following will occur (assuming **NO** operator action)?

GTS train "B"...

a. restarts and restores Reactor Building differential pressure to –0.25 inches WG or more negative.

b. restarts with flow less than rated, Reactor Building differential pressure is –0.05 inches WG.

c. remains off and GTS Train "A" flow raises to 4000 scfm, Reactor Building differential pressure is –0.05 inches WG.

d. remains off and GTS Train "A" flow raises to 4000 scfm, Reactor Building differential pressure is -0.25 inches WG or more negative.

Proposed Answer: A. The B train restarts because the initiation signal is still present and the A train can not maintain Rx Bldg differential. The valve failure doesn't effect SBGTS flow because both fans are running and no short cycle flow path exists

Question # RO 63 SRO 64

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	264000 A1.03	264000 A1.03
	Importance Rating	2.8	2.9

Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY GENERATORS (DIESEL/JET) controls including: Operating voltages, currents, and temperatures.

Proposed Question:

Emergency Diesel Generator 1 (EDG1) is running paralleled to the grid for the monthly load test. EDG1 parameters are:

- Voltage 4160 v
- Load 4400 kw
- Frequency 60.0 hz

A LOCA signal is received. Which one of the following describes the EDG1 voltage, load, and frequency one (1) minute later?

a. Voltage and frequency are lower, load is higher.

b. Voltage is zero, load is downscale, frequency is upscale.

c. Voltage is the same, load is zero, frequency is higher.

d. Voltage and frequency are the same, load is zero.

Proposed Answer: d.

Question # RO 64 SRO 65

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	264000 A3.06	264000 A3.06
	Importance Rating	3.1	3.2

Ability to monitor automatic operations of the EMERGENCY GENERATORS (DIESEL/JET) including: Cooling water system operations.

Proposed Question:

The Division I Emergency Diesel Generator (EDG) has been supplying its loads for ten (10) minutes following a LOCA. The following conditions exist:

- 852118, EDG 1 SERVICE WATER INLET PRESS LOW, alarms
- Pressure sensed at 2SWP*PT66A is 20 psig

Which one of the following describes an effect on EDG1?

a. EDG1 trips on high oil temperatures.

b. EDG1 trips on low service water flow.

c. EDG1 continues to operate with a higher service water flow.

d. EDG1 continues to operate with higher jacket water temperature.

Proposed Answer: d.

Question # RO 65 SRO 80

Examination Outline Cross-Reference		RO	SRO
	Level	RO	SRO
	Tier #	2	2
	Group #	2	3
	K/A #	201003 K6.01	201003 K6.01
	Importance Rating	3.3	3.3

Knowledge of the effect that a loss or malfunction of the following will have on the control rod and drive mechanism: Control rod drive hydraulic system.

Proposed Question:

The plant is operating at 50% power with the following CRD system indications:

- Drive water differential pressure 265 psid
- Drive flow 0.0 gpm
- Charging Header pressure 1450 psig
- CRD system flow 50 gpm

When attempting to insert control rod 18-19, drive water flow is observed at 0.0 gpm. When attempting to withdraw control rod 18-19, drive water flow is observed at 2.0 gpm. The control rod does **NOT** move, in either direction.

EWB 2/11/00

Which one of the following describes the cause of the above indications?

Directional Control Valve ...

a. SOV123, Insert Supply, is stuck open.

b. SOV123, Insert Supply, is stuck closed.

c. SOV122, Withdrawal Supply, is stuck open.

d. SOV122, Withdrawal Supply, is stuck closed.

Proposed Answer: b.

Question # RO 66

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	202001 A4.11
	Importance Rating	3.2

Ability to manually operate and/or monitor in the control room: Seal pressures: plant-specific.

Proposed Question:

The plant is operating at 20% power when the following annunciators alarm:

- 602109, RECIRC PUMP 1A OUTER SL LEAK HIGH
- 602115, RECIRC PUMP 1A SEAL STAGING FLOW HIGH/LOW

The following indications are observed:

• Seal leakage	1.7 gpm
• Seal staging flow	1.9 gpm
• Upper seal staging pressure	250 psig
• Lower seal staging pressure	950 psig

Which one of the following describes the state of the 1A Recirculation Pump seals?

a. The lower seal failed.

b. The upper seal failed.

c. Both the upper and lower seal failed.

d. The seal staging flow orifice is clogged.

Proposed Answer: b.

RO 67

Question #

Examination Outline Cross-Reference	Level	RO
	Tier #	-
	Group #	-
	K/A #	204000 K1.05
	Importance Rating	2.7

Knowledge of the physical connections and/or cause-effect relationships between reactor water cleanup system and the following: Plant air systems.

Proposed Question:

The Reactor Water Cleanup (WCS) System is operating with some flow being rejected to the Main Condenser when a complete loss of instrument air occurs. Which one of the following describes the effect on the WCS system?

a. WCS filter supply and return valves remain as is. WCS continues to operate.

b. WCS filter demineralizer inlet and outlet isolation valves and the reject flow control valve close.

c. WCS containment isolation valves fail closed. WCS pumps trip if no action is taken within 15 minutes.

d. WCS system will continue to operate in the reject mode but the return to the feedwater system will isolate.

Proposed Answer: b.

Question # RO 68 SRO 71

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	214000 K4.01	214000 K4.01
	Importance Rating	3.0	3.1

Knowledge of the Rod Position Information System design feature(s) and/or interlocks which provide for the following: reed switch locations.

Proposed Question:

An individual rod scram has been performed on control rod 30-31 using the SRI test switches. When the control rod is selected the four-rod display indicates two blank windows for control rod 30-31.

Which one of the following is the reason for the blank indication for control rod 30-31?

a. The rod is bypassed in the RPIS cabinet.

b. CRDM magnet for the rod is past position "00".

c. An odd reed switch position is actuated for the rod.

d. A substitute rod position is entered in RWM for position "00".

Proposed Answer: b.

Question # RO 69

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	215002 A3.05
	Importance Rating	3.2

Ability to monitor automatic operations of the Rod Block Monitor System including: Back panel meters and indicating lights: BWR-3,4,5.

Proposed Question:

A power ascension is in progress. Annunciator 603204, RBM UPSCALE/INOPERABLE alarms.

The following indications are observed on the RBM A NUMAC.

- RBM FLUX 89%
- APRM FLUX 68%
- FLOW 77%

- LPRMS IN RBM AVERAGE 3
- MINIMUM LPRMS ALLOWED 4
- SETUP RANGE PERMITTED HIGH

Which one of the following describes the required operator response?

a. Inform the CRS that RBM A is inoperable.

b. Reduce power to below the alarm setpoint.

c. Select another rod and then reselect the affected rod.

d. At 2CEC*PNL603, depress the PUSH TO SET UP pushbutton.

Proposed Answer: a.

Question # RO 70

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

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.

Proposed Question:

The plant is at 100% power. The "A" RHR loop is out of service.

- One SRV opens and CANNOT be closed
- The mode switch is placed to SHUTDOWN
- All control rods do NOT insert.
- Reactor power is 35%

Which one of the following describes the limit that will be challenged FIRST if the reactor CANNOT be scrammed and "B" RHR loop CANNOT be started when required?

a. SRV Tail Pipe level Limit

b. RPV Saturation Temperature

c. Pressure Suppression Pressure

d. Heat Capacity Temperature Limit

Proposed Answer: d.

Question #		RO 71	SRO 82

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	239001 K2-01	239001 K2.01
	Importance Rating	3.2	3.3

Knowledge of electrical power supplies to the following: Main steam isolation valve solenoids.

