

February 14, 2000

Mr. Harold W. Keiser
President and Chief Nuclear Officer
PSEG Nuclear LLC
Post Office Box 236
Hancock's Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION REACTOR OPERATOR AND
SENIOR REACTOR OPERATOR INITIAL EXAMINATION REPORT
05000272/1999302 AND 05000311/1999302

Dear Mr. Keiser:

This report transmits the results of the subject operator licensing examinations conducted by the NRC during the period of January 10 through 21, 2000. These examinations addressed areas important to public health and safety and were developed and administered using the guidelines of the "Examination Standards for Power Reactors" (NUREG-1021, Revision 8). Based on the results of the examinations, all ten Senior Reactor Operator and all five Reactor Operator (RO) applicants passed all portions of the examinations. The preliminary performance insights observed during the examination were discussed between Mr. L. Briggs and Mr. D. Jackson on January 21, 2000. The final results were discussed via telephone conference call on February 7, 2000.

No significant findings were identified.

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,

/RA/

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

Docket Nos. 05000272; 05000311

Mr. Harold W. Keiser

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Enclosure: Initial Examination Report No. 05000272/1999302 and 05000311/1999302
w/Attachments 1, 2, and 3

cc w/encl; w/Attachment 1-3:

J. McMahon, Director - Nuclear Training

cc w/encl; w/o Attachment 1-3:

L. Storz, Senior Vice President - Nuclear Operations
E. Simpson, Senior Vice President and Chief Administrative Officer
M. Bezilla, Vice President - Nuclear Operations
D. Garchow, Vice President - Technical Support
M. Trum, Vice President - Maintenance
T. O'Connor, Vice President - Plant Support
E. Salowitz, Director - Nuclear Business Support
G. Salamon, Manager - Licensing
A. F. Kirby, III, External Operations - Nuclear, Connective Energy
R. Kankus, Joint Owner Affairs
A. Tapert, Program Administrator
J. J. Keenan, Esquire
Consumer Advocate, Office of Consumer Advocate
W. Conklin, Public Safety Consultant, Lower Alloways Creek Township
M. Wetterhahn, Esquire
State of New Jersey
State of Delaware
J. Guinan, NJ PIRG
N. Cohen, Coalition for Peace and Justice
R. Fisher
F. Berryhill
B. August

Mr. Harold W. Keiser

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L. Briggs, Chief Examiner, DRS
V. Curley, DRS OL Facility File
R. Conte, DRS
H. Miller, RA/J. Wiggins, DRA
G. Meyer, DRP
S. Barr, DRP
R. Barkley, DRP
C. O'Daniell, DRP
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J. Shea, OEDO
E. Adensam, NRR
W. Gleaves, NRR
C. See, NRR
Inspection Program Branch, NRR (IPAS)
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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos: 05000272, 05000311

Report Nos: 05000272/1999302, 05000311/1999302

License Nos: DPR-70, DPR-75

Licensee: Public Service Electric and Gas Company

Facility: Salem Units 1 and 2

Location: Hancock's Bridge, NJ

Dates: January 10 - 21, 2000 (Operating and Written Test Administration)
January 24 - 28, 2000 (Grading)

Chief Examiner: L. Briggs, Senior Operations Engineer/Examiner

Examiners: S. Dennis, Operations Engineer/Examiner
T. Fish, Operations Engineer/Examiner

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

SUMMARY OF FINDINGS

Salem Nuclear Facility, Units 1 and 2
Examination Report Nos. 05000272/1999302 and 05000311/1999302

Findings were assessed according to potential risk significance and, if applicable, were assigned colors of *green, white, yellow, or red*. The inspection had no findings. *Green* findings, while not necessarily desirable, would have represented very low risk to safety. *White* findings would have indicated issues with low to moderate risk to safety and which may have required additional NRC inspections. *Yellow* findings would have indicated more serious issues with substantial risk to safety and would have required the NRC to take additional actions. *Red* findings would have represented an unacceptable loss of margin to safety and would have resulted in the NRC taking significant actions that could have included ordering the plant to shut down. The findings, considered in total with other inspection findings and performance indicators, will be used to determine overall plant performance.

- There were no findings.

Report Details

4. OTHER ACTIVITIES (OA)

4OA4 Operator Training and Qualifications

Reactor Operator and Senior Reactor Operator Initial License Examinations

a. Scope

The NRC examination team reviewed the written and operating initial examinations submitted by the Salem staff to ensure that they were prepared and developed in accordance with the guidelines of Revision 8 of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors". The review was conducted both in the Region I office and at the Salem facility. Final resolution of comments and incorporation of test revisions was conducted during and following the onsite preparation week. The NRC examiners administered the operating portion of the exam to all applicants from January 10 through 21, 2000. The written examinations were administered by Salem's training organization on January 17, 2000.

The examiners verified that the initially submitted written and operating examination met the target quality of NUREG-1021, Revision 8 (interim guidance is contained in Report of Interaction 99-18, dated November 24, 1999, and posted on the internet). Some editorial/enhancement changes and/or additions to the proposed exam were recommended by the NRC. The recommended changes were agreed to by the licensee and incorporated into the examination. Most of the NRC comments involved minor non-technical changes that did not affect question acceptability but were made to further enhance clarity and readability.

b. Observations and Findings

.1 Grading and Results

All 15 applicants passed all portions of the initial licensing examination.

There was one facility post-examination comment. The comment was accepted by the NRC and is documented in Attachment 1 of this report.

.2 Examination Preparation and Quality

No findings were identified.

.3 Examination Administration and Performance

One performance issue was identified during the operating portion of the examination. A time critical JPM (shifting to cold leg recirculation) was not performed within the required time by six of the fifteen applicants. Shifting to cold leg recirculation is an evolution that is normally performed as part of the EOP network. Under actual implementation the EOP steps would be read by the control room supervisor (SRO) to the operator(s) for implementation. Under the conditions of the examination the applicant (operator) had to both read and perform the EOP steps while being observed for examination purposes.

The licensee had time validated the JPM by having one individual read and perform the EOP actions. The JPM had also been used successfully during licensed operator requalification examinations. However, cautious self-checking by the applicants, coupled with reading and performing the EOP actions during the initial operator licensing examination extended the actual time beyond allowable times.

4OA5 Exit Meeting Summary

On January 21, 2000, the NRC examination team discussed preliminary overall observations during the examination with the Manager, Nuclear Training. On February 7, 2000, the Chief Examiner provided final conclusions and examination results to Salem training management representatives, Mr. D. Jackson and other staff members, via telephone. License numbers for the 15 applicants were also provided during the final exit meeting.

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

Attachments:

1. NRC Resolution of Post Examination Comment
2. SRO Written Exam w/Answer Key
3. RO Written Exam w/Answer Key

PARTIAL LIST OF PERSONS CONTACTED

FACILITY

E. Gallagher	Operations/Training Representative
M. Gwartz	Supervisor, Licensed Operator Training (Salem)
D. Jackson	Manager, Nuclear Training
J. Konovalchick	Operations Superintendent, Training
J. Lloyd	Senior Training Instructor

NRC

L. Briggs	Senior Operations Engineer/Examiner
S. Dennis	Operations Engineer/Examiner
T. Fish	Operations Engineer/Examiner

ATTACHMENT 1

RESOLUTION OF POST-EXAM WRITTEN EXAMINATION COMMENT

Question number 15 (RO) and 19 (SRO) summary: The question asked how the critical rod height would be affected if Boron concentration were erroneously adjusted to establish critical rod position using the end of life (EOL) hot zero power (HZP) when the reactor is at beginning of life (BOL), following a reactor trip. The original answer (d) was "Criticality cannot be achieved on rods alone."

Licensee's comment summary: The correct answer is "b." not "d." Since Boron concentration is set at a value to attain criticality at a certain rod position, in this case, at 1000 pcm which corresponds to 128 inches on group D. If Boron is adjusted to EOL values (a lower Boron concentration) the reactor will attain criticality at a lower critical rod position. The correct answer is "b." Criticality would occur below the ± 300 pcm administrative limit but above the rod insertion limit. Figure 4, "integral rod worth vs. rod position in overlap," shows that criticality would be achieved at 28 steps on group D vice the 128 steps calculated.

NRC resolution: Agree with the licensee's comment. The answer key was changed to accept "b." as the only correct answer for questions 15 (RO) and 19 (SRO).

Attachment 2

SRO WRITTEN EXAM W/ANSWER KEY

**U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination**

Applicant Information

Name:	Region: <u>I</u> / II / III / IV
Date:	Facility/Unit: <u>Salem 1 & 2</u>
License Level: RO / <u>SRO</u>	Reactor Type: <u>W</u> / CE / BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____ **Applicant's Signature**

Results

Examination Value	<u>100</u> Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

4. You may bring pens, pencils, and calculators into the examination room. Use black ink to ensure legible copies; dark pencil should be used only if necessary to facilitate machine grading.
5. Print your name in the blank provided on the examination cover sheet and the answer sheet. You may be asked to provide the examiner with some form of positive identification.
6. Mark your answers on the answer sheet provided and do not leave any question blank. Use only the paper provided and do not write on the back side of the pages. If you are using ink and decide to change your original answer, draw a single line through the error, enter the desired answer, and initial the change.
7. If you have any questions concerning the intent or the initial conditions of a question, do *not* hesitate asking them before answering the question. Ask questions of the NRC examiner or the designated facility instructor *only*. When answering a question, do *not* make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question. For example, you should not assume that any alarm has activated unless the question so states or the alarm is expected to activate as a result of the conditions that are stated in the question.
8. Restroom trips are permitted, but only one applicant at a time will be allowed to leave. Avoid all contact with anyone outside the examination room to eliminate even the appearance or possibility of cheating.
9. When you complete the examination, assemble a package including the examination questions, examination aids, answer sheets, and scrap paper and give it to the NRC examiner or proctor. Remember to sign the statement on the examination cover sheet indicating that the work is your own and that you have neither given nor received assistance in completing the examination. The scrap paper will be disposed of immediately after the examination.
10. After you have turned in your examination, leave the examination area as defined by the proctor or NRC examiner. If you are found in this area while the examination is still in progress, your license may be denied or revoked.
11. Do you have any questions?

~~PART C - GENERIC OPERATING TEST GUIDELINES (CATEGORIES A, B, AND C)~~

- ~~1. If you are asked a question or directed to perform a task that is unclear, you should not hesitate to ask for clarification.~~
- ~~2. The examiner will take notes throughout the test to document your performance, and sometimes the examiner may take a short break for this reason. The amount of note-~~

APPENDIX E
POLICIES AND GUIDELINES FOR TAKING NRC EXAMINATIONS

Each examinee shall be briefed on the policies and guidelines applicable to the examination category (written and/or operating test) being administered. The applicants may be briefed individually or as a group. Facility licensees are encouraged to distribute a copy of this appendix to every examinee before the examinations begin. All items apply to both initial and requalification examinations, except as noted.

PART A - GENERAL GUIDELINES

1. ***[Read Verbatim]*** Cheating on any part of the examination will result in a denial of your application and/or action against your license.
2. If you have any questions concerning the administration of any part of the examination, do not hesitate asking them before starting that part of the test.
4. SRO applicants will be tested at the level of responsibility of the senior licensed shift position (i.e., shift supervisor, senior shift supervisor, or whatever the title of the position may be).
5. You must pass every part of the examination to receive a license or to continue performing license duties. Applicants for an SRO-upgrade license may require remedial training in order to continue their RO duties if the examination reveals deficiencies in the required knowledge and abilities.
6. The NRC examiner is not allowed to reveal the results of any part of the examination until they have been reviewed and approved by NRC management. Grades provided by the facility licensee are preliminary until approved by the NRC. You will be informed of the official examination results about 30 days after all the examinations are complete.

PART B - WRITTEN EXAMINATION GUIDELINES

1. ***[Read Verbatim]*** After you complete the examination, sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination.
2. To pass the examination, you must achieve a grade of 80.00 percent or greater; grades will not be rounded up to achieve a passing score. Every question is worth one point.
3. For an initial examination, the time limit for completing the examination is five hours.

For a requalification examination, the time limit for completing both sections of the examination is three hours. If both sections are administered in the simulator during a single three-hour period, you may return to a section of the examination that was already completed or retain both sections of the examination until the allotted time has expired.

Question: 1

You are the Unit 2 Control Room Supervisor (CRS) with your crew on the last day of the current run of night shifts. Unit 2 is at 100% power. The crew is scheduled to be relieved by the same shift and personnel that all of you relieved. It is 0530 when the relieving Unit 2 RO calls in to report that his car has been stolen and he is not sure when he will get to work.

Assuming all personnel are actively licensed, which one of the following statements correctly describes proper manning of the RO position?

- With no formal approval or administrative action, the RO currently on duty can cover the watch until no later than 1100
- With your written approval, the RO currently on duty can volunteer to cover the watch until no later than 1100
- With written approval by the Operations Superintendent, the WCC NCO currently on duty can relieve the RO at 0700 and remain on watch until no later than 1100
- With written or telecon approval by the Operations Manager and GM/VP-NO, the WCC NCO currently on duty can relieve the RO at 0700 and remain on watch until no later than 1100

Question: 2

Given the following conditions for Unit 2:

- S/G tube leak has been identified at 0.25 gpm
- Chemistry has confirmed rising SG activity levels
- The unit was tripped from 10% power and transition has been made to 2-EOP-TRIP-2 "REACTOR TRIP RESPONSE"
- RCS Tave is 547°F and a cooldown is being initiated as directed by S2.OP-AB.SG-0001(Q) "STEAM GENERATOR TUBE LEAK" (AB.SG-1)
- Source Range (SR) channel N-32 failed earlier and, while I&C is checking the failed channel, misoperation results in failure of SR Channel N-31

Which one of the following describes the action(s) to be taken with respect to the Unit 2 Technical Specifications?

- Stabilize RCS temperature. Within ONE hour perform a shutdown margin surveillance, then continue with RCS cooldown.
- Invoke 10CFR50.54(x) to continue the cooldown with both SR channels out-of-service. Perform a shutdown margin surveillance prior to reaching cold shutdown.
- Make a one hour report to NRC. TS 3.0.3 will be violated when Mode 5 is entered with both SR channels out-of-service
- Continue the cooldown as directed by AB.SG-1. Abnormal Procedures take precedence over TS actions.

Question: 3

Given the following conditions for Unit 1:

- Today is June 23 @ 1115
- Unit is at normal operating temperature and pressure in preparation for reactor startup
- 1A Emergency Diesel Generator was declared inoperable today @1100.
- The weekly surveillance, S1.OP-ST.500-0001(Q), "ELECTRICAL POWER SYSTEMS AC SOURCES ALIGNMENT" was last performed June 16 at 1300.

According to the Unit 1 Technical Specifications, which one of the following correctly identifies the latest time for completion of this surveillance?

- a. 1200 hours today.
- b. 1215 hours today.
- c. 1300 hours today.
- d. 0700 hours on June 25.

Question: 4

Motor-operated valve (MOV) 2CV175, Rapid Borate Stop Valve, is being closed as part of a tagging operation.

In accordance with NC.NA-AP.ZZ-0005, STATION OPERATING PRACTICES, which one of the following describes the correct method for performing independent position verification for this valve?

- a. Check local valve stem position
- b. After power is removed, attempt to manually close the valve
- c. Check the bezel position lights after removing electrical power from the motor operator
- d. Prior to removing power, have the verifier attempt to close the valve from the control room

Question: 5

Which one of the following describes the requirements for maintaining the maximum allowable steady-state full power level in accordance with IOP-4 "Power Operations"?

- a. Average power may exceed 100% for a 12-hour shift, but at NO time shall it exceed 102%.
- b. Average power for a 12-hour shift shall be <101%. If it exceeds 102%, then power shall be reduced to $\leq 100\%$ within the next hour.
- c. Power may exceed 100% for a short duration due to intentional or unintentional operator action but at NO time shall it exceed 102%. The average power for a 12-hour shift is to be $\leq 100\%$.
- d. Power may exceed 100% for a short duration due to load fluctuation but at NO time shall it exceed 102%. The average power for a 12-hour shift is to be $\leq 100\%$.

Question: 6

Given the following conditions on Unit 2:

- Abnormal Service Water system pressure indications have been observed
- The System Manager directs that troubleshooting be initiated in accordance with SH.OP-AP.ZZ-0008(Q), "Operations Troubleshooting And Evolutions Plan Development"

Which one of the following is a responsibility of the CRS prior to initiating troubleshooting activities?

- a. Approving the troubleshooting plan but only if it is evaluated by the system manager as a HIGH RISK or VERY HIGH RISK evolution
- b. Independent verification of the proper installation of test equipment specified by the maintenance supervisor and/or the system manager
- c. Approval of any system manager waiver of a 10CFR50.59 review requirement
- d. Determining the risk level for the troubleshooting evolution

Question: 7

The control room readings are being logged by the NCO. The NCO has made a red circle around the reading for 1PI-936A, 11 Accumulator Pressure.

Which one of the following is indicated by the circled value?

- a. The indicator is fluctuating within the log limits but may be failing
- b. The reading must be independently verified by the Shift Technical Advisor (STA)
- c. The data falls outside the limits specified in the LCO statement
- d. Accumulator pressure has changed by $>\pm 5\%$ since the previous reading but is still within specifications

Question: 8

Unit 1 is currently in hot shutdown (HSD), heating up to hot standby (HSB) when the RO attempts to open 11SJ54, SI Accumulator Stop Valve, in accordance with S1.OP-IO.ZZ-0002, CSD to HSB. The valve fails to stroke open and the NEO sent to investigate reports that the breaker is tripped.

Which one of the following describes the correct action for the crew?

- a. Unseat the valve manually then reset and re-close the breaker. Under these conditions, two more attempts to stroke the valve are permitted.
- b. Unseat the valve manually then reset and re-close the breaker. Under these conditions, one additional attempt to stroke the valve is permitted.
- c. Refer to technical specifications and initiate a Notification to have maintenance investigate the problem.
- d. Dispatch a NEO to open the valve manually. Then reset the breaker but red tag it open and inform the Shift Electrician of the valve operation problem.

Question: 9

Unit 2 has been shutdown for refueling in accordance with the following schedule:

- 1/3/00, 0600 hours - Unit entered MODE 3
- 1/5/00, 2000 hours - Unit entered MODE 4
- 1/7/00, 1000 hours - Unit entered MODE 5
- 1/9/00, 1600 hours - Unit entered MODE 6

Which one of the following is the earliest date and time that spent fuel movement in the reactor vessel is permissible?