Proposed Question:

While operating at 50% power, the 2VBS-UPS3A output to its loads is lost. Which one of the following describes the final position of the MSIVs ten (10) seconds following the power loss?

	Inboard MSIVs	**Outboard MSIVs**
a.	Closed	Open
b.	Open	Closed
c.	Closed	Closed
d.	Open	Open

Proposed Answer: d.

Question # RO 72

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	239001 2.2.2
	Importance Rating	4.0

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

Proposed Question:

The plant is at 75% power with quarterly MSIV Functional Testing in progress. Inboard MSIV, MSS*AOV6A, will be tested first. Operator actions are as follows:

- MSS*AOV6A Close/Auto/Test Control switch is positioned to TEST. The MSIV remains OPEN and NO half scram occurs.
- Then MSS*AOV6A TRIP TEST pushbutton is depressed and is held in the depressed state for one (1) minute.

Which one of the following describes the plant response?

a. A full reactor scram occurs.

b. The remaining MSIVs close.

c. Reactor power stabilizes at a higher power.

d. Reactor pressure stabilizes at a lower pressure.

Proposed Answer: c.

Question # RO 73 SRO 72

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	245000 K5.02	245000 K5.02
	Importance Rating	2.8	3.1

Knowledge of the operational implications of the following concepts as they apply to Main Turbine Generator and Auxiliary Systems: Turbine operation and limitations.

Proposed Question:

In response to a lowering main condenser vacuum, reactor power is being reduced. Current conditions are:

- Main condenser vacuum is 24.3 inches Hg and slowly lowering
- 603112, RPS A CONT & STOP V CLOSURE BYPASSED, is ON
- 603412, RPS B CONT & STOP V CLOSURE BYPASSED, is ON

Which one of the following describes when the Main Turbine is required to be manually tripped, per N2-SOP-9, Loss Of Condenser Vacuum?

a. Immediately

b. After manual reactor scram

c. Turbine vibration rises by 2 mils

d. When vacuum lowers to 22.1 inches HG

Proposed Answer: a. N2-SOP-9 contains the "low load/high backpressue" actions. With 603112 and 603412 in alarm (indicating <30%), the required action is to trip the turbine, when below 30% and below 24.6 inches Hg..

Question # RO 74

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	256000 A4.10
	Importance Rating	3.2

Ability to manually operate and/or monitor in the control room: Feedwater temperature.

Proposed Question:

With the plant operating at 70% reactor power, 2FWS-MOV102, 6th POINT HEATERS BYPASS VALVE, inadvertently opens. The reactor operator is able to close the valve within 30 seconds of opening.

Which one of the following describes the effect on feedwater temperature including why?

a. Lowers then returns to normal because feedwater heating is restored.

b. Lowers and remains lower because extraction steam has isolated to the heater.

c. Remains the same because the extraction steam to the feedwater heaters remains in service.

d. Remains the same because the 6th point heaters bypass inlet and outlet MOVs are overridden closed.

Proposed Answer: a.

Question # RO 75 SRO 63

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	262001 A2.03	262001 A2.03
	Importance Rating	3.9	4.3

Ability to (a) predict the impacts of the following on the AC Electrical Distribution System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of offsite power.

Proposed Question:

The plant is operating at 100% power when a complete loss of offsite power occurs. Emergency Diesel Generator response is as follows:

- Division I EDG failed to start and CANNOT be started
- Division II EDG failed to start and CANNOT be started
- Division III EDG started and energized its bus

Which one of the following describes immediate operator actions for these conditions?

a. Enter N2-EOP-RPV, RPV Control, and N2-EOP-PC, Primary Containment Control.

b. Depress the EMERGENCY STOP PUSHBUTTON for EDG III. Enter N2-SOP-01, Station Blackout.

c. Start one service water pump in each division 2SWP*P1(A,C,E) and 2SWP*P1(B,D,F).

d. Close service water valves to the reactor and turbine buildings 2SWP*V23 and 2SWP*V17 and align service water to "A" RHS heat exchanger.

Proposed Answer: b.

Question # RO 76 SRO 74

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	262002 K6.01	262002 K6.01
	Importance Rating	2.7	2.9

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

Proposed Question:

2VBB-UPS1A is aligned to the inverter with the TRANSFER CONTROL SWITCH positioned to AUTO RESTART when the following occurs:

- 2NJS-US3 to 2VBB-TRS1 becomes deenergized and **remains deenergized**.
- 2VBB-TRS1 transfer to the alternate AC source is complete after 10 seconds.

Which one of the following describes where 2VBB-UPS1A loads are automatically powered from after this event?

a. 2NJS-US4 through the inverter.

b. 2NJS-US6 bypassing the inverter.

c. 2NJS-US5 bypassing the inverter.

d. 2BYS-SWG001A through the inverter.

Proposed Answer: a.

Question # RO 77 SRO 75

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	263000 K3.03	263000 K3.03
	Importance Rating	3.4	3.8

Knowledge of the effect that a loss or malfunction of the D.C. electrical distribution will have on the following: Systems with D.C. components.

Proposed Question:

The plant is operating at 100% power. One of the operating service water pumps is 2SWP*P1A. A ground fault results in the loss of 2BYS*SWG002A.

Which one of the following describes the effect of the power loss on the "A" Service Water Pump, 2SWP*P1A?

a. Trips and CANNOT be restarted until the ground fault is corrected.

b. Continues to run, but all trips and automatic functions are lost.

c. Trips and CANNOT be restarted until Division I DC power is restored.

d. Continues to run, but all protection <u>except</u> for the overcurrent and low suction pressure trips is lost.

Proposed Answer: b.

Question # RO 78 SRO 76

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	271000 A3.02	271000 A3.02
	Importance Rating	2.9	2.8

Ability to monitor automatic operations of the Offgas system including: System flows.

Proposed Question:

During power operation, fuel failures have caused the following conditions:

- Process Radiation Monitor **2OFG-RU13A** has exceeded its **High** Setpoint
- Process Radiation Monitor **2OFG-RU13B** has exceeded its **Alert** Setpoint

Which one of the following describes the expected Offgas System flow indications on 2CEC*PNL851?

	Train "A" Flow (SCFM)	Train "B" Flow (SCFM)
a.	0	36
b.	36	0
c.	18	18
d.	0	0

Proposed Answer: ~~d.~~ c

. to

Question # RO 79

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	272000 2.4.46
	Importance Rating	3.5
Ability to verify that alarms are consistent with the plant conditions.		

Proposed Question:

The plant is operating at 80% power. The following alarm is received:

- 851256, STACK EFFLUENT RAD MON ACTIVATED

Which one of the following describes how this alarm is verified consistent with plant conditions?

a. Review the status of the DRMS monitors.

b. Verify the reactor building isolates and Standby Gas starts.

c. Compare recorder readings on 2CEC-PNL882 to the posted aid.

d. Verify the Offgas discharge valve to the stack (AOV103) closes.

Proposed Answer: c.

Question # RO 80 SRO 77

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	286000 A2.06	286000 A2.06
	Importance Rating	3.1	3.2

Ability to (a) predict the impacts of the following on the fire protection system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low fire main pressure: plant-specific.

Proposed Question:

Which one of the following describes the pumps that automatically start if the fire protection header pressure lowers from 130 psig to 88 psig?

Assume all components function at their design setpoints.

a. Only the lead and lag pressure maintenance pumps.

b. Only the motor-driven fire pump and diesel driven fire pumps.

c. Only the lead and lag pressure maintenance and the motor-driven fire pumps start.

d. Only the lag pressure maintenance, motor-driven, and diesel driven fire pumps start.

Proposed Answer: c.

Question # RO 81

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	290001 K1.02
	Importance Rating	3.4

Knowledge of the physical connections and/or cause-effect relationships between SECONDARY CONTAINMENT and the following: Primary containment system: Plant-Specific

Proposed Question:

Which one of the following systems when subjected to a single failure could cause a leak path from the primary containment to the secondary containment when the plant is operating at power?

a. MSS, Main Steam System

b. ICS, Reactor Core Isolation Cooling

c. WCS, Reactor Water Cleanup System

d. CCP, Reactor Building Closed Loop Cooling

Proposed Answer: b.

Question # RO 82

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	2
	K/A #	290003 A1.05
	Importance Rating	3.2

Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROOM HVAC controls including: Radiation monitoring (control room)

Proposed Question:

Following a LOCA, the following conditions exist:

- Drywell pressure is 2.3 psig and slowly rising
- RPV water level is 140 inches and stable
- 2HVC*RE18B and 2HVC*RE18D are in alarm
- 2HVC*RE18A and 2HVC*RE18C are rising but have NOT alarmed

Which one of the following describes the Control Building (HVC) Special Filter Trains (SFT's) automatic response and the required operator actions per N2-OP-53A, Control Building Ventilation System?

a. Verify the "B" SFT has automatically started. Place the control switch for the non-running SFT to Normal-After-Stop to keep it off.

b. Verify both the "A" and "B" SFT have automatically started. Ensure that one SFT is secured within 20 minutes of actuation.

c. Verify the "B" SFT has automatically started. Place the control switch for the "A" SFT to start. Within 8 hours, isolate the more contaminated outside air intake path.

d. Verify both the "A" and "B" SFT have automatically started. Ensure that the more contaminated outside air intake path automatically isolates.

Proposed Answer: b.

Question #		RO 83	SRO 79
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	300000	300000
		K5.13	K5.13
	Importance Rating	2.9	2.9

Knowledge of the operational implications of the following concepts as they apply to the instrument air system: Filters.

Proposed Question:

An Auxiliary Operator reports that the in-service Instrument Air System (IAS) prefilter d/p is 9.2 psid for 2IAS-FLT2A. The operator is directed to change the in-service filter to 2IAS-FLT2B.

The operator reports that 2IAS-V218, PREFILTER 2B INLET, will NOT open.

Assuming NO additional operator actions are taken, which one of the following describes the plant response?

a. When pressure downstream of the prefilter reaches 70 psig, the MSIVs close.

b. After airflow through the filter lowers to zero, the reactor scrams on RPV low water level.

c. When prefilter d/p reaches 10 psid, 2IAS-V298, AIR DRYERS 1A & 1B BYPASS, opens to maintain IAS pressure.

d. After airflow through the filter lowers to zero, 2IAS-AOV171, INSTR/SERV AIR CROSSTIE, closes and maintains IAS pressure.

Proposed Answer: b.

Question # RO 84

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	3
	K/A #	215001 K4.01
	Importance Rating	3.4

Knowledge of Traversing In-Core Probe design feature(s) and/or interlocks which provide for the following: Primary containment isolation: Mark I&II (Not-BWR1)

Proposed Question:

Reactor Engineering is running TIP traces using the automatic mode. Four (4) TIPs are stowed in their shield chambers.

One TIP is out of its shield chamber and running into the core but has NOT reached the CORE TOP LIMIT. The low speed switch on the running TIP control panel is in the OFF position.

Which one of the following describes the automatic response of the TIP system to a PCIS isolation signal?

a. The TIP changes direction and retracts at fast speed to the indexer, then shifts to slow speed. When stowed the ball valve closes.

b. The shear valve fires and the ball valve closes leaving the TIP trapped in its guide tube and isolated from the secondary containment.

c. The TIP stops moving. When a confirmatory signal is received, it retracts at fast speed until stowed and then the ball valve closes.

d. The TIP shifts to fast speed and runs to the CORE TOP LIMIT. Then it retracts at fast speed and when stowed the ball valve closes.

Question # RO 85

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	3
	K/A #	233000 K1.15
	Importance Rating	2.9

Knowledge of the physical connections and/or cause-effect relationships between FUEL POOL COOLING AND CLEAN-UP and the following: Storage pools.

Proposed Question:

With the plant operating at power, which one of the following is the normal method utilized to maintain the desired SFC pool level?

a. A low fuel pool level signal causes pneumatic valves to open to provide makeup flow from the Makeup Water.

b. A low fuel pool level signal causes motor operated valves to open to provide makeup flow from the Condensate Transfer System.

c. A low skimmer surge tank level causes pneumatic valves to open to provide makeup flow from the Condensate Transfer System.

d. A low skimmer surge tank level causes motor operated valves to open to provide makeup flow from the Makeup Water System.

Proposed Answer: c.

Question # RO 86

Examination Outline Cross-Reference	Level	RO
	Tier #	2
	Group #	3
	K/A #	234000 A1.01
	Importance Rating	3.1

Ability to predict and/or monitor changes in parameters associated with operating the fuel handling equipment controls including: Spent fuel pool level.

Proposed Question:

Following a complete core offload, LPRMs are being changed out. After disconnecting the LPRM below vessel and installing the water seal cap, the water seal cap drain valve is left full open. The LPRM is removed from the reactor core.

It takes thirty (30) minutes before the water seal cap drain valve is closed. Which one of the following describes the effect on spent fuel pool level?

a. Lowers and continues to lower until the drain valve is closed.

b. Lowers and returns to normal after automatic makeup is initiated.

c. Remains the same because the LPRM guide tube is always dry.

d. Remains the same since the check valve in the drain line seats.

Proposed Answer: b.

Question # RO 87 SRO 83

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	2	2
	Group #	3	3
	K/A #	290002 A2.04	290002 A2.04
	Importance Rating	3.7	4.1

Ability to (a) predict the impacts of the following on the reactor vessel internals; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Excessive heatup/cooldown rate.

Proposed Question:

A unit shutdown is in progress. After placing the B RHR loop into shutdown cooling per N2-OP-31, Residual Heat Removal System, it is determined that the cooldown rate is being exceeded.

Which one of the following describes the required operator action to reduce the cooldown rate?

a. Throttle open RHS*MOV40B, SDC B RETURN THROTTLE.

b. Throttle open RHS*MOV104, RHS B TO REACTOR HEAD SPRAY.

c. Throttle open RHS*MOV8B, HEAT EXCHANGER B INLET BYP VLV THROTTLE.

d. Throttle open SWP*MOV33B, HEAT EXCHANGER 1B SVCE WTR OUTLET VLV.

Proposed Answer: c.

Question # RO 88 SRO 85

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.1.17	Generic 2.1.17
	Importance Rating	3.5	3.6

Ability to make accurate, clear and concise verbal reports.

Proposed Question:

During your shift the following events occur:

1. "A" Service Water Pump Discharge Strainer requires cleaning due to normal usage.
2. Work on replacing a non-safety related breaker is NOT completed before its' extended late date.
3. Before being used in a surveillance test a pressure test gauge is determined to be out of calibration.
4. Contractors are pulling cable from the turbine building through a penetration into the control building without a Breach Permit.

In accordance with NIP-ECA-01, DEVIATION/EVENT REPORT, which two events require the initiation of Deviation/Event Reports?

a. 1 and 3

b. 2 and 4

c. 3 and 2

d. 4 and 1

Proposed Answer: b.

Question # RO 89 SRO 86

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.1.16	Generic 2.1.16
	Importance Rating	2.9	2.8
Ability to operate plant phone, paging system, and two-way radio.			