- a. 1/7/00, 1001 hours
- b. 1/10/00, 0601 hours
- c. 1/11/00, 1401 hours
- d. 1/14/00, 1001 hours

Question: 10

Given the following information for an operator:

- Age is 47 years
- Total lifetime exposure is 9200 mRem TEDE
- Current year exposure is 900 mRem TEDE

A Site Area Emergency has been declared due to a LOCA outside containment, with limited makeup to the RWST available. The operator volunteers to make an emergency entry into the penetration area to attempt to isolate the leak. This action would result in a significant reduction in offsite dose. The action has been properly approved.

Which one of the following is the maximum allowed exposure (TEDE) the operator may receive while performing this action?

- a. 2100 mRem TEDE.
- b. 3600 mRem TEDE.
- c. 24,100 mRem TEDE.
- d. 25,000 mRem TEDE.

Question: 11

Unit 2 is in cold leg recirculation due to a LOCA and the Operations Superintendent has declared a Site Area Emergency. Four manual valves need to be operated in the Auxiliary Building in order to enhance CCW cooling capability. While important to the overall mitigation strategy, operation of the four valves is not a plant equipment or life-saving operation. Radiation levels in the work area are much higher than normal and airborne radiation levels have escalated due to pump seal leakage. The general area radiation level is 2 R/hr and isotopic analysis is such that, without a respirator, personnel would eventually receive 100 mR (TEDE) for each ten minutes spent in the area. The OSC Coordinator estimates that two operators will each spend 20 minutes performing their part of the job without a respirator and 30 minutes with a respirator.

Which one of the following describes the correct application of ALARA principles?

- a. The operators should perform the job wearing a respirator
- b. The operators should perform the job without a respirator
- c. Do NOT dispatch the operators since operation of these valves is not a plant equipment or life saving action
- d. Process a dose limit extension in case the operators exceed their first level administrative dose limit

Question: 12

A procedure requires independent verification (IV) on a group of valves located inside a radiation area. The dose rate is 50 mR/hr and it is projected that the two operators will each have to spend 20 minutes in the area in order to perform the task.

In accordance with NC.NA-AP.ZZ-0005, STATION OPERATING PRACTICES, which one of the following describes the correct process for performing this IV?

- a. Two operators who have sufficient margin to perform the task and yet still remain below administrative dose limits shall be assigned to do a "hands on" IV
- b. The IV is not required if the Unit CRS and the WCC SRO verify that none of the valves have been re-positioned since the last IV
- c. Based on the ALARA concept, the Operations Superintendent has the authority to waive any IV requirement when entry into a defined radiation area is necessary to perform the task
- d. The "hands on IV" can be waived by the Unit CRS. However, an alternative means of IV via observation of process parameters/indications is required

Question: 13

The operating crew entered S2.OP-AB.CA-0001 (AB.CA-1), Loss of Control Air, when control air (CA) pressure began to lower. Short-term corrective actions have been unsuccessful and CA pressure has now reached the point where a reactor trip is required.

Which one of the following correctly describes the continued use of AB.CA-1 after the RO has initiated a reactor trip?

- a. This AB shall be implemented in parallel with the EOP's
- b. The AB is terminated as soon as EOP-TRIP-1 is entered
- c. The AB is terminated as soon as EOP-TRIP-1 is entered. Entry conditions are re-evaluated after the EOP network is exited
- d. The CRS can suspend the EOP's and re-enter this AB if the low air pressure prevents the performance of major EOP steps

Question: 14

Given the following conditions on Unit 2:

- A LOCA has occurred
- Safety Injection is actuated
- Actions of 2-EOP-TRIP-1, "REACTOR TRIP OR SAFETY INJECTION" were initiated
- When the main turbine tripped, all AC power was lost for the Site
- The crew has initiated actions of 2-EOP-LOPA-1, "LOSS OF ALL AC POWER"
- The crew notes the following for the Critical Safety Function Status Trees:
 - (a) PURPLE path condition exists for the Core Cooling Status Tree
 - (b) RED path condition exists for the Containment Environment Status Tree

Which one of the following is the correct action for these conditions?

- a. Continue the actions of 2-EOP-LOPA-1 "LOSS OF ALL AC POWER"
- b. Transition to 2-EOP-LOPA-3 "LOSS OF ALL AC POWER RECOVERY/SI REQUIRED"
- c. Transition to 2-EOP-FRCE-1, "RESPONSE TO EXCESSIVE CONTAINMENT PRESSURE"
- d. Transition to 2-EOP-FRCC-2, "RESPONSE TO DEGRADED CORE COOLING"

Question: 15

Unit 2 is at 100% power when a loss of all overhead annunciators occurs for greater than 15 minutes. The Emergency Coordinator, in this case the Operations Superintendent, properly classified the problem as an UNUSUAL EVENT (UE) and provided the Initial Contact Message Form to the Primary Communicator. However, before the Primary Communicator makes any of the "within 15 minute notifications", the problem is corrected and the annunciators are restored.

Which one of the following describes the correct course of action for the Emergency Coordinator?

- a. Complete the actions for declaration of a UE and then terminate IAW the proper attachments
- b. Complete the actions for declaration of a UE and then issue a retraction IAW the ECG
- c. Make a 4 Hour Report in accordance with ECG Sect. 11.10 "Voluntary Notifications"
- d. Make a 1 Hour Report in accordance with ECG Sect. 11.6 "After the Fact"

Question: 16

The operating crew entered S2.OP-AB.ANN-0001, Loss of Overhead Annunciators, when it was noted that the CRT time stopped updating. In the process of implementing the procedure, operators are directed to perform the following step:

3.12 PERFORM System Lamp Test and VERIFY at least two of the following occur:

- OHA Window A-9, alarms or reflashes
- OHA CRT displays 11 logic error alarms or reflashes
- OHA local printer cabinet, ANN115-2, displays incoming alarms

Which one of the following correctly describes the reason for performing that step?

- a. Any 2/3 of those verifies that the system is not operable and the 15 minute clock for the ECG call should be started
- b. Any 2/3 of those verifies that the system is operable and capable of actuating on a valid alarm but frequent testing is initiated
- c. Any 2/3 of those verifies that SER B is in command. The system is degraded but capable of displaying alarms on the CRT and printer but will not actuate an audible alarm
- d. Identifies the specific source of the OHA problem to expedite reset or bypass of the proper component before the annunciators have been inoperable for >15 minutes

Question: 17

Given the following conditions:

- A Unit 1 reactor startup is in progress with Control Bank A presently being withdrawn
- The third NCO has started 12 SI Pump to refill 11 SI Accumulator due a low level alarm
- Reactor Engineering is using the fuel handling crane bridge to verify serial numbers for several spent fuel assemblies in Unit 1 Spent Fuel Pool
- Unit 2 is at 100% power
- Unit 3 is running and is synchronized to the grid for peak load support

In accordance with SC.OP-DD.ZZ-0039, OPERATING WITH AN EMERGENCY ON OPPOSITE UNIT, which one of the following actions is required if Unit 2 experiences a reactor trip/safety injection and an ALERT is declared by the Operations Superintendent?

- a. Unload and shutdown Unit 3.
- b. Insert all control rods on Unit 1.
- c. Dispatch a NEO to evacuate all personnel from Unit 1 FHB and disable the bridge.
- d. Secure the lineup to fill 11 SI Accumulator and stop the 12 SI Pump.

Question: 18

Abnormal procedure S2.OP-AB.ROD-0002, Dropped Rod, states that a dropped rod shall be recovered at a rate of withdrawal determined and approved by Reactor Engineering.

Which one of the following correctly describes the basis for that statement?

- a. Ensures that the rate of rod withdrawal does not result in a reactivity addition in excess of the core-life dependent value of the delayed neutron fraction
- b. If the rod is adjacent to a PRNIS detector, continuous withdrawal to the bank position may cause a positive rate reactor trip
- c. Conditions could be such that the Xenon concentration in the area of the dropped rod has been significantly lowered
- d. At EOL, the rate of rod withdrawal must be reduced in order to prevent the need for initiating rapid boration to offset the rate of reactivity change

Question: 19

The Unit 2 reactor is at BOL and was manually tripped due to a feedwater problem. An Estimated Critical Position (ECP) calculation has been performed and boron concentration was adjusted for a critical rod height of Control Bank D at 128 steps. However, when determining control bank worth, personnel performing the ECP incorrectly used the EOL HZP Integral Rod Worth Curve instead of the BOL HZP Curve.

Which one of the following correctly describes this how error affects critical rod height?

- a. Criticality would occur below the rod insertion limit (C-58 steps).
- b. Criticality would occur below the +/-300 pcm administrative limit but above the rod insertion limit.
- c. Criticality would occur above the +/-300 pcm administrative limit.
- d. Criticality cannot be achieved on rods alone.

Question: 20

Given the following conditions on Unit 2:

- Reactor power is 75%
- A leak rate surveillance indicates the following:
 - Total RCS leakage rate is 5.2 gpm
 - Leakage to PRT is 2.0 gpm
 - Leakage to the Reactor Coolant Drain Tank is 1.3 gpm
 - Total primary to secondary leakage is 0.08 gpm

Which one, if any, of the following Technical Specification leakage limits has been exceeded?

- a. Identified
- b. Unidentified
- c. Primary to Secondary
- d. Pressure Boundary

Question: 21

A loss of coolant accident has occurred. The RVLIS Summary Display Page is displaying dynamic range. During a cooldown and depressurization, void content indication remains constant at 80%.

Which one of the following describes actual void content response during the cooldown and depressurization?

- a. Actual void content decreased due to change in density as pressure and temperature decreased.
- b. Actual void content increased due to change in density as pressure and temperature decreased.
- c. Actual void content remained constant; indicated void content is compensated using pressure and temperature signals.
- d. Actual void content remained constant; differential pressure is an accurate indication of void content.

Question: 22

RCS pressure is 50 psig, VCT pressure is 18 psig.

Which one of the following describes both the proper alignment of and the basis for the RCP seal injection/seal return alignment?

- a. All No. 1 Seal return valves are closed to prevent VCT water from backflushing through the seals.
- b. Seal injection is isolated to prevent excessive seal leakoff flow.
- c. Seal leakoff is fully open to prevent boric acid from crystallizing and accumulating on the seal surfaces.
- d. Seal injection is isolated to prevent VCT water from backfilling the RCS.

Question: 23

With reactor power at 30%, the power supply breaker to 24 RCP trips.

Which one of the following is correct concerning the plant response with NO operator action?

- a. The plant will continue at 30% power unless a SG water level trip setpoint is exceeded
- b. A reactor trip will occur on low RCS flow
- c. A SI will occur on high steam flow (from 21/22/23 SG's) coincident with LO-LO Tave or low steam pressure
- d. A reactor trip will occur on 1/4 RCP under voltage

Question: 24

Given the following conditions on Unit 2:

- Reactor power is 50%
- Pressurizer level is at programmed level
- 22 Charging Pump is running
- The Master Flow Controller is in MANUAL
- Charging and letdown are balanced

Which one of the following describes the effect on the plant if the Master Flow Controller is maintained in MANUAL as power is raised to 100%?

- a. Pressurizer level will rise.
- b. Pressurizer level will remain the same.
- c. VCT level will lower.
- d. An eventual reactor trip on low pressure when the pressurizer goes empty

Question: 25

Given the following conditions on Unit 2:

- Reactor power is 50%
- The operating 21 Charging Pump has tripped
- No operator action is taken

Which one of the following will occur?

- a. Letdown isolation valves, CV2 & CV277, will immediately CLOSE.
- b. Charging flow control valve, CV55, will fully CLOSE until 22 Charging Pump is started
- c. Letdown heat exchanger outlet temperature control valve, CC71, will OPEN.
- d. Letdown heat exchanger outlet temperature control valve, CC71, and Letdown pressure control valve, will both close.

Question: 26

Given the following:

- Unit 1 is shutdown with RHR providing shutdown cooling
- The 11 RHR pump and 11 RHR Heat Exchanger are in service
- RCS pressure is 320 psig
- RCS temperature is 300°F
- RCS cooldown rate is 20°F/hr
- RHR total flow is 2000 gpm

Which one of the following will occur if the air pressure regulator to 11RH18, 11 RHR HX Outlet Flow Control Valve, failed such that air was lost to the valve operator?

- a. RCS cooldown rate will rise.
- b. RHR HX Component Cooling outlet temperature will lower.
- c. RCS pressure will slowly rise.
- d. RHR flow will lower.

Question: 27

Which one of the following would occur if SJ1, Charging Suction from RWST, failed at the 75% open position when a safety injection signal was received?

- a. Gas binding in the charging pumps when the VCT empties
- b. Lower than expected boron concentration in ECCS due to dilution from VCT makeup
- c. No effect, both CV40&41 close, isolating the VCT
- d. Backflow from the RWST to the VCT to the in-service CVC HUT, reducing the available inventory to inject into the reactor vessel.

Question: 28

Which one of the following correctly identifies the setpoints and coincidences for the low RCS pressure automatic safety injection signal and the associated automatic unblock?

- a. $2/4 \leq 1765$; $3/4 \geq 1915$
- b. $2/3 \leq 1765$; $1/3 \geq 1915$
- c. $2/4 \leq 1765$; $2/4 \geq 1915$
- d. $2/3 \leq 1765$; $2/3 \geq 1915$

Question: 29

Unit 2 was at 100% power when an automatic reactor trip and safety injection occurred. All systems responded per design.

Which one of the following correctly describes the flow path for RCP seal leakoff?

- a. All #2 Seals become film-riding seals and discharge to the Reactor Coolant Drain Tank, via the standpipe
- b. A relief valve in the seal return line lifts and discharges to the PRT
- c. A relief valve in the seal return line lifts and discharges to the Containment Trench
- d. A relief valve in the seal return line lifts and discharges upstream of the Seal Water Heat Exchanger

Question: 30

Given the following for Unit 2:

- Reactor power is 85%
- A S/G Feed Pump trips

Which one of the following describes the expected initial response of the Pressurizer Pressure Control System during this event?

- a. Pressurizer spray valves will modulate open to reduce pressure to normal.
- b. The proportional heaters and the backup heaters turn full on to raise pressure to normal.
- c. Pressurizer heaters de-energize at the -5% level deviation setpoint
- d. The PORVs open and maintain pressure below the high reactor trip setpoint.

Question: 31

The following conditions exist:

- The reactor is at 100% power
- The controlling Pressurizer Level Channel fails HIGH

Which one of the following will be the result from this failure if no operator action is taken?

- a. Actual Pressurizer level will start rising due to MAXIMUM charging flow and the reactor will trip on HIGH Pressurizer level.
- b. Actual Pressurizer level will lower due to reduced charging flow and the reactor will trip on LOW Pressurizer pressure.
- c. Actual Pressurizer level will initially lower, then rise until the reactor trips on HIGH Pressurizer level.
- d. Actual Pressurizer level will initially rise until PORVs open, then lower due to loss of RCS inventory until the reactor trips on LOW Pressurizer pressure.

Question: 32

Given the following plant conditions:

- Unit 1 is at 100% power
- All major controls are in AUTO
- PZR HTR 11 Backup Heater (BUH) Group is powered from the 1C 460V Vital Bus in accordance with S1.OP-SO.PZR-0010 for a test
- PZR HTR 12 BUH Group is powered from the normal source and selected to AUTO
- The controlling pressurizer level (PL) channel just failed low. No action has been taken

Which one of the following correctly describes BUH response and PZR operability if a SGFP trip re-directs the crew and actions for the failed PZR level channel are not completed in a timely manner?

- a. 12 BUH Group is de-energized until an operable PL channel is selected for control. The PZR is operable because 11 BUH Group remains energized and 12 BUH Group is capable of being powered from the emergency power supply.
- b. 12 BUH Group is de-energized until an operable PL channel is selected for control. 11 BUH Group remains energized but the PZR is inoperable because there is <150 KW of heater capacity currently available from 12 BUH Group.
- c. 12 BUH Group de-energized when the level channel failed low but will re-energize on high level deviation. 11 BUH Group remains energized. The PZR is operable since both groups can be powered from the emergency power supply.
- d. 12 BUH Group de-energized when the level channel failed low but will re-energize on high level deviation. 11 BUH Group remained energized but the PZR is inoperable because there is <150 KW of 11 BUH Group capacity available when so aligned.

Question: 33

Unit 1 is operating at 100% power when a 48 VDC power supply in the "A" Train SSPS Logic cabinet fails.

Which one of the choices correctly completes the following statement?

OHA Alarm A-34 "SSPS TRN A TRBL" actuates

- a. and Train A is NOT capable of automatically tripping the reactor.
- b. but Train A remains capable of automatically tripping the reactor.
- c. and the shunt trip coils for Reactor Trip Breaker A and Reactor Trip Bypass Breaker A are disabled.
- d. and the UV coils for Reactor Trip Breaker A and Reactor Trip Bypass Breaker A are disabled.

Question: 34

The circuit breaker (2CVIB9) providing 115VAC power to the 2C Safeguards Equipment Control (SEC) cabinet has been removed for replacement.

Which one of the following correctly describes the actions necessary to operate 22 SI Pump (SIP) if a valid SI signal is initiated with a concurrent loss of off-site AC power (Blackout)?

- a. Manually start 22 SIP
- b. Block 2C SEC at RP-1 and then manually start 22 SIP
- c. Close 2C EDG breaker and then manually start 22 SIP
- d. Start 2C EDG, close 2C EDG breaker, and then manually start 22 SIP

Question: 35

Unit 2 is operating at 100% power, with all systems in automatic when annunciator alarms "ROD INSERT LMT LO" (E8) and "ROD INSERT LMT LO-LO" (E16) activate. The plant is stable (no rod motion, no power changes, etc.)

Which one of the following correctly explains the cause of these alarms?

- a. 22 RCS loop Tavg signal has failed low
- b. A RCS Thot RTD has failed high
- c. The P-A Converter has failed
- d. Power has been lost to the IRPI's

Question: 36

Unit 2 is at 100% power with a Turbine First Stage Pressure Channel (PT-505) properly removed from service.

Which one of the following correctly describes the required crew action if 22 SGFP trips?

- a. Enter AB.CN-1, verify the immediate actions, and terminate the runback by placing turbine control in TURBINE MANUAL when power reaches 60-65%
- b. Enter AB.CN-1, verify the immediate actions, and stabilize the plant after the automatic runback is complete
- c. Trip the reactor and then enter EOP-TRIP-1
- d. Trip the turbine and then enter EOP-TRIP-1

Question: 37

A LOCA has occurred on Unit 1. The crew is in EOP-LOCA-1, Loss of Reactor Coolant. The RO notes that the reading on the Subcooling Margin Monitor (SCMM) is 16 °F lower than the last time he checked it but RCS temperature and pressure have not changed significantly.

Which one of the following correctly describes a reason for that change?

- a. The changing containment temperature is affecting the output signals from the in-core thermocouple reference junction box
- b. An in-core thermocouple has failed high
- c. Rising containment pressure is lowering RCS pressure detector output, pound for pound
- d. The SCMM automatically shifted to ADVERSE

Question: 38

Given the following conditions on Unit 2:

- Reactor is at 100% power when a small break LOCA occurs
- Containment pressure is 4.5 psig

Which one of the following describes the status of the containment cooling system for those conditions?

Service Water flow to containment coolers . . .

- a. rises to approximately 2640 gpm and all CFCU fans start in or are shifted to fast speed.
- b. rises to approximately 2640 gpm and all CFCU fans start in or are shifted to slow speed.
- c. lowers to approximately 960 gpm and all CFCU fan start in or are shifted to fast speed.
- d. lowers to approximately 960 gpm and all CFCU fans start in or are shifted to slow speed.

Question: 39

Given the following conditions on Unit 2:

- A loss of offsite power has occurred
- 2A 4KV Bus de-energized on DIFF

Which one of the following correctly describes the status of the CFCUs?

- a. 3 CFCU's will be operating in SLOW speed
- b. 4 CFCU's will be operating in SLOW speed
- c. CFCU's running before the event will restart in the speed selected
- d. No CFCU's will be operating

Question: 40

A large break LOCA has occurred. The crew has transitioned to FRCE-1, Response to Excessive Containment Pressure, on a PURPLE Path. Prior to starting containment spray (CS) pumps, the procedure poses the question "Is EOP-LOCA-5 in effect?" If the answer is YES then the crew is directed to "Operate CS Pumps as directed by EOP-LOCA-5."

Which one of the following correctly describes the difference between operation of the CS Pumps in LOCA-5 as compared to FRCE-1?

- a. LOCA-5 stops both CS Pumps to allow evaluation of CFCU capability to control containment pressure. CS Pumps are re-started one-at-a-time, if needed. FRCE-1 starts both CS Pumps and runs all CFCU's in LOW speed
- b. LOCA-5 stops both CS Pumps if all five CFCU's are available to run in HIGH speed. FRCE-1 starts both CS Pumps and runs all CFCU's in LOW speed
- c. LOCA-5 runs only one CS Pump as long as containment pressure is <47 psig. FRCE-1 starts both CS Pumps, regardless of containment pressure
- d. LOCA-5 runs CS Pumps based on the combined status of RWST level, containment pressure and the number of operating CFCU's. FRCE-1 always starts both CS Pumps

Question: 41

The 21 Containment Iodine Removal Unit (IRU) was started in preparation for a planned containment entry.

Which one of the following correctly describes the status of the IRUs if a Safety Injection signal is actuated?

21 IRU . . .

- a. continues to run and 22 IRU is locked out.
- b. is tripped and locked out, and 22 IRU is locked out.
- c. continues to run and 22 IRU starts on SEC Mode Operation.
- d. trips then restarts on SEC Mode Operation, and 22 IRU starts on SEC Mode Operation.

Question: 42

Given the following conditions for Unit 2:

- A large break LOCA has occurred
- Prior to the LOCA, containment temperature was 90°F
- Following the LOCA, containment pressure is 5 psig
- Containment temperature is currently 120°F
- The EOPs require that a Hydrogen Recombiner be placed in service

Which one of the following values will be set on the Hydrogen Recombiner potentiometer for the above conditions?

- a. 50.2 Kw
- b. 52.8 Kw
- c. 54.5 Kw
- d. 55.9 Kw

Question: 43

During a Unit 2 refueling, Fuel Handling Crane area radiation monitor (2R32A) reaches the HIGH alarm setpoint when the tool and attached spent fuel assembly are being raised. The crane hoist has not yet been fully raised.

Which one of the following describes the status of the fuel assembly attached to the crane?

- a. Crane controls can only lower the fuel assembly.
- b. Crane controls are disabled until jumpers are installed to defeat the interlock.
- c. The fuel assembly can be lowered only after pressing the BYP INT pushbutton on the crane controls.
- d. Movement of the fuel assembly is terminated IAW procedures until an HP Technician completes a general area survey.

Question: 44

Given the following conditions for Unit 2:

- Reactor power is 100%
- 2A 115 VAC Vital Bus power is lost

Which one of the following correctly describes the reason the operator is directed to shift the Steam Dump controller from TAVG to MS PRESS CONT?

- a. The steam dumps are armed. The steam dump valves will open due to the signal from the load rejection controller if Tavg exceeds Tref by 5°F.
- b. A steam dump demand signal is generated from the plant trip controller. If an arming signal is generated, the steam dump valves will open to the demanded position.
- c. A steam dump demand signal is generated from the load rejection controller. If an arming signal is generated, the steam dump valves will open to the demanded position.
- d. The steam dumps CANNOT be armed from the turbine first stage pressure signal. If ONE reactor trip breaker fails to open on a trip, the steam dumps would be inoperable in TAVG Mode.

Question: 45

Given the following conditions for Unit 2:

- Turbine Trip has occurred from 20% Reactor Power
- Maintenance activities have resulted in a break in the condenser rupture disk
- Condenser Air Removal Pumps are unable to handle the in-leakage volume and condenser vacuum is at 19 inches of Hg
- Tavg is at 547°F
- All Circulating Water System Pumps are in service.

Which one of the following correctly describes the status of the Condenser Steam Dump System?

- a. The Load Rejection Controller will be modulating the steam dump valves
- b. Low condenser vacuum is blocking steam dump valve operation
- c. The Plant Trip Controller will be modulating the steam dump valves
- d. Tavg is blocking steam dump valve operation

Question: 46

Given the following conditions for Unit 2:

- Reactor is at 100% power
- A break occurs just downstream of 22 Condensate Pump

Which one of the following correctly describes the subsequent plant response?

- a. The affected Steam Generator Feed Pump (SGFP) trips if suction pressure lowers to either: 215 psig after a 10-second delay, or 190 psig instantaneous.
- b. The Condensate Polisher Bypass valves CN-108s automatically open to restore SGFP suction pressure. If pressure lowers to 190 psig then any affected pump trips.
- c. At 275 psig on the suction of either SGFP a 10-second timer starts. If automatic opening of the CN-108 valves does not restore suction pressure then any affected pump trips.
- d. At 275 psig the "Condensate Suction Pressure LO" console alarm actuates. If suction pressure remains <275 psig for >10 seconds then any affected pump trips.

Question: 47

A reactor trip occurred on Unit 2. At the time of the trip 23BF19, Feedwater Regulating Valve, failed open and before the line could be isolated, 23 SG narrow range (NR) level peaked at 95% but is now 88%. The remaining SG's NR levels are all <33%. The control room crew is transitioning to S2.OP-IO.ZZ-0008, Maintaining Hot Standby, after completing both EOP-TRIP-2, REACTOR TRIP RESPONSE, and EOP-FRHS-3, RESPONSE TO STEAM GENERATOR HIGH LEVEL.

Which one of the following correctly describes the use of the steam generators for maintaining HSB conditions?

- a. Do not restore AFW flow to 23 SG until steaming has lowered NR level to <67%
- b. Do not steam 23 SG until the Technical Support Center (TSC) performs an overfill evaluation and provides further direction
- c. Close the main steamline isolation valves on all SG's and use only the MS10's for heat removal until the Technical Support Center (TSC) performs an overfill evaluation and provides further direction
- d. Close the main steamline isolation valves on 21, 22 and 24 SG's until 23 SG has steamed down to NR level <67%

Question: 48

Unit 1 is at 100% power. 13 AFW Pump is in LOCAL with the control board LOCAL-MANUAL bezel pushbutton illuminated while a technician tests the control circuit.

Which one of the following is a correct statement regarding the capability of the AFW system to provide design basis flow if a loss of all AC power occurs?

- a. The AFW system will provide the design flow requirement because the pump is still capable of manual LOCAL and REMOTE start
- b. The AFW system will provide the design flow requirement because the pump can be started locally or will start automatically after 2/3 levels on 2/4 SG's drop below the actuating setpoint
- c. The AFW system will not provide the design flow requirement unless the pump is started locally or the local switch is returned to REMOTE and the PO depresses 13 AFW Pump START pushbutton
- d. The AFW system will not provide the design flow requirement unless the pump is started locally, or either the local switch is returned to REMOTE or the PO depresses the 13 AFW Pump LOCAL-MANUAL pushbutton and then pushes the START pushbutton

Question: 49

Unit 2 is at 40% power. Operators had been raising power but a SW leak has developed on the MTLO Cooler. The following conditions exist:

- #23B Circulating Water (CW) Pump is OOS while electricians test the 4KV breaker, outside of the breaker cubicle
- The generator is synchronized to the grid
- Operators just tripped the turbine due to the SW leak on the MTLO Cooler
- Coincident with the turbine trip, the DIFF Relay on 2CW Bus Section 23 actuated

Which one of the following correctly describes the correct course of action for the control room crew?

- a. No action is required since 2CW Bus will swap to the alternate source
- b. Reduce power as necessary to maintain condenser vacuum above the steam dump interlock setpoint
- c. Reduce power to <5% to establish unit power generation within AFW capacity
- d. Immediately trip the reactor due to complete loss of steam dump capability

Question: 50

Which one of the following describes the mechanism used by the safety-related portion of the 115 VAC system to transfer power from its normal AC source to the 125 VDC source?

- a. An auctioneering circuit transfers power from the rectifier output to the 125 VDC supply.
- b. A static switch transfers power from AC regulator to 125 VDC supply.
- c. When low voltage is sensed from the AC regulator, the 125 VDC input breaker is automatically shut.
- d. A static switch transfers power from the rectifier output to 125 VDC if low 115 VAC bus voltage is sensed.

Question: 51

Which one of the following correctly describes TWO conditions that will independently cause automatic closure of 2WL51, Liquid Waste Discharge Valve?

- a. High discharge flow rate or high radiation sensed in the release header.
- b. High discharge flow rate or loss of power to RMS Channel R-18
- c. Loss of power to the flow recorder or loss of control air
- d. High radiation sensed in the release header or loss of 125 VDC control power to the valve.

Question: 52

Which one of the following correctly states the basis for the inlet pressure limitation on WG41, Waste Gas Release Valve?

- a. Maintain pressure less than the maximum design pressure for the packing in WG41
- b. At higher pressures leaks may develop in the release line components, leading to an unmonitored release
- c. Maintain D/P across the valve less than design to ensure the valve can close automatically
- d. The calculated release flow rate could be exceeded at higher pressures

Question: 53

Both units are at 100% power when Control Room Air Intake Radiation Monitor 2R1B-2 fails high. The following control area ventilation alignment is noted:

- One EACS Fan on Unit 1 is operating
- One EACS Fan on Unit 2 is operating
- The Unit 1 Outside Air Intake Damper is closed
- The Unit 2 Outside Air Intake Damper is open

Which one of the following describes the correct action with regard to technical specifications?

- a. Enter the TSAS on both units for the radiation monitor failure
- b. Enter the TSAS on Unit 2 for the radiation monitor failure
- c. Enter the TSAS on both units for the RMS failure and the TSAS on both units for the intake damper failure
- d. Enter the TSAS on Unit 2 for the RMS failure and the TSAS on Unit 1 for the intake damper failure

Question: 54

While performing the Emergency Operating Procedures, a step is encountered which states, "Control PZR level between 25% (33% adverse) and 77% (74% adverse) by adjusting charging and letdown flows." Containment pressure has risen to 5.5 psig and dropped back down to 3.3 psig, containment radiation levels have risen to $3E5$ R/hr and have dropped back down to $6.7E4$ R/hr.

Which one of the following states the indicated PZR levels that must be maintained?

- a. Minimum of 25%; Maximum of 77%
- b. Minimum of 33%; Maximum of 74%
- c. As specified by the Shift Technical Advisor
- d. As specified by the Operations Support Center

Question: 55

Which one of the following correctly describes the purpose of the accumulators installed in the Service Water System?

- a. Maintain SW flow to the CFCU motor coolers while the SW Pumps are started and SW pressure recovers in SEC Mode 3
- b. Maintain the CFCU's full of water to prevent damage from water hammer when the CFCU's and Service Water Pumps are automatically started in SEC Mode 3
- c. Provide an in-surge/out-surge volume to ensure pressure in all CFCU's remain within design limits while it is isolated and waiting for a SEC Mode 3 start signal
- d. Maintain SW pressure in the CFCU's to prevent the all SW57's, CFCU Inlet Pressure Control Valves, from opening too rapidly when a CFCU is started and causing runout on SW Pumps starting in SEC Mode 3

Question: 56

Due to concurrent problems with off-site power and the Station Air Compressors, control air header pressure is lowering on both units.

Which one of the following correctly describes the associated automatic actions for the conditions above?

- a. At 85 psig, #1 ECAC automatically starts to supply "A" Header and #2 ECAC automatically starts to supply "B" Header
- b. At 85 psig, #1 ECAC automatically starts to supply "B" Header and #2 ECAC automatically starts to supply "A" Header
- c. At 80 psig, #1 ECAC automatically starts to supply "A" Header and #2 ECAC automatically starts to supply "B" Header
- d. At 80 psig, #1 ECAC automatically starts to supply "B" Header and #2 ECAC automatically starts to supply "A" Header

Question: 57

Which one of the following correctly describes a difference in response for an AUTO as compared to a MANUAL actuation of the DG Area CO₂ system?

- a. AUTO CO₂ actuation is blocked on a SEC start
- b. MANUAL CO₂ actuation trips the associated, running EDG
- c. AUTO CO₂ actuation is blocked when the associated EDG is in LOCKOUT
- d. On a MANUAL actuation, there is no CO₂ discharge delay

Question: 58

Unit 2 is at 50% power with all major controls in AUTO.

Assuming no operator action, which one of the following failures presents the greatest challenge to fuel integrity?

- a. NIS Power Range Channel N-41 fails low
- b. RCS Loop 23 Thot RTD fails low
- c. RCS Loop 23 Tcold RTD fails high
- d. Turbine First Stage Pressure Transmitter PT-505 fails high

Question: 59

Given the following conditions on Unit 2:

- Reactor power - 25%
- Control rod 2D2 in Control Bank D has fully dropped.
- Recovery of the dropped rod is in progress per S2.OP-AB.ROD-0002(Q) "DROPPED ROD"
- All Disconnect Switches in Control Bank D are in DISCONNECT except for 2D2

Which one of the following describes an alarm that will actuate and the affect that alarm actuation will have on recovering the dropped control rod?

- a. A Non-Urgent Failure will actuate; rod recovery can proceed without additional operator action
- b. A Non-Urgent Failure will be received; rod recovery can proceed after depressing the ALARM RESET pushbutton on the console
- c. An Urgent Failure will actuate; rod recovery can proceed without additional operator action
- d. An Urgent Failure will actuate; rod recovery can proceed after depressing the ALARM RESET pushbutton on the console

Question: 60

Unit 1 is at 100% power when a SGFP trip results in an automatic rapid power reduction.

Which one of the following correctly identifies an alarm actuation that would be indicative of a single immovable control rod?

- a. Auxiliary Annunciator "DELTA I/EXCEEDS TARGET BAND"
- b. OHA E-38, UPPER SECT DEV ABV 50% PWR
- c. OHA E-40, ROD BANK URGENT FAILURE
- d. TAVE/TREF DEV Console Alarm

Question: 61

Given the following conditions for Unit 2:

- An electronic failure and technician error caused a reactor trip/SI from 100% power
- Train A reactor trip breaker (RTB A) failed to open
- All control rods inserted

Which one of the following correctly describes the purpose of the EOP-TRIP-1, REACTOR TRIP OR SAFETY INJECTION, steps for opening RTB A or the alternative path of having I&C install a P-4 jumper?

- a. To reset the high steam flow SI setpoint to the zero power value
- b. To allow a subsequent automatic SI signal to actuate the ESFAS on Train A
- c. To allow the operating crew to regain control of equipment
- d. To provide a lock in signal to ensure the Train A actuated containment isolation and feedwater isolation valves can only be opened by deliberate action

Question: 62

Given the following conditions for Unit 2:

- Reactor power is 87%
- Pzr pressure is 2235 psig
- Pzr PORV 2PR1 is leaking
- PRT pressure is 5 psig
- PORV discharge temperature has stabilized near 230°F

Considering each one individually, which one of the following directly causes PORV discharge temperature to rise?

- a. PRT pressure is allowed to rise to 10 psig
- b. PORV leak rate rises by 2 gpm
- c. Pzr vapor space temperature rises by 1°F
- d. The PRT rupture disk fails

Question: 63

Given the following conditions for Unit 2:

- A Small Break LOCA has occurred
- All ECCS pumps are operating as designed
- Twenty minutes after the initial transient, the following conditions exist:
 - No RCPs running
 - Core Exit TCs read 580°F
 - Pzr level indicates 0%
 - RCS pressure is at 1310 psig
- The operators begin drawing more steam from all S/Gs and increase AFW flow to maintain level

Which one of the following describes how and why ECCS flow changes as a result of these operator actions?

- a. As the plant cools down, RCS pressure lowers and ECCS flow rises
- b. ECCS flow will not change until the pressurizer begins to refill, then ECCS flow will lower
- c. For this set of conditions, cooldown has no effect on ECCS flow. RCS pressure cannot change unless one or more ECCS pumps are stopped
- d. ECCS flow will not change because the SI and Charging Pumps all are operating at their maximum flow rate

Question: 64

EOP-LOCA-1, Loss of Reactor Coolant, Step 28 reads "WAIT UNTIL 14 HOURS HAVE ELAPSED SINCE SI ACTUATION". The following arrow box reads "EOP-LOCA-4, TRANSFER TO HOT LEG RECIRCULATION".

Which one of the following correctly describes the basis for transitioning to EOP-LOCA-4 after 14 hours?