Proposed Question:

The Main Page Party / Public Address System Control Console is aligned as follows:

- MERGE/UNIT 1 & 2 ISOLATE switch ISOLATE
- MERGE/NMP2 & ADMIN ISOLATE switch ISOLATE
- O. D. SPKRS ON/OFF switch OFF

In response to a fire, the CSO positions the MERGE/UNIT 1 & 2 ISOLATE switch to MERGE, and then sounds the fire alarm. After the fire alarm terminates, the CSO announces the fire location.

Regarding the following areas (Unit 2, Unit 1, NMP Admin Bldg, and outside), which one of the following describes where the alarm and announcement are heard?

a. The alarm and announcement are only heard in Unit 2 and Unit 1.

b. The alarm and announcement are only heard in Unit 2, Unit 1, and outside areas.

c. The alarm and announcement are heard in Unit 2, Unit 1, NMP Admin Bldg and outside.

d. The alarm is only heard in Unit 2. The announcement is heard in Unit 2, Unit 1, and outside areas.

Proposed Answer: c.

Question # RO 90 SRO 87

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.1.4	Generic 2.1.4
	Importance Rating	4.3	4.2
Ability to execute procedural steps.			

Proposed Question:

The "A" RHR loop is being placed into suppression pool cooling to support RCIC Surveillance testing. After opening SWP*MOV90A, HEAT EXCHANGER 1A SVCE WTR INLET VLV, the Control Room E operator reports that the procedure cannot be continued as written, because the next step identifies opening valve RHS*MOV33A instead of SWP*MOV33A.

In accordance with NIP-PRO-01, Use of Procedures, which one of the following actions is required to permit completion of suppression pool cooling?

a. Stop and note the deficiency, complete the procedure for pool cooling, and then initiate a procedure change.

b. Place RHR back in standby. The procedure shall be changed using the procedure change process prior to placing RHR in pool cooling.

c. Stop action, make a pen and ink correction to the procedure, then complete the procedure for pool cooling. Initiate a procedure change after pool cooling is established.

d. Discontinue actions and leave all components operated in their current condition. The procedure shall be changed using the procedure change process prior to placing RHR in pool cooling.

Proposed Answer: b.

Question # RO 91

Examination Outline Cross-Reference	Level	RO
	Tier #	-
	Group #	-
	K/A #	Generic 2.2.30
	Importance Rating	3.5

Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area.

Proposed Question:

The reactor core is being offloaded. Conditions are as follows:

- Reactor Mode Switch is in REFUEL position
- All control rods are fully inserted into the reactor core

Step 213 just unlatched in the fuel pool. The Main Hoist has NOT been raised.

Step 214 removal of a fuel assembly from the reactor, will be performed next.

Which one of the following describes when Annunciator 603442, CONTROL ROD OUT BLOCK is expected to alarm during the performance of **step 214**?

a. The Main Hoist is raised to the Normal-Up position in the spent fuel pool.

b. The Main Hoist has been lowered from the Normal-Up position over the reactor core location.

c. The fuel assembly has been grappled but Main Hoist raise motion has NOT been commanded.

d. The fuel assembly has been grappled and raised from its seated position in the reactor core.

Proposed Answer: d.

Question # RO 92

Examination Outline Cross-Reference	Level	RO
	Tier #	-
	Group #	-
	K/A #	Generic 2.2.23
	Importance Rating	2.5
Ability to track limiting conditions for operations.		

Proposed Question:

A Limiting Condition for Operation (LCO) on RHR loop A is entered to support surveillance testing during the shift. The testing is completed and RHR Loop A is restored to OPERABLE status prior to the end of the shift.

Which one of the following describes where the short term LCO is required to be tracked?

a. CSO Log

b. SSS Log

c. Operability Log

d. Equipment Status Log

Proposed Answer: b.

Question # RO 93

Examination Outline Cross-Reference	Level	RO
	Tier #	
	Group #	
	K/A #	Generic 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 affect reactivity.

Proposed Question:

The following conditions occur during a startup and heatup:

- The reactor is critical on range 5 of the IRMs
- Reactor period is 120 seconds and shortening
- Reactor coolant temperature is 180°F and rising
- As reactor coolant temperature continues to rise reactor period shortens

With CRS concurrence, which one of the following actions is required per GAP-OPS-05, Reactivity Management?

a. Immediately insert control rods in reverse order to make the reactor subcritical.

b. If temperature rises above 200°F, position control rods to lower temperature.

c. Immediately bypass the RWM and insert all control rods in the cram array to position 00.

d. If reactor period shortens to 59 seconds, insert the last withdrawn control rod to position 00.

Proposed Answer: a.

Question # RO 94 SRO 94

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.3.11	Generic 2.3.11
	Importance Rating	2.7	3.2
Ability to control radiation releases.			

Proposed Question:

The plant is at 100% power. Irradiated fuel is being arranged in the fuel pool to support receipt of new fuel when annunciator 851254, PROCESS AIRBORNE RADN MON ACTIVATED, is received.

DRMS indicates "red" for the following:

- 2HVR-CAB14A-1, HVR ABOVE REFUEL FLR
- 2HVR-CAB14B-1, HVR ABOVE REFUEL FLR

Which one of the following describes the required operator action(s)?

a. Manually isolate the above refuel floor ventilation dampers. Start GTS and unit cooler 2HVR*UC413B.

b. Manually isolate the above <u>and</u> below refuel floor ventilation dampers. Start GTS and unit cooler 2HVR*UC413B.

c. Verify the above refuel floor ventilation dampers are isolated and both GTS are operating. Start unit cooler 2HVR*UC413B.

d. Verify the above <u>and</u> below refuel floor ventilation dampers are isolated, both GTS and unit cooler 2HVR*UC413B are operating.

Proposed Answer: d.

Question # RO 95 SRO 95

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.3.9	Generic 2.3.9
	Importance Rating	2.5	3.4

Knowledge of the process for performing a containment purge.

Proposed Question:

Following an accident, it is necessary to purge the suppression chamber with nitrogen using EOP-6, Attachment 25, Containment Purging. Suppression pool level is 203 feet.

Which one of the following describes how the gasses in the drywell atmosphere are vented to the main stack when performing this procedure?

a. After nitrogen is aligned to the suppression chamber and the suppression chamber is being vented, the drywell purge outlet valves are opened.

b. After nitrogen is aligned to the suppression chamber and the suppression chamber is being vented, nitrogen is aligned to the drywell and the drywell purge outlet valves are opened.

c. When drywell pressure is at least 5 psig higher than suppression chamber pressure, the drywell purge outlet valves and then the suppression chamber purge outlet valves are opened.

d. After the drywell purge inlet and suppression chamber purge outlet valves are open, drywell pressure rises and gasses vent through the downcomers to the suppression chamber.

Proposed Answer: d.

Question #		RO 96	SRO 96

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.3.1	Generic 2.3.1
	Importance Rating	2.6	3.0
Knowledge of 10CFR: 20 and related facility radiation control requirements.			

Proposed Question:

An auxiliary operator receives 28 mrem while performing an on-shift evolution.

Based on the dose received by the operator, which one of the following is the required action in accordance with the Shift Routines and Operating Practices section of the Operations Manual?

a. Read the operators TLD to confirm the dose.

b. Survey the area and verify radiological postings.

c. Assess the task for ways to reduce radiation exposure.

d. Remove the operator from duties that are performed within the RCA.

Proposed Answer: c. The required action is to perform a self-assessment to identify improvements.

Question # RO 97

		RO	SRO
Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	-	-
	Group #	-	-
	K/A #	Generic 2.3.2	-
	Importance Rating	2.5	-
Knowledge of facility ALARA program.			