- a. Eliminate steam voids that may be hindering heat removal in the upper core
- b. Wash fission product particulates back into solution for processing in the CVCS demineralizers
- c. Preclude the potential for boron precipitation to hinder core cooling
- d. Cover the core above the hot leg elevation to establish natural circulation flow to the SG's

Question: 65

A LOCA has occurred on Unit 2. After stopping all ECCS pumps except 21 Charging Pump, the control room crew properly transitioned from EOP-TRIP-3, SI Termination to EOP-LOCA-2, Post-LOCA Cooldown and Depressurization. The following conditions are observed:

- 21 Charging Pump running, drawing from the RWST
- Group Busses were lost during the automatic transfer
- RCS Subcooling is 20 °F
- RCS Pressure 1700 psig, slowly rising
- Pressurizer (PZR) Level 21%, slowly rising
- Containment Pressure 3 psig
- VCT Level is 19%

Which one of the following is the correct crew action if the leak rate begins to rise?

- a. If PZR level reaches $\leq 19\%$ and RCS subcooling = 0 °F, then start ECCS Pumps as necessary to restore PZR level or subcooling
- b. If PZR level reaches $\leq 19\%$ or RCS subcooling = 0 °F, then start ECCS Pumps as necessary to restore PZR level and subcooling
- c. If PZR level reaches $\leq 11\%$ or RCS subcooling = 0 °F, then start ECCS Pumps as necessary to restore PZR level and subcooling
- d. If PZR level reaches $\leq 11\%$ and RCS subcooling = 0 °F, then start ECCS Pumps as necessary to restore PZR level or subcooling

Question: 66

The unit is at 100% power.

Which one of the following sets of indications would occur if 21CV104, Seal Leakoff Isolation Valve, fails closed while operating at 100% power?

- a. #1 Seal D/P indicates low and PRT level is rising
- b. #1 Seal D/P indicates low and Seal Leakoff Flow is zero
- c. #1 Seal D/P indicates high and RCDT level is rising
- d. #1 Seal D/P indicates high and Seal Leakoff Flow is zero

Question: 67

Given the following conditions on Unit 2:

- Reactor power is 65%
- Auto makeup initiated to the VCT
- Shortly after AUTO Makeup started, boric acid filter clogging caused the BORIC ACID FLOW DEVIATION console alarm actuate

Assuming no operator action, which one of the following correctly describes what will occur?

- a. Control rods will insert in AUTO to control Tave
- b. Reactor power will rise slightly and level off.
- c. The running Boric Acid Transfer Pump will trip
- d. VCT level will drop until charging suction swaps to the RWST.

Question: 68

Given the following conditions for Unit 2:

- Power is 90%
- A plant transient has occurred that results in Control Bank D rods inserting beyond their insertion limits
- The RO is in the process of initiating a rapid boration,
- One Boric Acid Transfer Pump (BATP) is running in FAST speed
- 2CV175, Rapid Borate Stop Valve is open
- Charging flow is 75 gpm on 2FI-128B

Which one of the following actions will significantly raise the RCS boration rate?

- a. Starting the second BATP in FAST speed.
- b. Closing 21/22CV160 Boric Acid Tank Recirc valves.
- c. Throttle further open 2CV71, Seal Pressure Control valve.
- d. Close 2VCV175 and align the Charging Pumps suction to the RWST

Question: 69

Given the following conditions:

- Plant in Mode 5
- Highest CET temperature is 190°F
- RCS pressure is 325 psig
- 21 RHR loop is in service, 22 RHR loop is out of service for repairs
- RCS is intact with 20% Pzr level indicated
- 21 RHR Pump experiences a seal failure and is isolated from the RCS

According to S2.OP-AB.RHR-0001(Q), LOSS OF RHR, which one of the following is the preferred method of core cooling if a RHR cannot be restored and RCS temperatures are rising?

- a. Natural or forced RCS flow while steaming intact S/Gs with a level of equal to or greater than 70% NR.
- b. Fill from RWST via one SI Pump and the Hot Leg Injection Isolation valves, and spill through the Pzr PORVs.
- c. Fill via RWST gravity flow through RHR and reflux cooling to any S/G with level equal to or greater than 70% NR.
- d. Fill from RWST via one charging pump and the BIT Isolation valves, and spill via both PORVs and Reactor Head Vent Solenoid Valves.

Question: 70

Given the following conditions for Unit 2:

- A LOCA has occurred
- Actions of 2-EOP-LOCA-3 "TRANSFER TO COLD LEG RECIRCULATION" have been completed
- Two CCW Pumps are running

Which one of the following correctly identifies a consequence resulting from a tube leak in the Seal Water Heat Exchanger?

- a. Both CCW Pumps will eventually trip on loss of NPSH.
- b. A high level alarm will actuate for the CCW Surge tank.
- c. The CCW Pump supplying the safety related header will eventually trip due to loss of NPSH.
- d. The CCW Pump supplying the non-safety related header will eventually trip due to loss of NPSH.

Question: 71

Given the following conditions on Unit 2:

- RCS Tave - 150°F
- RCS pressure - 280 psig

Which one of the following describes the response of the PORVs if PT-405 wide range loop pressure transmitter fails high?

- a. Only the PORV fed by that channel opens
- b. Both PORVs open because the coincidence is 1/2 with POPS armed.
- c. Neither PORV opens because the enabling signal from the other channel is NOT met
- d. Neither PORV opens because both open when 2/2 WR pressure channels are >setpoint

Question: 72

Given the following conditions on Unit 2:

- Turbine load is 19% and Rod Control is in AUTO
- Charging flow controller has failed high

Which one of the following identifies the approximate value for actual pressurizer level when OHA E-20, PZR HTR ON LVL HI, actuates?

- a. 28%
- b. 33%
- c. 55%
- d. 70%

Question: 73

Which one of the following is a correct statement regarding operation of the charging pump(s) during the implementation of FRSM-1, Response to Nuclear Power Generation.

- a. A manual safety injection is initiated to start both centrifugal charging pumps and thereby ensure the maximum possible boron injection rate
- b. If RCS pressure exceeds 2335 psig then a second centrifugal charging pump is started to ensure the maximum possible boron injection rate
- c. Both charging pumps are placed in-service to provide the maximum possible charging flow and boron injection rate
- d. Only one charging pump is run. Running only one pump prevents excessive charging from contributing to a RCS pressure rise that actually lowers the boration rate

Question: 74

Which one of the following correctly describes the reason why it is worse for a full-power ATWS event to occur at the Beginning-of-Life (BOL) as compared to the End-of-Life (EOL)?

- a. The additional burnable poisons provide less heat conduction; therefore, the fuel pin outer clad temperatures are higher.
- b. The effective delayed neutron fraction is higher; therefore, the rate of power reduction is slower.
- c. The Moderator Temperature Coefficient (MTC) is less negative; therefore, the reactor power reduction due to heat addition is less.
- d. The higher boron concentration in the RCS causes the emergency boration to be less effective; therefore, it takes longer to achieve adequate Shutdown Margin (SDM).

Question: 75

Core re-load is in progress on Unit 2. The Audio Count Rate is selected to Source Range NIS (SRNIS) Channel N-31.

Which one of the following is the correct course of action if the count rate on SRNIS Channel N-31 rises dramatically?

- a. If the rising count rate is NOT confirmed on SRNIS Channel N-32 and IRNIS Channels N-35 and N-36, immediately switch the Audio Count Rate to SRNIS Channel N-32
- b. Restore SRNIS Channel N-31 to operable or switch the Audio Count Rate to an operable channel within the next 15 minutes or suspend fuel movement
- c. Immediately suspend any positive reactivity changes, direct the Refueling SRO to place any assembly being moved into a safe position and then suspend fuel movement
- d. Immediately select the Audio Count Rate Channel to SRNIS Channel N-32. Fuel movement can continue only if cavity boron concentration is ≥ 2050 ppm

Question: 76

Which one of the following describes the effect of having compensating voltage set too high on N35 during a unit startup?

- a. N35 indicates lower than N36; P-6 is not affected since the coincidence is 1/2.
- b. N35 indicates higher than N36; the Source Range High Flux Trip will occur prior to reaching P-6.
- c. N35 indicates lower than N36 but the SUR will be the same.
- d. N35 indicates higher than N36 and P-6 will energize prior to achieving proper Source Range/Intermediate Range overlap on the correctly reading channel

Question: 77

Which one of the choices correctly completes the following statement?

In accordance with the Updated Final Safety Analysis Report (UFSAR), the worst case fuel handling accident occurs when a spent fuel assembly _____.

- a. is dropped into the refueling cavity
- b. is dropped into the spent fuel pit
- c. is located in the RCC Change Fixture and a large leak occurs in the refueling cavity seal
- d. is upright in the Transfer Pool and a large leak occurs in the refueling cavity seal

Question: 78

Which one of the following conditions differentiates between a S/G tube leak, which is addressed in S2.OP-AB.SG-0001(Q) "STEAM GENERATOR TUBE LEAK", and a steam generator tube rupture (SGTR), which is addressed in the Emergency Procedures (EOPs)?

- a. Affected S/G level is controlled at the programmed level, in automatic
- b. RCS pressure is stable or rising with all PZR heaters energized and no load change in progress
- c. PZR level can be maintained stable or rising
- d. Affected S/G Blowdown Radiation Monitor (R-19) remains below the alarm setpoint

Question: 79

Given the following conditions for Unit 2:

- A S/G tube rupture has been identified on 23 S/G
- SI has been actuated
- The crew has completed the initial cooldown actions of 2-EOP-SGTR-1

Which one of the following conditions would occur if the RCS temperature established is higher than the target temperature stipulated by the EOP?

- a. Pzr level will go solid (100%) during the subsequent RCS depressurization
- b. Pressure of the ruptured S/G rises with resultant lifting of a S/G Safety Valve
- c. Pressure of the non-ruptured S/Gs rises with resultant opening of the MS10's
- d. RCS subcooling may be lost before RCS and ruptured S/G pressures are equalized

Question: 80

Abnormal procedure S2.OP-AB.COND-0001, Loss of Condenser Vacuum, requires load reductions in accordance with Attachment 4, Condenser Back Pressure Limits, to stabilize condenser vacuum at or greater than the OPERATING LIMIT. However, it is possible to stabilize vacuum at that value but still be required to initiate a turbine trip based on the 5 MINUTE OPERATING LIMIT.

Which one of the following correctly describes the basis for the 5 MINUTE OPERATING LIMIT?

- a. During low load-low vacuum conditions, extraction steam temperatures rise causing excessive thermal stresses in and possible failure of the feedwater heaters.
- b. During low load-low vacuum conditions, the turbine-condenser "boot" overheats rapidly and may fail.
- c. Low steam flow-low vacuum conditions can cause non-synchronous blade vibration (flutter) in the final stage of turbine blades and irreversible damage will occur.
- d. At low loads, one or more turbine governor valves may be closed. If the closed governor valves are in alternate quadrants then "double-shocking" of the first stage turbine blades occurs and the turbine may fail.

Question: 81

Unit 2 is at 100% power. A break has occurred in the main feedwater line just upstream of 23BF22, Feedwater Stop Valve.

Assuming no operator action, which one of the choices correctly completes the following statement?

The reactor will trip on low SG level and 23 SG will

- a. completely blowdown. 23AF21 will remain closed on pressure override.
- b. be maintained at steam header pressure. AFW flow will maintain a level.
- c. be maintained at steam header pressure. AFW flow will be out the break.
- d. depressurize, causing an AUTO SI when steam pressure drops to 100 psi less than the other SG's.

Question: 82

Given the following conditions for Unit 2:

- A loss of all AC power has occurred
- The SECs have been deenergized in accordance with 2-EOP-LOPA-1, "LOSS OF ALL AC POWER"
- RCP Seal Cooling isolation has been completed
- Buses 2B and 2C vital buses were just re-energized

Which one of the following sets of parameters/conditions is used to select the appropriate recovery procedure?

- a. SI actuation status
- b. RCS subcooling and Pzr level
- c. The vital buses power sources
- d. Pzr pressure and S/G pressures

Question: 83

Which one of the following describes SEC operation if a Safety Injection actuation (Mode I) occurs while Blackout (Mode II) loading is in progress?

- a. Mode II loading is completed. Operators must reset the SEC and start any Mode III loads not started in Mode II
- b. Mode II loading stops, all loads are shed, and Mode III loading begins
- c. Mode II loading stops, the SEC resets to Mode III and any ESF loads not already running are sequentially started.
- d. Mode II loading is completed. The SEC will then shed any non-Mode III loads and start any Mode III loads not already running

Question: 84

Procedure S2.OP-AB.115-0002, "LOSS OF 2B 115V VITAL INSTRUMENT BUS", directs the installation of a jumper to energize pressurizer level comparator 2LC460D-C from an alternate source.

Which one of the following describes the operation of the Pzr Backup Heaters during the interim?

Until the jumper is installed, the heaters...

- a. cannot be energized
- b. can be operated using the LOCAL control
- c. can be operated using the normal console pushbuttons
- d. can only be operated by transferring to the emergency power supplies

Question: 85

Which one of the following describes how a loss of 125 VDC affects the Reactor Trip Breakers (RTBs)?

- a. The breaker is not capable of opening on a signal to the shunt trip coil
- b. The loss of voltage causes a shunt trip actuation and the breaker opens
- c. The breaker is not capable of opening on a signal to the UV trip coil
- d. The loss of voltage de-energizes the UV coil and the breaker opens

Question: 86

Unit 2 is in Mode 5 and Unit 1 is at 100% power. A radioactive liquid release is in progress from 21 CVCS Monitor Tank, via 22 CCHX to Unit 1 Circulating Water. 12A Circulating Water Pump is OOS, all others are operating.

Which one of the following correctly describes the required action if 11B Circulator trips?

- a. The release can continue, the minimum dilution flow is still available
- b. The release shall be terminated, immediately
- c. The release may continue but only if RMS Channel R-18 is in service
- d. The Unit 2 CRS shall direct the responsible NEO to reduce the release flow rate by 50%

Question: 87

Given the following conditions for Unit 2:

- Power is at 100%
- OHAs for 21 SW HDR PRESS LO (B-13) and 22 SW HDR PRESS LO (B-14) actuated
- Pressure on both Service Water (SW) header pressure indicators is lowering
- Actions of S2.OP-AB.SW-0001(Q), "Loss of Service Water Header Pressure" are being performed
- After closing 21&22SW17, SW Bay tie valves, and 21&22SW23 Nuclear Header tie valves, both SW header pressure meters still indicate a slow pressure reduction

Which one of the following components would the NEOs be directed to check for leaks and proper operation?

- a. 21 CFCU Piping.
- b. 2SW308, SW Bay 2 Pressure Control Valve.
- c. Leakage into the 22SW valve and piping compartment.
- d. Emergency Diesel Generator SW supply header piping.

Question: 88

During a complete loss of control air, S2.OP-AB.CA-0001(Q) "LOSS OF CONTROL AIR" the operator is directed to stop any liquid or gaseous radioactive releases in progress by closing 2WL51, Liquid Release Stop, and 2WG41, Gas Decay Tanks Vent Isolation.

Which one of the following correctly describes the reason for closing these valves?

- a. Ensure a positive closing signal while some air pressure is available
- b. Without air pressure, neither valve is capable of closing on interlock from their respective RMS channel
- c. This action terminates the open signal. Otherwise, these valves will re-open when air pressure is restored
- d. Ensures a release is not continued while degrading air pressure may be causing a change in the dilution medium flow rate

Question: 89

Given the following conditions for Unit 2:

- Power is at 100%
- OHA, FIRE PROT FIRE (A-7) alarms
- 2RP5 is checked and indicates the following:
 - Zone 59, Air and Water Deluge, Containment EI. 100 Panel 335 is flashing
 - Zone 74, Smoke and Fire Detector, Containment EI. 100 Panel 335 is lit

Which one of the following describes the status of the fire protection system?

- a. Fire protection water is being delivered via deluge valves
- b. A single manual valve in the Mechanical Penetration Area must be opened to initiate fire protection water flow via the open deluge valves
- c. The containment isolation valve must be opened from the control room to initiate fire protection water flow via the open deluge valves
- d. The Panel 335-related deluge valves located in the Mechanical Penetration Area must be manually opened to initiate fire protection water flow

Question: 90

Given the following conditions for Unit 2:

- A control room evacuation has occurred due to habitability concerns
- All immediate actions have been completed for S2.OP-AB.CR-0001(Q)
"CONTROL ROOM EVACUATION"
- CCW system was aligned with 21 and 23 Pumps running and 22 Pump in AUTO
- After leaving the control room but prior manning the Hot Shutdown Panel (HSD), CCW header pressure dropped to 65 psig and then recovered.
- No actions were taken to alter CCW Pump status when control was established at the Hot Shutdown Panel

Which one of the following describes the CCW Pump indication status the operator would observe when re-establishing control in the control room?

- a. The START backlight for only 21 and 23 Pumps will be lit.
- b. The START backlight for 21 and 23 Pumps will be lit. The START backlight for 22 Pump will be flashing and the audible group alarm will be sounding.
- c. No CCW Pump indications will be observable until the respective HSD Panel switches are returned to REMOTE, then the START backlight for only 21 and 23 Pumps will be lit.
- d. No CCW Pump indications will be observable until the respective HSD Panel switches are returned to REMOTE, then the START backlight for 21 and 23 Pumps will light, the START backlight for 22 Pump will flash and the audible group alarm will sound.

Question: 91

Given the following conditions for Unit 2:

- A LOCA has occurred
- A Core Cooling RED Path exists and 2-EOP-FRCC-1, "RESPONSE TO INADEQUATE CORE COOLING" is being implemented.
- Steam Generator depressurization was ineffective in restoring core cooling.
- All RCPs are stopped
- TEN CETs indicate temperatures above 1200°F

In order to provide core cooling, which one of the following conditions must be established prior to starting an RCP?

- a. RVLIS Full Range level is greater than 39%.
- b. Seal injection flow for the selected RCP is greater than 6 gpm.
- c. Level in the S/G in the loop for the selected RCP is greater than 15% NR.
- d. The RCP Oil Lift Pump on selected pump is running for greater than 2 minutes.