Proposed Question:

Which one of the following meets the requirements for the SSS to waive the independent verification of a markup?

a. Markup is in a **high radiation area** and can only be applied by a licensed reactor operator.

b. Markup is in a **high radiation area** and can be applied by either an auxiliary operator <u>or</u> a licensed reactor operator.

c. Markup is in a **radiation area** with an expected exposure of ≥15 mrem and can only be applied by a licensed reactor operator.

d. Markup is in a **radiation area** with an expected exposure of ≥15 mrem and can be applied by either an auxiliary operator <u>or</u> a licensed reactor operator.

Proposed Answer: a.

Question # RO 98 SRO 98

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #	Generic	Generic
	Group #	-	-
	K/A #	2.4.32	2.4.32
	Importance Rating	3.3	3.5
Knowledge of operator response to loss of all annunciators.			

Proposed Question:

Following annunciator testing of control room panel 2CEC*PNL603, its annunciators are locked in the fast flash mode. Which one of the following describes the immediate operator actions?

a. Station a licensed operator to continuously monitor all control room panels.

b. Notify the Fire Chief to initiate increased monitoring of the Fire System status.

c. Station a licensed operator to continuously monitor the affected control room panels.

d. Direct a licensed operator to start a new set of rounds as another operator is completing the rounds in affected areas of the plant.

Proposed Answer: c.

Question # RO 99

Examination Outline Cross-Reference	Level	RO
	Tier #	-
	Group #	-
	K/A #	Generic 2.4.19
	Importance Rating	2.7
Knowledge of EOP layout / symbols / and icons.		

Proposed Question:

While performing N2-EOP-6, Attachment 14, Alternate Control Rod Insertions, the step to defeat the RPS interlocks is encountered. Which one of the following is indicated by the "T" that is in the left margin adjacent to this step?

a. Indicates a temporary alteration.

b. Indicates the use of a jumper for the alteration.

c. Indicates the time that the alteration is made must be recorded.

d. Indicates the TSC must authorize performance of the alteration.

Proposed Answer: b.

Question # RO 100 SRO 100

Examination Outline Cross-Reference	Level	RO	SRO
	Tier #		
	Group #		
	K/A #	Generic 2.4.21	Generic 2.4.21
	Importance Rating	3.7	4.3

Knowledge of the parameters and logic used to assess the status of safety functions including:

1. Reactivity control
2. Core cooling and heat removal
3. Reactor coolant system integrity
4. Containment conditions
5. Radioactivity release control.

Proposed Question:

The Safety Parameter Display System (SPDS) is selected to indicate SAFETY FUNCTION STATUS.

Which one of the following describes how an operator is alerted that drywell pressure is at 2.0 psig?

a. Only the Level 2 Safety Status Indicator for CONTAINMENT INTEGRITY is **red**.

b. Only the Level 2 Safety Status Indicator for CONTAINMENT INTEGRITY is **yellow**.

c. The parameter and the Level 2 Safety Status Indicator for CONTAINMENT INTEGRITY are **red**.

d. The parameter and the Level 2 Safety Status Indicator for CONTAINMENT INTEGRITY are **yellow**.

Proposed Answer: d.

Question # SRO 2

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295003 2.2.22
	Importance Rating	4.1
Knowledge of limiting conditions for operations and safety limits		

Proposed Question:

The plant is at 70% power and continuing to raise power following a refueling outage. The following events occur:

Day 1, 1100 hours - A fault occurs on the 115KV Offsite Line 6. LCO entered on one offsite circuit inoperable.
Day 1, 1400 hours - 2ENS*SWG103 was transferred to the Auxiliary Boiler Service Transformer, 2ABS-X1.
Day 1, 2200 hours - Diagnosis of the fault determined it was caused by the wrong contacts (undersized) installed in Motor Operated Disconnect 2YUL-MDS2.
Day 2, 0100 hours - Further investigation reveals that these same contacts where installed in 115KV Offsite Line 5 Motor Operated Disconnect 2YUL-MDS1.

Which one of the following Technical Specifications actions is required?

a. Restore Line 6 to service by Day 4, 1100 hours, then remove Line 5 from service, then enter the LCO for one offsite circuit inoperable.

b. Remove Line 5 from service, then enter the LCO for two offsite circuits inoperable, restore Line 6 within 24 hours of removing Line 5 from service.

c. Declare Line 5 inoperable at Day 2, 0100 hours, restore Line 6 by Day 3, 0100 hours, then remove Line 5 from service and restore Line 5 by Day 4, 1100.

d. Enter the LCO for two offsite circuits inoperable at Day 2, 0100 hours, Return Line 5 to operability by Day 3, 1100 hours, and Line 6 by Day 8, 0100 hours.

Proposed Answer: c.

Question # SRO 4

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295006 AK2.07
	Importance Rating	4.1

Knowledge of the interrelations between SCRAM and the following: reactor pressure control.

Proposed Question:

The plant is operating at 100% power when a feedwater control malfunction causes an RPV high level that trips the reactor feedwater pumps.

Which one of the following describes how reactor pressure is controlled for the next few minutes? **ASSUME NO OPERATOR ACTIONS**

a. **No** SRVs open, turbine bypass valves fully open then throttle to maintain reactor pressure.

b. **No** SRVs open, turbine bypass valves fully open and remain open to control reactor pressure.

c. Several SRVs open then sequentially close, one or two SRVs remain open to control reactor pressure.

d. Several SRVs open then close as turbine bypass valves fully open then throttle to maintain reactor pressure.

Proposed Answer: d. TCVs Close , SRVs open initially open then close as BPV control pressure.

Question # SRO 6

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295007 AA1.04
	Importance Rating	3.9

Ability to operate and/or monitor the following as they apply to High Reactor Pressure: Safety/relief valve operation: Plant-Specific.

Proposed Question:

The plant is operating at full power when all MSIVs close. All control rods fully insert into the reactor. Reactor pressure rises to 1128 psig.

Assume that the Safety Relief Valves (SRVs) function at their design set point (± 0.0 psig).

Which one of the following describes how many SRVs will open?

a. Two (2)

b. Six (6)

c. Ten (10)

d. Fourteen (14)

Proposed Answer: c.

Question # SRO 13

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295016 2.4.11
	Importance Rating	3.6
Knowledge of abnormal condition procedure.		

Proposed Question:

With the plant operating at 100% power, a Control Room evacuation becomes necessary. Following the evacuation the Control Room E operator implements the immediate actions of N2-SOP-78, CONTROL ROOM EVACUATION, to lineup Reactor Core Isolation Cooling (RCIC). The Control Room E operator reports that RCIC injection can **NOT** be established.

Which one of the following is directed to maintain reactor water level?

a. Locally start HPCS and feed the RPV as necessary.

b. Locally start the second CRD Pump and maximize injection.

c. Lower RPV pressure with the SRVs and establish makeup with the RHR System.

d. Take local control of Turbine Bypass Valves and lower pressure and establish injection with the feedwater system.

Proposed Answer: c.

Question # SRO 14

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295017 AA2.01
	Importance Rating	4.2

Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE: off-site release rate: plant specific.

Proposed Question:

The plant is operating at 100% power when a drain line breaks off the "C" Main Steam line immediately upstream of the Turbine Control Valves. Operators in the Control Room manually initiate a Group 1 isolation but the isolation fails to stop the leak. The following conditions exist:

- A **Site Area Emergency** has been declared
- Turbine building full of steam and evacuated
- Measured release rates have **NOT** risen above normal
- Several turbine building ARMs have alarmed
- Wind direction is **from 295°**
- Wind speed is **3 mph**

Which one of the following methods is used to make an initial off-site dose assessment?

a. Direct RP to calculate off-site dose rates based on the stack release.

b. Send RP to South East side of the site boundary to take dose rate readings.

c. Dispatch on-site monitoring teams to monitor the North side of the site fence.

d. Request a monitoring team be sent to the first population center located 115° from the site.

Proposed Answer: b.

Question # SRO 18

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295025 EA2.04
	Importance Rating	3.9

Ability to determine and interpret the following as they apply to HIGH REACTOR PRESSURE: suppression pool level.

Proposed Question:

The plant is operating at 100% power when an improper valve lineup drains CST water into the suppression pool. As suppression pool level rises the crew enters N2-SOP-101C, REACTOR SCRAM. During the scram a Group 1 isolation occurs. The following conditions exist:

- RPV pressure is **1042 psig** and rising
- RPV level is **223 inches**
- Suppression Pool Level is **210 feet** and rising

Which one of the following actions should be taken?

a. Immediately open all 7 ADS valves and blowdown.

b. Open an SRV to lower pressure to less than 870 psig.

c. Position turbine bypass valves to depressurize the reactor.

d. Place RHS in steam condensing and RCIC in full flow test lineup.

Proposed Answer: a. PC control 16/5

Question # SRO 19

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295026 2.2.12
	Importance Rating	3.4
Knowledge of surveillance procedures.		

Proposed Question:

The plant is operating at 50% power with the following conditions:

- RHR A is in suppression pool cooling
- RCIC is operating in the CST to CST mode for a surveillance
- During the surveillance, suppression pool temperature reaches 96°F

Which one of the following describes the requirements for entry into and execution of N2-EOP-PC, PRIMARY CONTAINMENT CONTROL.

a. Technical Specifications allow modification of the EOP entry condition to 105°F while performing this test.

b. Surveillance allows 4 hours to reduce suppression pool temperature below the EOP entry condition upon completion.

c. As soon as suppression pool temperature exceeds the EOP entry condition, the EOP must be entered and the actions performed.

d. EOP actions are deferred for 24 hours after the test if suppression pool temperature can be reduced below the EOP entry condition.

Proposed Answer: c.

Question # SRO 20

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295026 EK1.01
	Importance Rating	3.4

Knowledge of operational implications of the following concepts as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE and the following: Pump NPSH.

Proposed Question:

The following conditions exist after a LOCA:

- RPV Level +24 inches and rising
- RPV Pressure 29 psig
- Drywell Pressure 12 psig
- Suppression Pool Water Temperature 255°F
- Suppression Pool Pressure 9 psig
- Suppression Pool Level 194 ft
- RHR "B" LPCI Flow 4500 gpm

With regard to the "B" RHR Loop which one of the following is required?

a. Raise RHR pump flow rate to 7000 gpm to restore reactor water level.

b. Monitor RHR pump flow rate and do **NOT** allow flow to exceed 6000 gpm.

c. Enter Attachment 3 of EOP-6, EOP SUPPORT PROCEDURE, and throttle RHR flow to less than 2000 gpm.

d. Shutdown the RHR Pump and establish injection from sources **NOT** taking a suction from the Suppression Pool.

Proposed Answer: b. The high pressure in the containment ensures NPSH for this temperature; 194 ft = 6.5 psig + 9 psig = 15.5 psig

Question # SRO 23

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295037 2.4.8
	Importance Rating	3.7

Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-bases EOPs.

Proposed Question:

The plant is operating at 100% power. The following annunciators are received:

- 603110, RPS A AUTO TRIP
- 603410, RPS B AUTO TRIP
- 603402, RPS B NMS TRIP
- 603102, RPS A NMS TRIP

Plant parameters are:

- Reactor Power 38% and stable
- RPV Level 166 inches, lowering slowly
- Reactor Pressure 1085 psig, rising slowly

No operator actions have been taken. Which one of the following describes the the **first** actions to be directed?

a. Arm and depress both Manual Scram pushbuttons on either side of 2CEC*PNL603.

b. Manually inhibit ADS and override the opening of CSH*MOV107, HPCS INJECTION VALVE.

c. Place the Reactor Mode switch in SHUTDOWN; verify RPS pilot scram valve solenoid lights are OFF.

d. Initiate RRCS by Arming and depressing DIVISION I AND II CHANNEL A and B MANUAL INITIATION pushbuttons.

Proposed Answer: c.

Question # SRO 25

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	1
	K/A #	295038 EK2.05
	Importance Rating	4.7

† Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Site emergency plan.

Proposed Question:

A primary system leak has occurred in the secondary containment, with a subsequent failure of the secondary containment. All attempts to isolate the leak have failed.

One point at the site boundary has a projected TEDE of 1015 mr/hr.
Which one of the following actions is required?

a. Verify a reactor scram occurred, and open all turbine bypass valves.

b. Verify a reactor scram occurred, and open all seven ADS valves.

c. Perform a rapid power reduction, and open all seven ADS valves.

d. Perform a rapid power reduction, and open all turbine bypass valves.

Proposed Answer: b.

Question # SRO 35

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295020 AA2.02
	Importance Rating	3.4

Ability to determine and/or interpret the following as they apply to inadvertent containment isolation: Drywell containment temperature.

Proposed Question:

The plant is operating at 60% power when an inadvertent group 8 isolation occurs.

Which one of the following describes how to determine containment temperature is below 150°F?

a. Only method is to monitor SPDS indication.

b. Align the Post Accident Sampling system to the drywell.

c. Monitor back panel recorders, process computer, or SPDS.

d. Only method is to monitor the containment high temperature alarm.

Proposed Answer: c.

Question # SRO 38

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295029 EK3.01
	Importance Rating	3.9

Knowledge of the reasons for the following responses as they apply to HIGH SUPPRESSION POOL WATER LEVEL: Emergency depressurization.

Proposed Question:

Which one of the following is the basis for maintaining the suppression pool water level within the safe region of the SRV Tail Pipe Level Limit (N2-EOP-PC, Figure N)?

a. Maintain the capability to vent the suppression chamber.

b. Prevent damage to the ECCS suction strainers or their supports.

c. Prevent damage to relief valve steam discharge components in the suppression pool.

d. Maintain the suppression chamber-to-drywell vacuum breakers uncovered.

Proposed Answer: c.

Question # SRO 39

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	295033 EA1.01
	Importance Rating	4.0

Ability to operate and/or monitor the following as they apply to high secondary containment area radiation levels: Area radiation monitoring system.

Proposed Question:

Which one of the following Radiation Monitoring events requires that you assume the role as Station Emergency Director (SED)?

a. Lowering fuel pool water level causes an automatic containment isolation.

b. A coolant leak at one control rod HCU causes the local ARM to indicate yellow on DRMS.

c. When changing a TIP the general area ARM goes offscale high until the TIP is in the transfer cask.

d. During LPRM removal, one local ARM goes upscale before the LPRM is lowered and submerged ten feet.

Proposed Answer: a.

Question # SRO 43

Examination Outline Cross-Reference	Level	SRO
	Tier #	1
	Group #	2
	K/A #	600000 AK2.01
	Importance Rating	2.7

Knowledge of the interrelations between plant fire on site and the following: Sensors/detectors and valves.

Proposed Question:

The plant is at 100% power. It is determined that two (2) ionization detectors in fire zone 333XL, DIV 1 Switchgear Room, are inoperable at 0800 on 12/1/99. One (1) detector is inoperable in each loop of detection.