Question: 92

Given the following conditions for Unit 2:

- R31, Letdown Line-Failed Fuel Process Rad Monitor, indication is rising
- S2.OP-AB.RC-0002(Q), "HIGH ACTIVITY IN REACTOR COOLANT" was entered
- High RCS activity is confirmed
- As directed by the CONTINUOUS ACTION SUMMARY, the CRS directs the Unit to be shutdown and RCS temperature reduced to 500°F.

Which one of the below identifies the bases for reducing Tave below this value?

- a. Ensures S/G pressures remain below the lift setpoint for the MS10s in the event of a SGTR
- b. Lowers the expected peak containment pressure in the event of a LOCA
- c. This lowers CVCS letdown temperature to increase the effectiveness of the demineralizers in removing activated corrosion products
- d. Reduces migration of radioactive nuclides through existing cracks or breaks in the clad by lowering clad tensile stresses

Question: 93

The following conditions exist on Unit 2:

- An electronic failure and technician error caused an inadvertent SI
- The crew has transitioned to TRIP-3, SI Termination
- SI and Phase A are reset
- 2B and 2C SEC are reset
- 2A SEC failed to reset

Which one of the following correctly describes the expected response of the 4KV vital buses if a loss of off-site power occurs before 2A SEC can be de-energized?

- a. Blackout loading occurs on all buses
- b. Accident+Blackout loading occurs on all buses
- c. Blackout loading occurs on 2B and 2C buses. Accident+Blackout loading occurs on 2A Bus
- d. Blackout loading occurs on 2B and 2C buses. 2A bus is de-energized.

Question: 94

Given the following conditions for Unit 2:

- A LOCA has occurred
- The crew is performing actions of 2-EOP-LOCA-2 "POST LOCA COOLDOWN AND DEPRESSURIZATION"
- After stopping ONE Charging pump the following parameters exist:
 - RCS pressure is 1025 psig stable
 - Pzr level is 28%
 - RCS temperature (CETs) are reading 480°F
 - Containment pressure is 4.4 psig

Which one of the following describes the action to be taken for these conditions?

- a. SI should be manually re-initiated.
- b. Re-start the Charging pump based on subcooling less than 38°F.
- c. Stopping of ONE SI Pump should be evaluated using NORMAL values for subcooling and Pzr level.
- d. Stopping of ONE SI Pump should be evaluated using ADVERSE values for subcooling and Pzr level.

Question: 95

Given the following conditions for Unit 2:

- Unit is in MODE 4 cooling down on RHR
- RCS Temperature - 340°F
- RCS pressure - 300 psig lowering
- PZR level - 22% lowering
- CNMT pressure - 0.2 psig
- 2R16, Plant Vent Effluent Monitor is in ALERT
- R41B, Plant Vent Iodine Monitor radiation levels are trending higher
- S/G levels stable at - 42% (21); 40% (22); 43% (23); 40% (24)
- S/G pressures stable at - 100 psig (21), 95 psig (22), 100 psig (23), 98 psig (24)

Which one of the following events is taking place?

- a. POPS actuated and one PORV is stuck open.
- b. A LOCA has occurred in the area of the Regenerative Heat Exchanger
- c. A LOCA has occurred on the suction of the RHR pump.
- d. Letdown line pressure control valve 2CV18 has failed open.

Question: 96

Which one of the following is the reason that 2-EOP-FRHS-1 "RESPONSE TO LOSS OF SECONDARY HEAT SINK" directs transition to the procedure and step in effect if RCS pressure is less than all intact or ruptured S/G pressures?

- a. Feeding S/Gs under these conditions may halt natural circulation core cooling
- b. Core decay heat is being removed by means other than the secondary heat sink
- c. Under these conditions, initiating feed flow can cause a substantial reverse delta-P that may result in a S/G tube rupture
- d. RCS subcooling must be restored prior to the initiation of feed and bleed

Question: 97

Given the following conditions for Unit 2:

- A break has occurred on 22 main steam line and 22MS167 cannot be closed
- The other S/Gs were initially overfed with current levels approximately 30% NR
- A reactor trip and SI have occurred
- Pressurizer pressure is 1300 psig and slowly lowering
- Pressurizer level is off-scale low
- 2-EOP-TRIP-1 Step 21, RCS Temperature Control, is being performed
- The RO reports the lowest loop Tcold is 260°F and slowly lowering

Which one of the following identifies the correct process of EOP implementation?

- a. Immediately transition to FRTS-1 "Response To Imminent Pressurized Thermal Shock Conditions".
- b. Immediately transition to FRTS-2 "Response To Anticipated Pressurized Thermal Shock Conditions".
- c. Complete actions of TRIP-1 through Faulted S/G Evaluation, transition to LOSC-1 "Loss of Secondary Coolant" and then immediately transition to FRTS-1 "Response To Imminent Pressurized Thermal Shock Conditions".
- d. Complete actions of TRIP-1 through Faulted S/G Evaluation, transition to LOSC-1 "Loss of Secondary Coolant" and then immediately transition to FRTS-2 "Response To Anticipated Pressurized Thermal Shock Conditions".

Question: 98

Which one of the following correctly describes a major philosophical difference between EOP-TRIP-5 (TRIP-5), Natural Circulation Rapid Cooldown Without RVLIS, and EOP-TRIP-6 (TRIP-6), Natural Circulation Rapid Cooldown With RVLIS?

- a. In TRIP-5 steps are taken to prevent bubble formation in the reactor vessel head. In TRIP-6 steps are taken if a bubble forms in the reactor vessel head.
- b. In TRIP-5 the cooldown rate is limited to 50°F/hr. In TRIP-6 the cooldown rate is 100°F/hr.
- c. In TRIP-5 the cooldown and depressurization is performed in discrete steps. In TRIP-6 the cooldown is continuous and steps are taken if RVLIS indicates excessive reactor vessel head bubble formation.
- d. TRIP-6 permits use of a PZR PORV for depressurization while TRIP-5 does NOT. Reactor vessel head bubble formation cannot be accurately inferred from indicated pressurizer level while a PORV is open.

Question: 99

Given the following conditions for Unit 2:

- A LOCA has occurred
- While performing actions of 2-EOP-LOCA 1 "LOSS OF REACTOR COOLANT", 22 RHR pump motor seizes and power is lost to the 21 RHR pump
- The crew enters 2-EOP-LOCA-5, "LOSS OF EMERGENCY RECIRCULATION"
- A cooldown as been initiated as directed in 2-EOP-LOCA-5
- During the cooldown, the crew restores power to 21 RHR pump.

Based on current plant conditions, which one of the following represents the correct mitigation strategy?

- a. Return to 2-EOP-LOCA-1 and continue recovery actions with the step previously in effect
- b. Start the RHR pump to provide makeup flow to the RCS and continue recovery via 2-EOP-LOCA-5
- c. Continue with the cooldown and start the RHR pump when directed in 2-EOP-LOCA-5
- d. Immediately start the RHR pump and transition to 2-EOP-LOCA-3, Transfer to Cold Leg Recirculation

Question: 100

Given the following conditions for Unit 2:

- A steamline break occurred on the 22 S/G 25 minutes ago
- All MSIVs failed to close
- RCS pressure is 1050 psig
- RCS temperature (SPDS) average 370°F
- RCS Tcolds: 310°F (21), 280°F (22), 320°F (23), 320°F (24)
- CNMT pressure has stabilized at 8 psig
- S/G WR levels - 50% (21); 8% (22); 48% (23); 55% (24)

The operating crew is performing the Safeguards Reset Actions in accordance with 2-EOP-LOSC-2, "MULTIPLE STEAM GENERATOR DEPRESSURIZATION" when the STA reports a PURPLE Path for Thermal Shock Status Tree.

Which one of the following correctly describes the AFW flow strategy for both procedures?

- a. Maintain flow at 1.0E04 lb/hr to each S/G, to limit cooldown and prevent S/G tube dryout.
- b. Maintain total flow >22E04 lb/hr but only feed 21, 23, 24 S/G's, to maintain an adequate heat sink but limit cooldown
- c. Maintain flow to 21, 23, 24 SG at 1.0E04 lb/hr each, to limit cooldown and prevent SG tube dryout
- d. Maintain total flow at 22E04 lb/hr, feeding all S/Gs to maintain an adequate heat sink but limit cooldown

Circle your answer, if you change your answer write it in the blank.

- 1. a b c d —
- 2. a b c d —
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- 45. a b c d —
- 46. a b c d —
- 47. a b c d —
- 48. a b c d —
- 49. a b c d —
- 50. a b c d —

Answers to questions No 30, 71 + 92 recorded as a. to more evenly balance answers. Changes made by licensee.

Answer to question 19 changed to b, the technically correct answer.

L. E. B. 2/8/83

KEY

Circle your answer, if you change your answer write it in the blank.

- | | |
|--|--|
| 51. a b c <u>d</u> ___ | 76. <u>a</u> b c d ___ |
| 52. a b c <u>d</u> ___ | 77. a <u>b</u> c d ___ |
| 53. <u>a</u> b c d ___ | 78. a b <u>c</u> d ___ |
| 54. a <u>b</u> c d ___ | 79. a b c <u>d</u> ___ |
| 55. a <u>b</u> c d ___ | 80. a b <u>c</u> d ___ |
| 56. a <u>b</u> c d ___ | 81. a <u>b</u> c d ___ |
| 57. a b c <u>d</u> ___ | 82. a <u>b</u> c d ___ |
| 58. a b c <u>d</u> ___ | 83. a <u>b</u> c d ___ |
| 59. a b <u>c</u> d ___ | 84. a <u>b</u> c d ___ |
| 60. a <u>b</u> c d ___ | 85. <u>a</u> b c d ___ |
| 61. a b <u>c</u> d ___ | 86. <u>a</u> b c d ___ |
| 62. <u>a</u> b c d ___ | 87. a b c <u>d</u> ___ |
| 63. <u>a</u> b c d ___ | 88. a b c <u>d</u> ___ |
| 64. a b <u>c</u> d ___ | 89. a b <u>c</u> d ___ |
| 65. a b <u>c</u> d ___ | 90. a <u>b</u> c d ___ |
| 66. a <u>b</u> c d ___ | 91. a b <u>c</u> d ___ |
| 67. a b c <u>d</u> ___ | 92. <u>a</u> b c d <u>a</u> <i>uh</i> |
| 68. a <u>b</u> c d ___ | 93. a b <u>c</u> d ___ |
| 69. a b c <u>d</u> ___ | 94. a b c <u>d</u> ___ |
| 70. a b c <u>d</u> ___ | 95. a b <u>c</u> d ___ |
| 71. <u>a</u> b c d <u>a</u> <i>uh</i> | 96. a <u>b</u> c d ___ |
| 72. a <u>b</u> c d ___ | 97. a b <u>c</u> d ___ |
| 73. a b <u>c</u> d ___ | 98. a b <u>c</u> d ___ |
| 74. a b <u>c</u> d ___ | 99. <u>a</u> b c d ___ |
| 75. a b <u>c</u> d ___ | 100. <u>a</u> b c d ___ |

KEY

ATTACHMENT 3

RO WRITTEN EXAM W/ANSWER KEY

**U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination**

Applicant Information

Name:	Region: <u>I</u> / II / III / IV
Date:	Facility/Unit: <u>Salem 1 & 2</u>
License Level: <u>RO</u> / SRO	Reactor Type: <u>W</u> / CE / BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

Examination Value	<u>100</u> Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

APPENDIX E
POLICIES AND GUIDELINES FOR TAKING NRC EXAMINATIONS

Each examinee shall be briefed on the policies and guidelines applicable to the examination category (written and/or operating test) being administered. The applicants may be briefed individually or as a group. Facility licensees are encouraged to distribute a copy of this appendix to every examinee before the examinations begin. All items apply to both initial and requalification examinations, except as noted.

PART A - GENERAL GUIDELINES

1. ***[Read Verbatim]*** Cheating on any part of the examination will result in a denial of your application and/or action against your license.
2. If you have any questions concerning the administration of any part of the examination, do not hesitate asking them before starting that part of the test.
4. SRO applicants will be tested at the level of responsibility of the senior licensed shift position (i.e., shift supervisor, senior shift supervisor, or whatever the title of the position may be).
5. You must pass every part of the examination to receive a license or to continue performing license duties. Applicants for an SRO-upgrade license may require remedial training in order to continue their RO duties if the examination reveals deficiencies in the required knowledge and abilities.
6. The NRC examiner is not allowed to reveal the results of any part of the examination until they have been reviewed and approved by NRC management. Grades provided by the facility licensee are preliminary until approved by the NRC. You will be informed of the official examination results about 30 days after all the examinations are complete.

PART B - WRITTEN EXAMINATION GUIDELINES

1. ***[Read Verbatim]*** After you complete the examination, sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination.
2. To pass the examination, you must achieve a grade of 80.00 percent or greater; grades will not be rounded up to achieve a passing score. Every question is worth one point.
3. For an initial examination, the time limit for completing the examination is five hours.

For a requalification examination, the time limit for completing both sections of the examination is three hours. If both sections are administered in the simulator during a single three-hour period, you may return to a section of the examination that was already completed or retain both sections of the examination until the allotted time has expired.

4. You may bring pens, pencils, and calculators into the examination room. Use black ink to ensure legible copies; dark pencil should be used only if necessary to facilitate machine grading.
5. Print your name in the blank provided on the examination cover sheet and the answer sheet. You may be asked to provide the examiner with some form of positive identification.
6. Mark your answers on the answer sheet provided and do not leave any question blank. Use only the paper provided and do not write on the back side of the pages. If you are using ink and decide to change your original answer, draw a single line through the error, enter the desired answer, and initial the change.
7. If you have any questions concerning the intent or the initial conditions of a question, do *not* hesitate asking them before answering the question. Ask questions of the NRC examiner or the designated facility instructor *only*. When answering a question, do *not* make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question. For example, you should not assume that any alarm has activated unless the question so states or the alarm is expected to activate as a result of the conditions that are stated in the question.
8. Restroom trips are permitted, but only one applicant at a time will be allowed to leave. Avoid all contact with anyone outside the examination room to eliminate even the appearance or possibility of cheating.
9. When you complete the examination, assemble a package including the examination questions, examination aids, answer sheets, and scrap paper and give it to the NRC examiner or proctor. Remember to sign the statement on the examination cover sheet indicating that the work is your own and that you have neither given nor received assistance in completing the examination. The scrap paper will be disposed of immediately after the examination.
10. After you have turned in your examination, leave the examination area as defined by the proctor or NRC examiner. If you are found in this area while the examination is still in progress, your license may be denied or revoked.
11. Do you have any questions?

~~PART C - GENERIC OPERATING TEST GUIDELINES (CATEGORIES A, B, AND C)~~

- ~~1. If you are asked a question or directed to perform a task that is unclear, you should not hesitate to ask for clarification.~~
- ~~2. The examiner will take notes throughout the test to document your performance and sometimes the examiner may take a short break for this reason. The amount of note-~~

Question: 1

A licensed reactor operator (RO) is currently assigned to administrative duties reviewing proposed abnormal procedure revisions. On Wednesday, the operator was required to cover the position of Unit 1 RO for the 0700-1900 due to illness of the assigned person. At 1900 on the following Sunday evening, the operator again assumed the position of Unit 1 RO at turnover.

Which one of the choices correctly completes the following sentence regarding review of the Unit 1 Control Room Narrative Log, following shift turnover on Sunday?

According to SH.OP-AP.ZZ-0107, SHIFT TURNOVER RESPONSIBILITIES, the operator must review the Unit 1 Control Room Narrative Log(s) back to at least

- a. 1900, Wednesday
- b. 1900, Thursday
- c. 1900, Friday
- d. 1900, Saturday

Question: 2

Motor-operated valve (MOV) 2CV175, Rapid Borate Stop Valve, is being closed as part of a tagging operation.

In accordance with NC.NA-AP.ZZ-0005, STATION OPERATING PRACTICES, which one of the following describes the correct method for performing independent position verification for this valve?

- a. Check local valve stem position
- b. After power is removed, attempt to manually close the valve
- c. Check the bezel position lights after removing electrical power from the motor operator
- d. Prior to removing power, have the verifier attempt to close the valve from the control room

Question: 3

Which one of the following describes the requirements for maintaining the maximum allowable steady-state full power level in accordance with IOP-4 "Power Operations"?

- a. Average power may exceed 100% for a 12-hour shift, but at NO time shall it exceed 102%.
- b. Average power for a 12-hour shift shall be $<101\%$. If it exceeds 102%, then power shall be reduced to $\leq 100\%$ within the next hour.
- c. Power may exceed 100% for a short duration due to intentional or unintentional operator action but at NO time shall it exceed 102%. The average power for a 12-hour shift is to be $\leq 100\%$.
- d. Power may exceed 100% for a short duration due to load fluctuation but at NO time shall it exceed 102%. The average power for a 12-hour shift is to be $\leq 100\%$.

Question: 4

The control room readings are being logged by the NCO. The NCO has made a red circle around the reading for 1PI-936A, 11 Accumulator Pressure.

Which one of the following is indicated by the circled value?

- a. The indicator is fluctuating within the log limits but may be failing
- b. The reading must be independently verified by the Shift Technical Advisor (STA)
- c. The data falls outside the limits specified in the LCO statement
- d. Accumulator pressure has changed by $>\pm 5\%$ since the previous reading but is still within specifications

Question: 5

Unit 1 is currently in hot shutdown (HSD), heating up to hot standby (HSB) when the RO attempts to open 11SJ54, SI Accumulator Stop Valve, in accordance with S1.OP-IO.ZZ-0002, CSD to HSB. The valve fails to stroke open and the NEO sent to investigate reports that the breaker is tripped.

Which one of the following describes the correct action for the crew?

- a. Unseat the valve manually then reset and re-close the breaker. Under these conditions, two more attempts to stroke the valve are permitted.
- b. Unseat the valve manually then reset and re-close the breaker. Under these conditions, one additional attempt to stroke the valve is permitted.
- c. Refer to technical specifications and initiate a Notification to have maintenance investigate the problem.
- d. Dispatch a NEO to open the valve manually. Then reset the breaker but red tag it open and inform the Shift Electrician of the valve operation problem.

Question: 6

Unit 2 has been shutdown for refueling in accordance with the following schedule:

- 1/3/00, 0600 hours - Unit entered MODE 3
- 1/5/00, 2000 hours - Unit entered MODE 4
- 1/7/00, 1000 hours - Unit entered MODE 5
- 1/9/00, 1600 hours - Unit entered MODE 6

Which one of the following is the earliest date and time that spent fuel movement in the reactor vessel is permissible?