Which one of the following describes the required actions in accordance with Section 9.A of the USAR?

established Eais 2/11/00

a. A fire watch must be ~~stationed~~ by 0900 and must be stationed until both detectors are operable.

b. A fire watch must be established by 0900 but may be secured when one of the detectors is operable.

c. If both detectors are **NOT** operable by 0800 on 12/15/99, then a fire watch must be ~~stationed~~ within the next hour.
established Eais 2/11/00

d. If both detectors are **NOT** operable by 0800 on 12/15/99, then a unit shutdown must be commenced within the next hour.

Proposed Answer: a.

Question # SRO 57

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	1
	K/A #	223002 A2.01
	Importance Rating	3.5

Ability to (a) predict the impacts of the following on the primary containment isolation system / nuclear steam supply shut-off; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A.C. electrical distribution failures.

Proposed Question:

The plant is operating at 100% power when Electrical Protection Assembly (EPA) 2VBS*ACB2A trips. The following group isolations are received:

- Groups 2, 3, 4, 5, 8, and 9

Which one of the following describes the required Technical Specification actions in response to Reactor Coolant System leakage detection?

a. Enter T.S. 3.0.3 and start a power reduction within 1 hour.

b. Be in MODE 3 within 12 hours and MODE 4 within 36 hours.

c. Determine drywell leak rate by other means until group 9 is reset.

d. Analyze grab samples of drywell every 12 hours until group 8 is reset.

Proposed Answer: a. There is no T.S. condition for both the particulate and gaseous monitors being inoperable this requires entry into T.S. 3.0.3

Question # SRO 58

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	1
	K/A #	226001 A1.05
	Importance Rating	3.4

Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: Containment spray mode controls including: system lineup.

Proposed Question:

A steam leak inside the Drywell is in progress. The following conditions exist:

- Drywell Pressure is 2.5 psig
- The "B" Loop of Residual Heat Removal (RHR) is placed in operation
- Drywell Spray Valves RHS*MOV25B and RHS*MOV15B are stroking open

Which one of the following describes the response of the Drywell Spray Valves if drywell pressure lowers to 1.0 psig <u>before</u> the valves are full open?

a. Stroke full open and then close.

b. Stroke full open and remain full open.

c. Stop stroking at an intermediate position.

d. Reverse direction at an intermediate position and close.

Proposed Answer: c.

Question # SRO 59

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	1
	K/A #	239002 A4.06
	Importance Rating	3.4

Ability to manually operate and/or monitor in the control room: Reactor water level.

Proposed Question:

During the execution of EOP-C5, Failure to Scram, which one of the following is a concern when Safety Relief Valves (SRVs) are used for pressure control?

a. Inadequate core cooling.

b. Reactor power transients.

c. Loss of preferred injection sources.

d. Inaccurate reactor pressure indication.

Proposed Answer: b.

Question # SRO 61

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	1
	K/A #	259002 2.1.6
	Importance Rating	4.3

Ability to supervise and assume a management role during plant transients and upset conditions.

Proposed Question:

Following a LOCA reactor water level CANNOT be maintained above the top of active fuel (TAF) using preferred injection systems. Actions are in progress to lineup Alternate Injection Systems for injection. Conditions are:

- RPV Pressure 22 psig
- Drywell Pressure 12 psig
- Drywell Temperature 278°F
- Suppression Chamber Pressure 9 psig
- Suppression Pool Level 204 feet
- Suppression Pool Temperature 131°F

Which one of the following describes the required action?

a. Enter the RPV Flooding EOP.

b. Enter the Steam Cooling EOP.

c. Enter the RPV Blowdown EOP.

d. Continue in the RPV Control EOP.

Proposed Answer: a.

Question # SRO 66

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	1
	K/A #	290001 2.4.16
	Importance Rating	4.0

Knowledge of EOP implementation hierarchy and coordination with other support procedures.

Proposed Question:

In accordance with EPIP-EPP-18, Activation And Direction Of The Emergency Plans, which one of the following responsibilities is retained by the Station Shift Supervisor when other responsibilities are transferred to the Site Emergency Director?

a. Re-classification of the emergency event.

b. Determining the need for a site evacuation.

c. Decision to enter the Severe Accident Procedures.

d. Making the decision to notify off-site emergency management.

Proposed Answer: c. per RPV Control, step L-16 (and others)

Question # SRO 69

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	2
	K/A #	204000 2.4.49
	Importance Rating	3.8

Ability to interpret control room indications to verify status and operation of system, and understand how operator actions and directives effect plant and system condition.

Proposed Question:

During a reactor startup the Reactor Water Cleanup System (WCS) is operating in Flow Rejection (Blowdown Mode). The following WCS lineup exists:

- Reactor Pressure is 890 psig
- WCS-P1A and WCS-P1B are in service
- Four (4) WCS Filter Demineralizers are in service.
- 2WCS-MOV1~~28~~, REJECT RESTRICTING ORIFICE BYPASS VLV is Closed 108 ELB 2/11/00
- 2WCS-FV135, REJECT FLOW CONTROL MANUAL CONTROL is 100% Open
- WCS-MOV200, CLEANUP RETURN ISOL VLV THROTTLE is Open
- Reject Flowrate is 90 gpm
- Non-Regenerative Heat Exchanger Outlet Temperature is 128°F

Which one of the following will occur if the Control Switch for 2WCS-MOV128 is placed and held in the open position?

a. Pressure will rise downstream of 2WCS-FV135 initiating an isolation of 2WCS-FV135 and Low Flow trip of both WCS Pumps.

b. A rising Non-Regenerative Heat Exchanger outlet temperature isolates the Cleanup Outboard Suction Isolation Valve, 2WCS-MOV112, and this causes a trip of both WCS Pumps.

c. A High Delta Flow condition causes an isolation of the Cleanup Outboard Suction Isolation Valve, 2WCS-MOV112, and a subsequent low flow trip of the WCS Pumps in about 14 minutes.

d. A rapid pressure reduction upstream of 2WCS-FV135, initiates an isolation of Cleanup Outboard and Inboard Suction Isolation Valves, 2WCS-MOV112, and 2WCS-MOV102, trip of both WCS Pumps on loss of suction flow path.

Proposed Answer: b.

Question # SRO 70

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	2
	K/A #	205000 A4.07
	Importance Rating	3.7

Ability to manually operate and/or monitor in the control room: Reactor temperatures (moderator, vessel, flange).

Proposed Question:

The unit is in MODE 5 for a refueling outage. The reactor cavity is flooded and the fuel pool gates are removed.

- Shutdown cooling is lost and CANNOT be restarted
- A reactor recirculation pump CANNOT be started
- Reactor water cleanup is operating

Within one (1) hour, the Alternate Decay Heat (ADH) system is aligned and placed in operation. Which one of the following describes how to determine reactor coolant temperature?

a. RHR HX 1A Inlet temperature

b. Recirc Loop B suction temperature

c. RPV bottom head drain temperature

d. Spent Fuel Pool Cooling HX inlet temperature

Proposed Answer: c.

Question # SRO 78

Examination Outline Cross-Reference	Level	SRO
	Tier #	2
	Group #	2
	K/A #	290003 K1.04
	Importance Rating	3.3

Knowledge of the physical connections and/or cause-effect relationships between control room HVAC and the following: Nuclear steam supply shutoff system (NSSSS/PCIS): Plant-specific.

Proposed Question:

One (1) hour following a large break loss of coolant accident, the Control Room "E" operator reports that NO manual alignment changes have been made to the Control Building Ventilation System. Which one of the following describes the concern with the Control Room environment?

a. Pressure will become negative.

b. Temperature will rise above 90°F.

c. Humidity will be higher than expected.

d. Dose rate will be higher than expected.