- a. 1/7/00, 1001 hours
- b. 1/10/00, 0601 hours
- c. 1/11/00, 1401 hours
- d. 1/14/00, 1001 hours

Question: 7

In accordance with SH.OP-DD.ZZ-0004, OPERATIONS STANDARDS, which one of the following actions has a measurable affect on core reactivity during power operations?

- a. Starting a second charging pump
- b. Initiating flow to the S/Gs from a motor-driven AFW pump
- c. Tripping one of two running S/G Feed Pumps at 50% power
- d. Placing Reactor Makeup controls in AUTO following a boration

Question: 8

Given the following information for an operator:

- Age is 47years
- Total lifetime exposure is 9200 mRem TEDE
- Current year exposure is 900 mRem TEDE

A Site Area Emergency has been declared due to a LOCA outside containment, with limited makeup to the RWST available. The operator volunteers to make an emergency entry into the penetration area to attempt to isolate the leak. This action would result in a significant reduction in offsite dose. The action has been properly approved.

Which one of the following is the maximum allowed exposure (TEDE) the operator may receive while performing this action?

- a. 2100 mRem TEDE.
- b. 3600 mRem TEDE.
- c. 24,100 mRem TEDE.
- d. 25,000 mRem TEDE.

Question: 9

Unit 2 is in cold leg recirculation due to a LOCA and the Operations Superintendent has declared a Site Area Emergency. Four manual valves need to be operated in the Auxiliary Building in order to enhance CCW cooling capability. While important to the overall mitigation strategy, operation of the four valves is not a plant equipment or life-saving operation. Radiation levels in the work area are much higher than normal and airborne radiation levels have escalated due to pump seal leakage. The general area radiation level is 2 R/hr and isotopic analysis is such that, without a respirator, personnel would eventually receive 100 mR (TEDE) for each ten minutes spent in the area. The OSC Coordinator estimates that two operators will each spend 20 minutes performing their part of the job without a respirator and 30 minutes with a respirator.

Which one of the following describes the correct application of ALARA principles?

- a. The operators should perform the job wearing a respirator
- b. The operators should perform the job without a respirator
- c. Do NOT dispatch the operators since operation of these valves is not a plant equipment or life saving action
- d. Process a dose limit extension in case the operators exceed their first level administrative dose limit

Question: 10

A procedure requires independent verification (IV) on a group of valves located inside a radiation area. The dose rate is 50 mR/hr and it is projected that the two operators will each have to spend 20 minutes in the area in order to perform the task.

In accordance with NC.NA-AP.ZZ-0005, STATION OPERATING PRACTICES, which one of the following describes the correct process for performing this IV?

- a. Two operators who have sufficient margin to perform the task and yet still remain below administrative dose limits shall be assigned to do a "hands on" IV
- b. The IV is not required if the Unit CRS and the WCC SRO verify that none of the valves have been re-positioned since the last IV
- c. Based on the ALARA concept, the Operations Superintendent has the authority to waive any IV requirement when entry into a defined radiation area is necessary to perform the task
- d. The "hands on IV" can be waived by the Unit CRS. However, an alternative means of IV via observation of process parameters/indications is required

Question: 11

A LOCA has occurred on Unit 2. The crew initiated a manual reactor trip/safety injection and has entered EOP-TRIP-1. RCS pressure is steadily trending down and has dropped below 1500 psig. While enroute to the control room, the shift technical advisor (STA) broke her leg and is unable to report for duty.

Which one of the following correctly identifies both the position responsible for monitoring the continuous action summaries (CAS) and when 2CV139 and 2CV140 can be closed?

- a. Reactor Operator (RO) and Plant Operator (PO) monitor and report parameter values as the CAS's are read by the CRS, when each EOP page is turned. The valves can be closed any time after the functional restoration procedure implementation step (20) in EOP-TRIP-1.
- b. RO and PO monitor parameters associated with the CAS's. The valves can be closed any time after the immediate actions of EOP-TRIP-1 have been verified.
- c. RO monitors parameters associated with the CAS's. The valves can be closed any time after the functional restoration procedure implementation Step (20) in EOP-TRIP-1.
- d. RO and PO monitor and report values when the CAS's are read by the CRS, at page 2 of EOP-TRIP-1 and at each procedure transition. The valves can be closed any time after the immediate actions of EOP-TRIP-1 have been verified.

Question: 12

The operating crew entered S2.OP-AB.CA-0001 (AB.CA-1), Loss of Control Air, when control air (CA) pressure began to lower. Short-term corrective actions have been unsuccessful and CA pressure has now reached the point where a reactor trip is required.

Which one of the following correctly describes the continued use of AB.CA-1 after the RO has initiated a reactor trip?

- a. This AB shall be implemented in parallel with the EOP's
- b. The AB is terminated as soon as EOP-TRIP-1 is entered
- c. The AB is terminated as soon as EOP-TRIP-1 is entered. Entry conditions are re-evaluated after the EOP network is exited
- d. The CRS can suspend the EOP's and re-enter this AB if the low air pressure prevents the performance of major EOP steps

Question: 13

Given the following conditions on Unit 2:

- A LOCA has occurred
- Safety Injection is actuated
- Actions of 2-EOP-TRIP-1, "REACTOR TRIP OR SAFETY INJECTION" were initiated
- When the main turbine tripped, all AC power was lost for the Site
- The crew has initiated actions of 2-EOP-LOPA-1, "LOSS OF ALL AC POWER"
- The crew notes the following for the Critical Safety Function Status Trees:
 - (a) PURPLE path condition exists for the Core Cooling Status Tree
 - (b) RED path condition exists for the Containment Environment Status Tree

Which one of the following is the correct action for these conditions?

- a. Continue the actions of 2-EOP-LOPA-1 "LOSS OF ALL AC POWER"
- b. Transition to 2-EOP-LOPA-3 "LOSS OF ALL AC POWER RECOVERY/SI REQUIRED"
- c. Transition to 2-EOP-FRCE-1, "RESPONSE TO EXCESSIVE CONTAINMENT PRESSURE"
- d. Transition to 2-EOP-FRCC-2, "RESPONSE TO DEGRADED CORE COOLING"

Question: 14

When a dropped rod in Control Bank D is being recovered, the CBD position is selected on the Rod Bank Selector Switch (RBSS).

Which one of the following correctly describes a reason for that switch position selection?

- a. Using the CBD position prevents actuation of an URGENT FAILURE alarm during the rod withdrawal
- b. Using the CBD position ensures the Bank Overlap Unit is not tracking the affected rod motion while withdrawal is in progress
- c. Using the MANUAL position would require operators to open the lift coil disconnects for the non-affected rods in all control banks
- d. Using the MANUAL position would result in dropping all the rods in the opposite Control Bank D group

Question: 15

The Unit 2 reactor is at BOL and was manually tripped due to a feedwater problem. An Estimated Critical Position (ECP) calculation has been performed and boron concentration was adjusted for a critical rod height of Control Bank D at 128 steps. However, when determining control bank worth, personnel performing the ECP incorrectly used the EOL HZP Integral Rod Worth Curve instead of the BOL HZP Curve.

Which one of the following correctly describes this how error affects critical rod height?

- a. Criticality would occur below the rod insertion limit (C-58 steps).
- b. Criticality would occur below the +/-300 pcm administrative limit but above the rod insertion limit.
- c. Criticality would occur above the +/-300 pcm administrative limit.
- d. Criticality cannot be achieved on rods alone.

Question: 16

Which one of the following will cause the Rod Control System to insert control rods at 72 steps per minute?

- a. T-hot wide range RTD shorted.
- b. T-cold wide range RTD is open.
- c. T-hot narrow range RTD is open.
- d. T-cold narrow range RTD is shorted.

Question: 17

A loss of coolant accident has occurred. The RVLIS Summary Display Page is displaying dynamic range. During a cooldown and depressurization, void content indication remains constant at 80%.

Which one of the following describes actual void content response during the cooldown and depressurization?

- a. Actual void content decreased due to change in density as pressure and temperature decreased.
- b. Actual void content increased due to change in density as pressure and temperature decreased.
- c. Actual void content remained constant; indicated void content is compensated using pressure and temperature signals.
- d. Actual void content remained constant; differential pressure is an accurate indication of void content.

Question: 18

RCS pressure is 50 psig, VCT pressure is 18 psig.

Which one of the following describes both the proper alignment of and the basis for the RCP seal injection/seal return alignment?

- a. All No. 1 Seal return valves are closed to prevent VCT water from backflushing through the seals.
- b. Seal injection is isolated to prevent excessive seal leakoff flow.
- c. Seal leakoff is fully open to prevent boric acid from crystallizing and accumulating on the seal surfaces.
- d. Seal injection is isolated to prevent VCT water from backfilling the RCS.

Question: 19

With reactor power at 30%, the power supply breaker to 24 RCP trips.

Which one of the following is correct concerning the plant response with NO operator action?

- a. The plant will continue at 30% power unless a SG water level trip setpoint is exceeded
- b. A reactor trip will occur on low RCS flow
- c. A SI will occur on high steam flow (from 21/22/23 SG's) coincident with LO-LO Tave or low steam pressure
- d. A reactor trip will occur on 1/4 RCP under voltage

Question: 20

Given the following conditions on Unit 2:

- Reactor power is 50%
- Pressurizer level is at programmed level
- 22 Charging Pump is running
- The Master Flow Controller is in MANUAL
- Charging and letdown are balanced

Which one of the following describes the effect on the plant if the Master Flow Controller is maintained in MANUAL as power is raised to 100%?

- a. Pressurizer level will rise.
- b. Pressurizer level will remain the same.
- c. VCT level will lower.
- d. An eventual reactor trip on low pressure when the pressurizer goes empty

Question: 21

Given the following conditions on Unit 2:

- Reactor power is 50%
- The operating 21 Charging Pump has tripped
- No operator action is taken

Which one of the following will occur?

- a. Letdown isolation valves, CV2 & CV277, will immediately CLOSE.
- b. Charging flow control valve, CV55, will fully CLOSE until 22 Charging Pump is started
- c. Letdown heat exchanger outlet temperature control valve, CC71, will OPEN.
- d. Letdown heat exchanger outlet temperature control valve, CC71, and Letdown pressure control valve, will both close.

Question: 22

Given the following:

- Unit 1 is shutdown with RHR providing shutdown cooling
- The 11 RHR pump and 11 RHR Heat Exchanger are in service
- RCS pressure is 320 psig
- RCS temperature is 300°F
- RCS cooldown rate is 20°F/hr
- RHR total flow is 2000 gpm

Which one of the following will occur if the air pressure regulator to 11RH18, 11 RHR HX Outlet Flow Control Valve, failed such that air was lost to the valve operator?

- a. RCS cooldown rate will rise.
- b. RHR HX Component Cooling outlet temperature will lower.
- c. RCS pressure will slowly rise.
- d. RHR flow will lower.

Question: 23

Which one of the following would occur if SJ1, Charging Suction from RWST, failed at the 75% open position when a safety injection signal was received?

- a. Gas binding in the charging pumps when the VCT empties
- b. Lower than expected boron concentration in ECCS due to dilution from VCT makeup
- c. No effect, both CV40&41 close, isolating the VCT
- d. Backflow from the RWST to the VCT to the in-service CVC HUT, reducing the available inventory to inject into the reactor vessel.

Question: 24

Which one of the following correctly identifies the setpoints and coincidences for the low RCS pressure automatic safety injection signal and the associated automatic unblock?

- a. $2/4 \leq 1765$; $3/4 \geq 1915$
- b. $2/3 \leq 1765$; $1/3 \geq 1915$
- c. $2/4 \leq 1765$; $2/4 \geq 1915$
- d. $2/3 \leq 1765$; $2/3 \geq 1915$

Question: 25

Unit 2 was at 100% power when an automatic reactor trip and safety injection occurred. All systems responded per design.

Which one of the following correctly describes the flow path for RCP seal leakoff?

- a. All #2 Seals become film-riding seals and discharge to the Reactor Coolant Drain Tank, via the standpipe
- b. A relief valve in the seal return line lifts and discharges to the PRT
- c. A relief valve in the seal return line lifts and discharges to the Containment Trench
- d. A relief valve in the seal return line lifts and discharges upstream of the Seal Water Heat Exchanger

Question: 26

Given the following:

- 21 and 22 CCW Pumps are running
- 23 CCW is selected to AUTO

Which one of the following would cause 22 CCW Pump STOP push button to start flashing?

- a. A SEC MODE III actuation and the pump breaker failed to close.
- b. 28 VDC power swapped to the alternate source
- c. 125 VDC control power for the pump breaker has failed.
- d. A SEC MODE II actuation and the pump breaker failed to close.

Question: 27

The following plant conditions exist:

- The reactor is at 100% power
- All Pressurizer heaters are OFF
- Both pressurizer spray valves are MODULATING
- Pressurizer PORVs are CLOSED

Which one of the following RCS pressures is appropriate for the stated conditions?

- a. 2215 psig
- b. 2223 psig
- c. 2272 psig
- d. 2340 psig

Question: 28

Given the following for Unit 2:

- Reactor power is 85%
- A S/G Feed Pump trips

Which one of the following describes the expected initial response of the Pressurizer Pressure Control System during this event?

- a. Pressurizer spray valves will modulate open to reduce pressure to normal.
- b. The proportional heaters and the backup heaters turn full on to raise pressure to normal.
- c. Pressurizer heaters de-energize at the -5% level deviation setpoint
- d. The PORVs open and maintain pressure below the high reactor trip setpoint.

Question: 29

The following conditions exist:

- The reactor is at 100% power
- The controlling Pressurizer Level Channel fails HIGH

Which one of the following will be the result from this failure if no operator action is taken?

- a. Actual Pressurizer level will start rising due to MAXIMUM charging flow and the reactor will trip on HIGH Pressurizer level.
- b. Actual Pressurizer level will lower due to reduced charging flow and the reactor will trip on LOW Pressurizer pressure.
- c. Actual Pressurizer level will initially lower, then rise until the reactor trips on HIGH Pressurizer level.
- d. Actual Pressurizer level will initially rise until PORVs open, then lower due to loss of RCS inventory until the reactor trips on LOW Pressurizer pressure.

Question: 30

The unit is at 100% power with 21 Charging Pump running and 2CV55, Charging Flow Control Valve, in AUTO when the controlling pressurizer level channel fails. The RO has placed the Charging Flow Master Controller in MANUAL in accordance with alarm response procedures.

Which one of the following correctly describes what will happen if the RO misunderstands an order and lowers Flow Demand to ZERO?

- a. All charging flow will be through the RCP seals
- b. Charging header flow lowers to zero but the miniflow valves open to maintain cooling flow through the pump
- c. 2CV55 will close to the minimum stop position
- d. 2CV55 will fully close then shift to MANUAL and go to the minimum stop position

Question: 31

Unit 1 is operating at 100% power when a 48 VDC power supply in the "A" Train SSPS Logic cabinet fails.

Which one of the choices correctly completes the following statement?

OHA Alarm A-34 "SSPS TRN A TRBL" actuates

- a. and Train A is NOT capable of automatically tripping the reactor.
- b. but Train A remains capable of automatically tripping the reactor.
- c. and the shunt trip coils for Reactor Trip Breaker A and Reactor Trip Bypass Breaker A are disabled.
- d. and the UV coils for Reactor Trip Breaker A and Reactor Trip Bypass Breaker A are disabled.

Question: 32

Given the following conditions:

- A LOCA has occurred inside containment
- All busses are supplied from off-site power and all SEC's are reset
- Containment pressure has just exceeded the Hi-Hi Containment pressure setpoint

Which one of the choices correctly completes the following statement?

The Containment Spray (CS) pumps . . .

- a. will start automatically and the CS valves will align automatically.
- b. must be started manually and the CS valves must be manually aligned.
- c. will start automatically but the CS valves must be manually aligned.
- d. must be started manually but the CS valves will align automatically.

Question: 33

Which one of the following "isolations" occurs in coincidence with a MANUAL Containment Spray actuation?

- a. Steamline
- b. Feedwater
- c. Containment Phase A
- d. Containment Ventilation

Question: 34

Given the following conditions for Unit 2:

- Mode 3 with RCS cooldown and depressurization underway in accordance with procedures
- RCS pressure is 1900 psig
- RCS temperature is 525°F
- When a Main Steam Safety Valve on the 23 S/G fails open resulting in the following S/G pressures: 820 psig (21); 780 psig (22); 700 psig (23); 810 psig (24)

Which one of the following correctly describes the status of the ESF actuation system for the stated conditions?

- a. No ESF signal has been generated.
- b. Only a Safety Injection signal has been generated.
- c. Only a Main Steam Line Isolation signal has been generated.
- d. A Safety Injection signal and a Main Steam Line Isolation signal have been generated.

Question: 35

Unit 2 is operating at 100% power, with all systems in automatic when annunciator alarms "ROD INSERT LMT LO" (E8) and "ROD INSERT LMT LO-LO" (E16) activate. The plant is stable (no rod motion, no power changes, etc.)

Which one of the following correctly explains the cause of these alarms?

- a. 22 RCS loop Tavg signal has failed low
- b. A RCS Thot RTD has failed high
- c. The P-A Converter has failed
- d. Power has been lost to the IRPI's

Question: 36

Given the following conditions on Unit 2:

- Reactor startup is in progress
- No manual blocks have been inserted
- Intermediate Channel N35 indicates 2E-10
- Intermediate Channel N36 indicates 9E-11
- Power is lost to Source Range Channel N31

Which one of the following describes the reactor response to the conditions above?

- a. A reactor trip signal is generated resulting in a reactor trip
- b. A reactor trip signal is generated but no trip occurs since one channel is above P-6
- c. No reactor trip signal is generated since the channel has failed low
- d. No reactor trip signal is generated until N36 indicates greater than 1E-10.

Question: 37

During performance of S2.RE-ST.ZZ-0001(Q) "Calorimetric Calculation", the feedwater temperature points utilized were reading 10°F lower than actual feedwater temperature. Power range NI's were adjusted in accordance with the directions of the calorimetric procedure.

Which one of the following correctly describes the effect of the NIS adjustment?

- a. Indicated power is less than actual power; therefore, power range instruments are set conservatively.
- b. Indicated power is less than actual power; therefore, power range instruments are set non-conservatively.
- c. Indicated power is greater than actual power; therefore, power range instruments are set conservatively.
- d. Indicated power is greater than actual power; therefore, power range instruments are set non-conservatively.

Question: 38

Given the following conditions on Unit 2:

- Reactor cooldown and depressurization is in progress
- Pzr PORV block valves PR-6 and PR-7 are closed in accordance with TSAS 3.4.5, due to seat leakage past the PORVs PR-1 and PR-2
- RCS pressure is being maintained at 800 psig due to problems isolating the SI accumulators
- RCS temperature drops to 305°F.

Which one of the following correctly describes the outcome if the operator arms the Pressurizer Overpressure Protection System (POPS) under these conditions?

PR-6 and PR-7 would . . .

- a. OPEN; PR-1 and PR-2 would remain CLOSED.
- b. OPEN; PR-1 and PR-2 would OPEN.
- c. remain CLOSED; PR-1 and PR-2 would remain CLOSED.
- d. remain CLOSED; PR-1 and PR-2 would OPEN.

Question: 39

A LOCA has occurred on Unit 1. The crew is in EOP-LOCA-1, Loss of Reactor Coolant. The RO notes that the reading on the Subcooling Margin Monitor (SCMM) is 16 °F lower than the last time he checked it but RCS temperature and pressure have not changed significantly.

Which one of the following correctly describes a reason for that change?

- a. The changing containment temperature is affecting the output signals from the in-core thermocouple reference junction box
- b. An in-core thermocouple has failed high
- c. Rising containment pressure is lowering RCS pressure detector output, pound for pound
- d. The SCMM automatically shifted to ADVERSE

Question: 40

Given the following conditions on Unit 2:

- Reactor is at 100% power when a small break LOCA occurs
- Containment pressure is 4.5 psig

Which one of the following describes the status of the containment cooling system for those conditions?

Service Water flow to containment coolers . . .

- a. rises to approximately 2640 gpm and all CFCU fans start in or are shifted to fast speed.
- b. rises to approximately 2640 gpm and all CFCU fans start in or are shifted to slow speed.
- c. lowers to approximately 960 gpm and all CFCU fan start in or are shifted to fast speed.
- d. lowers to approximately 960 gpm and all CFCU fans start in or are shifted to slow speed.

Question: 41

Given the following conditions on Unit 2:

- A loss of offsite power has occurred
- 2A 4KV Bus de-energized on DIFF

Which one of the following correctly describes the status of the CFCUs?

- a. 3 CFCU's will be operating in SLOW speed
- b. 4 CFCU's will be operating in SLOW speed
- c. CFCU's running before the event will restart in the speed selected
- d. No CFCU's will be operating

Question: 42

A large break LOCA has occurred. The crew has transitioned to FRCE-1, Response to Excessive Containment Pressure, on a PURPLE Path. Prior to starting containment spray (CS) pumps, the procedure poses the question "Is EOP-LOCA-5 in effect?" If the answer is YES then the crew is directed to "Operate CS Pumps as directed by EOP-LOCA-5."

Which one of the following correctly describes the difference between operation of the CS Pumps in LOCA-5 as compared to FRCE-1?

- a. LOCA-5 stops both CS Pumps to allow evaluation of CFCU capability to control containment pressure. CS Pumps are re-started one-at-a-time, if needed. FRCE-1 starts both CS Pumps and runs all CFCU's in LOW speed
- b. LOCA-5 stops both CS Pumps if all five CFCU's are available to run in HIGH speed. FRCE-1 starts both CS Pumps and runs all CFCU's in LOW speed
- c. LOCA-5 runs only one CS Pump as long as containment pressure is <47 psig. FRCE-1 starts both CS Pumps, regardless of containment pressure
- d. LOCA-5 runs CS Pumps based on the combined status of RWST level, containment pressure and the number of operating CFCU's. FRCE-1 always starts both CS Pumps

Question: 43

Given the following conditions for Unit 2:

- A large-break LOCA has occurred
- The Injection Phase of SI is in progress
- 22 Containment Spray Pump is unavailable

Which one of the following correctly describes the response to the above conditions?

- a. Safeguards Pumps will operate for a longer time with suction from the RWST before swapover to the containment sump.
- b. The higher pressure in containment will result in overpressurizing the RHR suction piping when swapover to the containment sump occurs.
- c. A portion of the 22 RHR pump discharge flow must be diverted to provide flow through the affected spray header.
- d. Water level in the containment sump will NOT be sufficient to supply all ECCS pumps when the alignment for cold leg recirculation is complete.

Question: 44

The 21 Containment Iodine Removal Unit (IRU) was started in preparation for a planned containment entry.

Which one of the following correctly describes the status of the IRUs if a Safety Injection signal is actuated?

21 IRU . . .

- a. continues to run and 22 IRU is locked out.
- b. is tripped and locked out, and 22 IRU is locked out.
- c. continues to run and 22 IRU starts on SEC Mode Operation.
- d. trips then restarts on SEC Mode Operation, and 22 IRU starts on SEC Mode Operation.

Question: 45

Given the following conditions for Unit 2:

- A large break LOCA has occurred
- Prior to the LOCA, containment temperature was 90°F
- Following the LOCA, containment pressure is 5 psig
- Containment temperature is currently 120°F
- The EOPs require that a Hydrogen Recombiner be placed in service

Which one of the following values will be set on the Hydrogen Recombiner potentiometer for the above conditions?

- a. 50.2 Kw
- b. 52.8 Kw
- c. 54.5 Kw
- d. 55.9 Kw

Question: 46

Unit 1 is in Mode 5 with a containment purge in progress. All RMS channels are operable.

Which one of the following describes a condition requiring immediate termination of the containment purge?

- a. An Auxiliary BLDG AIR D/P LOW console alarm.
- b. Failure of the Plant Vent Flow Monitor with all Auxiliary Building Exhaust Fans operating.
- c. Failure of RMS Channel 1R16, Plant Vent Effluent
- d. Failure of RMS Channel 1R12A, Containment Noble Gas

Question: 47

During a Unit 2 refueling, Fuel Handling Crane area radiation monitor (2R32A) reaches the HIGH alarm setpoint when the tool and attached spent fuel assembly are being raised. The crane hoist has not yet been fully raised.

Which one of the following describes the status of the fuel assembly attached to the crane?

- a. Crane controls can only lower the fuel assembly.
- b. Crane controls are disabled until jumpers are installed to defeat the interlock.
- c. The fuel assembly can be lowered only after pressing the BYP INT pushbutton on the crane controls.
- d. Movement of the fuel assembly is terminated IAW procedures until an HP Technician completes a general area survey.

Question: 48

While in Hot Standby awaiting reactor startup, an operator error causes the steam dump auto steam pressure setpoint to be reduced from 1005 psig to 940 psig.

Which one if the following is the resulting RCS Tavg maintained by the steam dumps?

- a. 536°F
- b. 539°F
- c. 543°F
- d. 547°F

Question: 49

Given the following conditions for Unit 2:

- Reactor power is 100%
- 2A 115 VAC Vital Bus power is lost

Which one of the following correctly describes the reason the operator is directed to shift the Steam Dump controller from TAVG to MS PRESS CONT?

- a. The steam dumps are armed. The steam dump valves will open due to the signal from the load rejection controller if Tavg exceeds Tref by 5°F.
- b. A steam dump demand signal is generated from the plant trip controller. If an arming signal is generated, the steam dump valves will open to the demanded position.
- c. A steam dump demand signal is generated from the load rejection controller. If an arming signal is generated, the steam dump valves will open to the demanded position.
- d. The steam dumps CANNOT be armed from the turbine first stage pressure signal. If ONE reactor trip breaker fails to open on a trip, the steam dumps would be inoperable in TAVG Mode.

Question: 50

Given the following conditions for Unit 2:

- Turbine Trip has occurred from 20% Reactor Power
- Maintenance activities have resulted in a break in the condenser rupture disk
- Condenser Air Removal Pumps are unable to handle the in-leakage volume and condenser vacuum is at 19 inches of Hg
- Tavg is at 547°F
- All Circulating Water System Pumps are in service.

Which one of the following correctly describes the status of the Condenser Steam Dump System?

- a. The Load Rejection Controller will be modulating the steam dump valves
- b. Low condenser vacuum is blocking steam dump valve operation
- c. The Plant Trip Controller will be modulating the steam dump valves
- d. Tavg is blocking steam dump valve operation

Question: 51

Given the following conditions for Unit 2:

- Reactor is at 100% power
- A break occurs just downstream of 22 Condensate Pump

Which one of the following correctly describes the subsequent plant response?

- a. The affected Steam Generator Feed Pump (SGFP) trips if suction pressure lowers to either: 215 psig after a 10-second delay, or 190 psig instantaneous.
- b. The Condensate Polisher Bypass valves CN-108s automatically open to restore SGFP suction pressure. If pressure lowers to 190 psig then any affected pump trips.
- c. At 275 psig on the suction of either SGFP a 10-second timer starts. If automatic opening of the CN-108 valves does not restore suction pressure then any affected pump trips.
- d. At 275 psig the "Condensate Suction Pressure LO" console alarm actuates. If suction pressure remains <275 psig for >10 seconds then any affected pump trips.

Question: 52

Given the following conditions for Unit 2:

- Reactor is at 100% power
- All BF19 and BF40 valves, and both feed pumps are in AUTO
- The operator places the feed pump MASTER controller in MANUAL and lowers the demand setting.

Which one of the following describes the result of this action?

Feed pump speed will lower resulting in . . .

- a. all BF19's closing down to maintain ΔP and the resultant continuous lowering of S/G levels
- b. all BF19's opening further to maintain programmed S/G levels.
- c. a reduction in feed flow and a possible reactor trip on steam flow-feed flow mismatch in coincidence with a low steam generator level
- d. an ADFWCS alarm on LOW ΔP and shifting of all BF19 and BF40 controllers to MANUAL

Question: 53

Given the following conditions for Unit 2:

- The Unit tripped from 100% 4 hours ago
- Unit is in MODE 3 at normal operating pressure and temperature
- Level in 22 S/G rose to 72% due to misoperation of 22AF21, AFW Discharge Flow Control Valve
- Level has been restored to 35%

Which one of the following states the minimum actions necessary to perform stroke testing of the BF40s, FWRV Bypass valves?

- a. Cycle the reactor trip breakers
- b. Reset the Feedwater Interlock Signal
- c. Cycle the reactor trip breakers and then reset the Feedwater Interlock Signal
- d. Reset the Feedwater Isolation signal

Question: 54

Given the following conditions for Unit 2:

- Unit is in Mode 3 with Tavg at 547°F
- The 23 AFW pump is NOT available
- The 21 AFW pump has been just stopped due to unusual motor noises
- The 22 AFW pump is running with normal parameters
- An operator has been dispatched to open 21AF923 and 22AF923 to allow cross-tie of the AFW headers from the motor-driven AFW pumps.

Assuming the CRS wants to maintain all SG levels within the normal operating band, which one of the choices correctly completes the following statement?

After the AF923 valves have been opened, the PO...

- a. only needs to throttle the AF21 valve to each SG.
- b. must depress the PRESS OVERRIDE DEFEAT for both AFW Pumps, then throttle the AF21 valve to each SG
- c. must depress the PRESS OVERRIDE DEFEAT for 22 AFW Pump, and then throttle the AF21 valve to each SG.
- d. must depress the PRESS OVERRIDE DEFEAT for 21 AFW Pump, and then throttle the AF21 valve to each SG

Question: 55

The unit is at 100% power. 22 AFW Pump is stopped but selected to LOCAL while a technician performs a circuit test.

Which one of the following correctly describes the status of 22 AFW Pump if 2B 4KV Vital Bus de-energizes when the transfer relay fails during a swap to the alternate SPT?

- a. 22 AFW Pump will not start when 2B SEC loads the EDG
- b. 22 AFW Pump will not start since 2B SEC will not actuate
- c. 22 AFW Pump will start when 2B SEC loads the EDG and the associated AF21 valves will stroke open after the pump discharge pressure interlock is satisfied
- d. 22 AFW Pump will start when 2B SEC loads the EDG but the associated AF21 valves will remain closed on pressure override due to lower SG pressure at HFP

Question: 56

Which one of the following describes the mechanism used by the safety-related portion of the 115 VAC system to transfer power from its normal AC source to the 125 VDC source?

- a. An auctioneering circuit transfers power from the rectifier output to the 125 VDC supply.
- b. A static switch transfers power from AC regulator to 125 VDC supply.
- c. When low voltage is sensed from the AC regulator, the 125 VDC input breaker is automatically shut.
- d. A static switch transfers power from the rectifier output to 125 VDC if low 115 VAC bus voltage is sensed.

Question: 57

The 2A Diesel Generator (EDG) is running and paralleled to the grid during a surveillance test.

Which one of the following correctly states the result of operating the EDG Voltage Control Switch in the manner described?

Positioning the VOLTAGE CONTROL switch...

- a. to LOWER raises generator amperage but has no effect on either real or reactive load.
- b. to LOWER has no effect because voltage control is automatic when the EDG is synchronized.
- c. to RAISE causes the generator to pick up a larger share of the real load.
- d. to RAISE causes the generator to pick up a larger share of the reactive load.

Question: 58

Which one of the following correctly describes TWO conditions that will independently cause automatic closure of 2WL51, Liquid Waste Discharge Valve?

- a. High discharge flow rate or high radiation sensed in the release header.
- b. High discharge flow rate or loss of power to RMS Channel R-18
- c. Loss of power to the flow recorder or loss of control air
- d. High radiation sensed in the release header or loss of 125 VDC control power to the valve.

Question: 59

Given the following conditions for Unit 2:

- A Pressurizer Safety Valve has been leaking
- Procedural actions being taken to prevent overpressurizing the PRT are generating liquid rad waste
- 2WL13 is open

Which one of the following correctly describes the flow path of water from the PRT after a NCO opens 2PR14, PRT Drain Valve?

- a. RCDT pumps start on interlock with 2WL12, directing flow to the in-service CVC HUT.
- b. The PRT gravity drains to the RCDT. The RCDT pumps automatically cycle on RCDT level, pumping to the in-service CVC HUT.
- c. The RCDT Pump in AUTO cycles to control PRT level whenever 2PR14 is open.
- d. The PRT gravity drains to the in-service CVC HUT.

Question: 60

Which one of the following correctly states the basis for the inlet pressure limitation on WG41, Waste Gas Release Valve?

- a. Maintain pressure less than the maximum design pressure for the packing in WG41
- b. At higher pressures leaks may develop in the release line components, leading to an unmonitored release
- c. Maintain D/P across the valve less than design to ensure the valve can close automatically
- d. The calculated release flow rate could be exceeded at higher pressures

Question: 61

While performing the Emergency Operating Procedures, a step is encountered which states, "Control PZR level between 25% (33% adverse) and 77% (74% adverse) by adjusting charging and letdown flows." Containment pressure has risen to 5.5 psig and dropped back down to 3.3 psig, containment radiation levels have risen to 3E5 R/hr and have dropped back down to 6.7E4 R/hr.

Which one of the following states the indicated PZR levels that must be maintained?

- a. Minimum of 25%; Maximum of 77%
- b. Minimum of 33%; Maximum of 74%
- c. As specified by the Shift Technical Advisor
- d. As specified by the Operations Support Center

Question: 62

Which one of the following correctly describes the purpose of the accumulators installed in the Service Water System?

- a. Maintain SW flow to the CFCU motor coolers while the SW Pumps are started and SW pressure recovers in SEC Mode 3
- b. Maintain the CFCU's full of water to prevent damage from water hammer when the CFCU's and Service Water Pumps are automatically started in SEC Mode 3
- c. Provide an in-surge/out-surge volume to ensure pressure in all CFCU's remain within design limits while it is isolated and waiting for a SEC Mode 3 start signal
- d. Maintain SW pressure in the CFCU's to prevent the all SW57's, CFCU Inlet Pressure Control Valves, from opening too rapidly when a CFCU is started and causing runout on SW Pumps starting in SEC Mode 3

Question: 63

Due to concurrent problems with off-site power and the Station Air Compressors, control air header pressure is lowering on both units.

Which one of the following correctly describes the associated automatic actions for the conditions above?

- a. At 85 psig, #1 ECAC automatically starts to supply "A" Header and #2 ECAC automatically starts to supply "B" Header
- b. At 85 psig, #1 ECAC automatically starts to supply "B" Header and #2 ECAC automatically starts to supply "A" Header
- c. At 80 psig, #1 ECAC automatically starts to supply "A" Header and #2 ECAC automatically starts to supply "B" Header
- d. At 80 psig, #1 ECAC automatically starts to supply "B" Header and #2 ECAC automatically starts to supply "A" Header

Question: 64

Which one of the following correctly describes a difference in response for an AUTO as compared to a MANUAL actuation of the DG Area CO₂ system?

- a. AUTO CO₂ actuation is blocked on a SEC start
- b. MANUAL CO₂ actuation trips the associated, running EDG
- c. AUTO CO₂ actuation is blocked when the associated EDG is in LOCKOUT
- d. On a MANUAL actuation, there is no CO₂ discharge delay

Question: 65

Given the following conditions on Unit 2:

- Reactor power - 25%
- Control rod 2D2 in Control Bank D has fully dropped.
- Recovery of the dropped rod is in progress per S2.OP-AB.ROD-0002(Q) "DROPPED ROD"
- All Disconnect Switches in Control Bank D are in DISCONNECT except for 2D2

Which one of the following describes an alarm that will actuate and the affect that alarm actuation will have on recovering the dropped control rod?

- a. A Non-Urgent Failure will actuate; rod recovery can proceed without additional operator action
- b. A Non-Urgent Failure will be received; rod recovery can proceed after depressing the ALARM RESET pushbutton on the console
- c. An Urgent Failure will actuate; rod recovery can proceed without additional operator action
- d. An Urgent Failure will actuate; rod recovery can proceed after depressing the ALARM RESET pushbutton on the console

Question: 66

Unit 1 is at 100% power when a SGFP trip results in an automatic rapid power reduction.

Which one of the following correctly identifies an alarm actuation that would be indicative of a single immovable control rod?

- a. Auxiliary Annunciator "DELTA I/EXCEEDS TARGET BAND"
- b. OHA E-38, UPPER SECT DEV ABV 50% PWR
- c. OHA E-40, ROD BANK URGENT FAILURE
- d. TAVE/TREF DEV Console Alarm

Question: 67

Which one of the following is the expected Source Range indication following a reactor trip? (No operator action taken)

The Source range channels read approximately...