Proposed Answer: d.

Question # SRO 81

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

Knowledge of system status criteria which require the notification of plant personnel.

Proposed Question:

In accordance with the Operations Manual, which one of the following Spent Fuel Pool Cooling and Cleanup (SFC) related events requires notifying the General Supervisor Operations (GSO) when operating in MODE 1?

a. After a trip of 2SFC*P1A, **NEITHER** SFC pump can be started.

b. A fire alarm is activated in the vicinity of a SFC pump due to a faulty detector.

c. 2SFC*P1A is **NOT** returned to service within the scheduled time after maintenance.

d. The SFC lineup will be changed from the "Cooling Only" Mode to "Filter/Demin Subsystem" Mode.

Proposed Answer: a.

Question # SRO 84

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.1.4
	Importance Rating	3.4
Knowledge of shift staffing requirements.		

Proposed Question:

The unit is in MODE 3. The CRS is designated to assume the role of the STA if the Site Emergency Plan is activated.

In the absence of the SSS from the control room, which one of the following describes who may be designated to assume the control room command function? — Per Technical Specifications? [illegible] 2/11/00

a. The on-shift CRS if the absence will be less than 10 minutes.

b. Any individual with an active SRO license including the on-shift CRS.

c. Any individual with an active SRO license other than the on-shift CRS.

d. Only an individual with an active SRO license who is qualified as SSS.

Proposed Answer: c.

Question # SRO 88

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.1.12
	Importance Rating	4.0
Ability to apply Technical Specifications for a system.		

Proposed Question:

The unit is operating at 80% power when the following occur on **2/6/2000**:

- ***0810***: Service Water intake tunnel water temperature lowers to 38°F.
- ***0810***: It is reported that each intake structure has seven (7) operable heaters in operation. NO other heaters are operable.
- ***0830***: SW pumps "A", "B", and "C" are declared inoperable.
- ***1200***: SW loop "A" is declared inoperable.

Assume that NO equipment is restored to operable status. In accordance with Technical Specifications, which one of the following describes the latest time and date that the plant shall be in Hot Shutdown without requiring entry into LCO 3.0.3?

a. 2110 on 2/6/00.

b. 0830 on 2/7/00.

c. 2400 on 2/9/00.

d. 2030 on 2/13/00.

Proposed Answer: Answer: a. T.S. action 3.7.1.1.f becomes applicable at 0810 when it is discovered that the intake structure deicing heater system is inoperable requiring that action be initiated within 1 hour and the plant be in Hot Shutdown in the next 12 hours (13 hours from declaring the LCO statement not met).

Question # SRO 89

Examination Outline Cross-Reference	Level	SRO
	Tier #	Generic
	Group #	-
	K/A #	2.2.26
	Importance Rating	3.7

Knowledge of refueling administrative requirements.

Proposed Question:

Preparations have been made to start a full core offload in the next hour (at 0800 on 12/3/99). All requirements of N2-FHP-13.1, Complete Core Offload, are satisfied with the following exception:

- SRM B was declared inoperable at 0700 on 12/3/99.

Which one of the following describes when the core offload can be started and the restrictions that apply?

a. The core offload can be started as scheduled, but must be stopped at the completion of **sequence step 33**.
core off-load EWB 2/11/00

b. The core offload can be started as scheduled, but must be stopped at the completion of **sequence step 64**.
core off-load EWB 2/11/00

c. The core offload CANNOT be started until **after** SRM B operability is demonstrated by the SRM Channel Functional Test.

d. The core offload CANNOT be started until **after** SRM B is operable and all "prior to fuel movement" checks are performed again.

Proposed Answer: a.

Question # SRO 90

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. Switchyard maintenance is in progress and will be complete in 24 hours. Maintenance also desires to work on any one of the following this shift: **EDG1, RCIC, LPCS, Div. I Battery.**

To comply with GAP-PSH-03, Control of On-Line Work Activities, which one of the maintenance activities above could be approved to work this shift without introducing a higher than usual risk?

a. Removal of EDG1 from service.

b. Removal of RCIC from service.

c. Removal of LPCS from service.

d. Removal of Div. I Battery from service.

Proposed Answer: c.

Question # SRO 91

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	2.2.6
	Importance Rating	3.3

Knowledge of the process for making changes in procedures as described in the safety analysis report.

Proposed Question:

A Type 1 change to N2-OP-101A, Plant Startup, that does NOT alter the intent of the procedure is requested. Which one of the following satisfies the approval requirements to implement the temporary change?

a. Only the CRS <u>or</u> SSS approve the change.

b. The CSO **and** the SSS approve the change.

c. Any two members of the management staff approve the change.

d. The CRS **and** a member of management staff approve the change.

Proposed Answer: d.

Question # SRO 92

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.2.23
	Importance Rating	3.8
Ability to track limiting conditions for operations.		

Proposed Question:

A short term Limiting Condition for Operation (LCO) on RHR loop A is entered to support surveillance testing during the shift. The testing is completed and RHR Loop A is restored to OPERABLE status prior to the end of the shift.

Which one of the following describes where the short term LCO is tracked including the information that is required to be entered?

a. Only the date and time of action statement entry are entered in the SSS log.

b. Only the date and time of action statement entry are entered into the SSS log and the ESL log.

c. The date and time of action statement entry and the actions taken are only entered in the SSS log.

d. The date and time of action statement entry and the actions taken are entered into the SSS log and the ESL log.

Proposed Answer: c.

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:

A station operator has an accumulated TEDE of 3800 mrem for the year. Because of dose projections during the assigned outage work, the individual is expected to receive an additional TEDE of 300 mrem.

In accordance with S-RAP-RPP-0703, Authorization to Exceed Administrative Dose Limits, which one of the following describes the **final** authorization required for the worker to receive the expected dose?

a. Plant Manager

b. Outage Manager

c. Unit ALARA Manager

d. Site Vice President – Nuclear

Proposed Answer: a.

Question # SRO 97

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.4.1
	Importance Rating	4.6
Knowledge of EOP entry conditions and immediate action steps.		

Proposed Question:

A unit startup is in progress. The first Reactor Feedwater Pump was just placed into service when the "A" CRD pump trips. The initial attempt to start the "B" CRD pump is unsuccessful.

Which one of the following conditions requires that the reactor be scrammed per N2-SOP-101C, Reactor Scram?

a. Neither CRD pump can be started within 20 minutes.

b. Seal cooling cannot be aligned to the WCS pumps from CCP.

c. Reference leg backfill is secured to RPV instrumentation for greater than 20 minutes.

d. Accumulator pressure is verified at 930 psig for a control rod at position 04.

Proposed Answer: d.

Question # SRO 99

Examination Outline Cross-Reference	Level	SRO
	Tier #	-
	Group #	-
	K/A #	Generic 2.4.19
	Importance Rating	3.7
Knowledge of EOP layout / symbols / and icons.		

Proposed Question:

While executing N2-EOP-C4, RPV Flooding, injection into the reactor is reestablished to maintain six (6) SRVs open. Reactor pressure is being maintained just above the Minimum Alternate Reactor Flooding Pressure.

Which one of the following is the basis for establishing the conditions above?

a. Ensure core criticality will not occur during RPV Flooding if boron injection is complete.

b. Ensure RPV injection flow is controlled to flood the RPV without flooding the suppression pool first.

c. Ensure sufficient decay heat removal to cool the nuclear fuel and maintain adequate core cooling.

d. Ensure conditions are established to maintain the SRVs open with a mixture of steam and water flow.

Proposed Answer: c.