- a. 4000 cps at 10 minutes, post trip.
- b. 6000 cps at 20 minutes, post trip
- c. 0 cps at 30 minutes, post trip.
- d. 1000 cps at 40 minutes, post trip.

Question: 68

Given the following conditions for Unit 2:

- Reactor power is 87%
- Pzr pressure is 2235 psig
- Pzr PORV 2PR1 is leaking
- PRT pressure is 5 psig
- PORV discharge temperature has stabilized near 230°F

Considering each one individually, which one of the following directly causes PORV discharge temperature to rise?

- a. PRT pressure is allowed to rise to 10 psig
- b. PORV leak rate rises by 2 gpm
- c. Pzr vapor space temperature rises by 1°F
- d. The PRT rupture disk fails

Question: 69

Given the following conditions for Unit 2:

- A Small Break LOCA has occurred
- All ECCS pumps are operating as designed
- Twenty minutes after the initial transient, the following conditions exist:
 - No RCPs running
 - Core Exit TCs read 580°F
 - Pzr level indicates 0%
 - RCS pressure is at 1310 psig
- The operators begin drawing more steam from all S/Gs and increase AFW flow to maintain level

Which one of the following describes how and why ECCS flow changes as a result of these operator actions?

- a. As the plant cools down, RCS pressure lowers and ECCS flow rises
- b. ECCS flow will not change until the pressurizer begins to refill, then ECCS flow will lower
- c. For this set of conditions, cooldown has no effect on ECCS flow. RCS pressure cannot change unless one or more ECCS pumps are stopped
- d. ECCS flow will not change because the SI and Charging Pumps all are operating at their maximum flow rate

Question: 70

EOP-LOCA-1, Loss of Reactor Coolant, Step 28 reads "WAIT UNTIL 14 HOURS HAVE ELAPSED SINCE SI ACTUATION". The following arrow box reads "EOP-LOCA-4, TRANSFER TO HOT LEG RECIRCULATION".

Which one of the following correctly describes the basis for transitioning to EOP-LOCA-4 after 14 hours?

- a. Eliminate steam voids that may be hindering heat removal in the upper core
- b. Wash fission product particulates back into solution for processing in the CVCS demineralizers
- c. Preclude the potential for boron precipitation to hinder core cooling
- d. Cover the core above the hot leg elevation to establish natural circulation flow to the SG's

Question: 71

Which one of the following correctly lists indications that are evaluated as possible sources of excessive inventory in the containment sump, per EOP-FRCE-2, Response to High Containment Sump Level?

- a. Fire Protection water flow, Demineralized Water Storage Tank, Primary Water Storage Tank
- b. Fire Protection water flow, Auxiliary Feedwater Storage Tank, Component Cooling Water Surge Tank
- c. CFCU SW flow, CVCS Volume Control Tank, Component Cooling Water Surge Tank
- d. CFCU SW flow, Demineralized Water Storage Tank, Boric Acid Storage Tank

Question: 72

The unit is at 100% power.

Which one of the following set of indications would occur if 21CV104, Seal Leakoff Isolation Valve, fails closed while operating at 100% power?

- a. #1 Seal D/P indicates low and PRT level is rising
- b. #1 Seal D/P indicates low and Seal Leakoff Flow is zero
- c. #1 Seal D/P indicates high and RCDT level is rising
- d. #1 Seal D/P indicates high and Seal Leakoff Flow is zero

Question: 73

Given the following conditions on Unit 2:

- Reactor power is 65%
- Auto makeup initiated to the VCT
- Shortly after AUTO Makeup started, boric acid filter clogging caused the BORIC ACID FLOW DEVIATION console alarm actuate

Assuming no operator action, which one of the following correctly describes what will occur?

- a. Control rods will insert in AUTO to control Tave
- b. Reactor power will rise slightly and level off.
- c. The running Boric Acid Transfer Pump will trip
- d. VCT level will drop until charging suction swaps to the RWST.

Question: 74

Given the following conditions for Unit 2:

- Power is 90%
- A plant transient has occurred that results in Control Bank D rods inserting beyond their insertion limits
- The RO is in the process of initiating a rapid boration,
- One Boric Acid Transfer Pump (BATP) is running in FAST speed
- 2CV175, Rapid Borate Stop Valve is open
- Charging flow is 75 gpm on 2FI-128B

Which one of the following actions will significantly raise the RCS boration rate?

- a. Starting the second BATP in FAST speed.
- b. Closing 21/22CV160 Boric Acid Tank Recirc valves.
- c. Throttle further open 2CV71, Seal Pressure Control valve.
- d. Close 2V175 and align the Charging Pumps suction to the RWST

Question: 75

Given the following conditions:

- Plant in Mode 5
- Highest CET temperature is 190°F
- RCS pressure is 325 psig
- 21 RHR loop is in service, 22 RHR loop is out of service for repairs
- RCS is intact with 20% Pzr level indicated
- 21 RHR Pump experiences a seal failure and is isolated from the RCS

According to S2.OP-AB.RHR-0001(Q), LOSS OF RHR, which one of the following is the preferred method of core cooling if a RHR cannot be restored and RCS temperatures are rising?

- a. Natural or forced RCS flow while steaming intact S/Gs with a level of equal to or greater than 70% NR.
- b. Fill from RWST via one SI Pump and the Hot Leg Injection Isolation valves, and spill through the Pzr PORVs.
- c. Fill via RWST gravity flow through RHR and reflux cooling to any S/G with level equal to or greater than 70% NR.
- d. Fill from RWST via one charging pump and the BIT Isolation valves, and spill via both PORVs and Reactor Head Vent Solenoid Valves.

Question: 76

Given the following conditions for Unit 2:

- A LOCA has occurred
- Actions of 2-EOP-LOCA-3 "TRANSFER TO COLD LEG RECIRCULATION" have been completed
- Two CCW Pumps are running

Which one of the following correctly identifies a consequence resulting from a tube leak in the Seal Water Heat Exchanger?

- a. Both CCW Pumps will eventually trip on loss of NPSH.
- b. A high level alarm will actuate for the CCW Surge tank.
- c. The CCW Pump supplying the safety related header will eventually trip due to loss of NPSH.
- d. The CCW Pump supplying the non-safety related header will eventually trip due to loss of NPSH.

Question: 77

Given the following conditions on Unit 2:

- RCS Tave - 150°F
- RCS pressure - 280 psig

Which one of the following describes the response of the PORVs if PT-405 wide range loop pressure transmitter fails high?

- a. Only the PORV fed by that channel opens
- b. Both PORVs open because the coincidence is 1/2 with POPS armed.
- c. Neither PORV opens because the enabling signal from the other channel is NOT met
- d. Neither PORV opens because both open when 2/2 WR pressure channels are >setpoint

Question: 78

Given the following conditions on Unit 2:

- Turbine load is 19% and Rod Control is in AUTO
- Charging flow controller has failed high

Which one of the following identifies the approximate value for actual pressurizer level when OHA E-20, PZR HTR ON LVL HI, actuates?

- a. 28%
- b. 33%
- c. 55%
- d. 70%

Question: 79

Which one of the following correctly describes the reason why it is worse for a full-power ATWS event to occur at the Beginning-of-Life (BOL) as compared to the End-of-Life (EOL)?

- a. The additional burnable poisons provide less heat conduction; therefore, the fuel pin outer clad temperatures are higher.
- b. The effective delayed neutron fraction is higher; therefore, the rate of power reduction is slower.
- c. The Moderator Temperature Coefficient (MTC) is less negative; therefore, the reactor power reduction due to heat addition is less.
- d. The higher boron concentration in the RCS causes the emergency boration to be less effective; therefore, it takes longer to achieve adequate Shutdown Margin (SDM).

Question: 80

Which one of the following describes the effect of having compensating voltage set too high on N35 during a unit startup?

- a. N35 indicates lower than N36; P-6 is not affected since the coincidence is 1/2.
- b. N35 indicates higher than N36; the Source Range High Flux Trip will occur prior to reaching P-6.
- c. N35 indicates lower than N36 but the SUR will be the same.
- d. N35 indicates higher than N36 and P-6 will energize prior to achieving proper Source Range/Intermediate Range overlap on the correctly reading channel

Question: 81

Given the following conditions for Unit 2:

- A S/G tube rupture has been identified on 23 S/G
- SI has been actuated
- The crew has completed the initial cooldown actions of 2-EOP-SGTR-1

Which one of the following conditions would occur if the RCS temperature established is higher than the target temperature stipulated by the EOP?

- a. Pzr level will go solid (100%) during the subsequent RCS depressurization
- b. Pressure of the ruptured S/G rises with resultant lifting of a S/G Safety Valve
- c. Pressure of the non-ruptured S/Gs rises with resultant opening of the MS10's
- d. RCS subcooling may be lost before RCS and ruptured S/G pressures are equalized

Question: 82

Which one of the following parameters can be used shortly after event initiation to differentiate between a secondary steam leak and a small primary loss-of-coolant accident, both inside containment?

- a. Pzr level.
- b. RCS pressure.
- c. T-cold temperatures.
- d. ECCS injection flow rates.

Question: 83

Abnormal procedure S2.OP-AB.COND-0001, Loss of Condenser Vacuum, requires load reductions in accordance with Attachment 4, Condenser Back Pressure Limits, to stabilize condenser vacuum at or greater than the OPERATING LIMIT. However, it is possible to stabilize vacuum at that value but still be required to initiate a turbine trip based on the 5 MINUTE OPERATING LIMIT.

Which one of the following correctly describes the basis for the 5 MINUTE OPERATING LIMIT?

- a. During low load-low vacuum conditions, extraction steam temperatures rise causing excessive thermal stresses in and possible failure of the feedwater heaters.
- b. During low load-low vacuum conditions, the turbine-condenser "boot" overheats rapidly and may fail.
- c. Low steam flow-low vacuum conditions can cause non-synchronous blade vibration (flutter) in the final stage of turbine blades and irreversible damage will occur.
- d. At low loads, one or more turbine governor valves may be closed. If the closed governor valves are in alternate quadrants then "double-shocking" of the first stage turbine blades occurs and the turbine may fail.

Question: 84

Unit 2 is at 100% power. A break has occurred in the main feedwater line just upstream of 23BF22, Feedwater Stop Valve.

Assuming no operator action, which one of the choices correctly completes the following statement?

The reactor will trip on low SG level and 23 SG will

- a. completely blowdown. 23AF21 will remain closed on pressure override.
- b. be maintained at steam header pressure. AFW flow will maintain a level.
- c. be maintained at steam header pressure. AFW flow will be out the break.
- d. depressurize, causing an AUTO SI when steam pressure drops to 100 psi less than the other SG's.

Question: 85

In accordance with 2-EOP-LOPA-1 "LOSS OF ALL AC POWER", which one of the following is the basis for maintaining S/G Narrow Range levels above 9% when the RCS is being cooled to 310°F Cold Leg temperature?

- a. Ensures the capability to cooldown once AC power is restored
- b. Ensure proper thermal stratification layer in the S/Gs in the event of a S/G tube rupture
- c. Narrow Range level is the only indication of S/G inventory available after a loss of all AC power
- d. Ensure sufficient heat transfer capability exists to remove heat from the RCS via natural circulation

Question: 86

Which one of the following describes SEC operation if a Safety Injection actuation (Mode I) occurs while Blackout (Mode II) loading is in progress?

- a. Mode II loading is completed. Operators must reset the SEC and start any Mode III loads not started in Mode II
- b. Mode II loading stops, all loads are shed, and Mode III loading begins
- c. Mode II loading stops, the SEC resets to Mode III and any ESF loads not already running are sequentially started.
- d. Mode II loading is completed. The SEC will then shed any non-Mode III loads and start any Mode III loads not already running

Question: 87

Procedure S2.OP-AB.115-0002, "LOSS OF 2B 115V VITAL INSTRUMENT BUS", directs the installation of a jumper to energize pressurizer level comparator 2LC460D-C from an alternate source.

Which one of the following describes the operation of the Pzr Backup Heaters during the interim?

Until the jumper is installed, the heaters...

- a. cannot be energized
- b. can be operated using the LOCAL control
- c. can be operated using the normal console pushbuttons
- d. can only be operated by transferring to the emergency power supplies

Question: 88

Which one of the following describes how a loss of 125 VDC affects the Reactor Trip Breakers (RTBs)?

- a. The breaker is not capable of opening on a signal to the shunt trip coil
- b. The loss of voltage causes a shunt trip actuation and the breaker opens
- c. The breaker is not capable of opening on a signal to the UV trip coil
- d. The loss of voltage de-energizes the UV coil and the breaker opens

Question: 89

Given the following conditions for Unit 2:

- Power is at 100%
- OHAs for 21 SW HDR PRESS LO (B-13) and 22 SW HDR PRESS LO (B-14) actuated
- Pressure on both Service Water (SW) header pressure indicators is lowering
- Actions of S2.OP-AB.SW-0001(Q), "Loss of Service Water Header Pressure" are being performed
- After closing 21&22SW17, SW Bay tie valves, and 21&22SW23 Nuclear Header tie valves, both SW header pressure meters still indicate a slow pressure reduction

Which one of the following components would the NEOs be directed to check for leaks and proper operation?

- a. 21 CFCU Piping.
- b. 2SW308, SW Bay 2 Pressure Control Valve.
- c. Leakage into the 22SW valve and piping compartment.
- d. Emergency Diesel Generator SW supply header piping.

Question: 90

During a complete loss of control air, S2.OP-AB.CA-0001(Q) "LOSS OF CONTROL AIR" the operator is directed to stop any liquid or gaseous radioactive releases in progress by closing 2WL51, Liquid Release Stop, and 2WG41, Gas Decay Tanks Vent Isolation.

Which one of the following correctly describes the reason for closing these valves?

- a. Ensure a positive closing signal while some air pressure is available
- b. Without air pressure, neither valve is capable of closing on interlock from their respective RMS channel
- c. This action terminates the open signal. Otherwise, these valves will re-open when air pressure is restored
- d. Ensures a release is not continued while degrading air pressure may be causing a change in the dilution medium flow rate

Question: 91

Given the following conditions for Unit 2:

- Power is at 100%
- OHA, FIRE PROT FIRE (A-7) alarms
- 2RP5 is checked and indicates the following:
 - Zone 59, Air and Water Deluge, Containment El. 100 Panel 335 is flashing
 - Zone 74, Smoke and Fire Detector, Containment El. 100 Panel 335 is lit

Which one of the following describes the status of the fire protection system?

- a. Fire protection water is being delivered via deluge valves
- b. A single manual valve in the Mechanical Penetration Area must be opened to initiate fire protection water flow via the open deluge valves
- c. The containment isolation valve must be opened from the control room to initiate fire protection water flow via the open deluge valves
- d. The Panel 335-related deluge valves located in the Mechanical Penetration Area must be manually opened to initiate fire protection water flow

Question: 92

Given the following conditions for Unit 2:

- A control room evacuation has occurred due to habitability concerns
- All immediate actions have been completed for S2.OP-AB.CR-0001(Q)
"CONTROL ROOM EVACUATION"
- CCW system was aligned with 21 and 23 Pumps running and 22 Pump in AUTO
- After leaving the control room but prior manning the Hot Shutdown Panel (HSD), CCW header pressure dropped to 65 psig and then recovered.
- No actions were taken to alter CCW Pump status when control was established at the Hot Shutdown Panel

Which one of the following describes the CCW Pump indication status the operator would observe when re-establishing control in the control room?

- a. The START backlight for only 21 and 23 Pumps will be lit.
- b. The START backlight for 21 and 23 Pumps will be lit. The START backlight for 22 Pump will be flashing and the audible group alarm will be sounding.
- c. No CCW Pump indications will be observable until the respective HSD Panel switches are returned to REMOTE, then the START backlight for only 21 and 23 Pumps will be lit.
- d. No CCW Pump indications will be observable until the respective HSD Panel switches are returned to REMOTE, then the START backlight for 21 and 23 Pumps will light, the START backlight for 22 Pump will flash and the audible group alarm will sound.

Question: 93

Given the following conditions for Unit 2:

- A LOCA has occurred
- A Core Cooling RED Path exists and 2-EOP-FRCC-1, "RESPONSE TO INADEQUATE CORE COOLING" is being implemented.
- Steam Generator depressurization was ineffective in restoring core cooling.
- All RCPs are stopped
- TEN CETs indicate temperatures above 1200°F

In order to provide core cooling, which one of the following conditions must be established prior to starting an RCP?

- a. RVLIS Full Range level is greater than 39%.
- b. Seal injection flow for the selected RCP is greater than 6 gpm.
- c. Level in the S/G in the loop for the selected RCP is greater than 15% NR.
- d. The RCP Oil Lift Pump on selected pump is running for greater than 2 minutes.

Question: 94

Given the following conditions for Unit 2:

- R31, Letdown Line-Failed Fuel Process Rad Monitor, indication is rising
- S2.OP-AB.RC-0002(Q), "HIGH ACTIVITY IN REACTOR COOLANT" was entered
- High RCS activity is confirmed
- As directed by the CONTINUOUS ACTION SUMMARY, the CRS directs the Unit to be shutdown and RCS temperature reduced to 500°F.

Which one of the following correctly identifies the basis for reducing Tave below this value?

- a. Ensures S/G pressures remain below the lift setpoint for the MS10s in the event of a SGTR
- b. Lowers the expected peak containment pressure in the event of a LOCA
- c. This lowers CVCS letdown temperature to increase the effectiveness of the demineralizers in removing activated corrosion products
- d. Reduces migration of radioactive nuclides through existing cracks or breaks in the clad by lowering clad tensile stresses

Question: 95

The following conditions exist on Unit 2:

- An electronic failure and technician error caused an inadvertent SI
- The crew has transitioned to TRIP-3, SI Termination
- SI and Phase A are reset
- 2B and 2C SEC are reset
- 2A SEC failed to reset

Which one of the following correctly describes the expected response of the 4KV vital buses if a loss of off-site power occurs before 2A SEC can be de-energized?

- a. Blackout loading occurs on all buses
- b. Accident+Blackout loading occurs on all buses
- c. Blackout loading occurs on 2B and 2C buses. Accident+Blackout loading occurs on 2A Bus
- d. Blackout loading occurs on 2B and 2C buses. 2A bus is de-energized.

Question: 96

Given the following conditions for Unit 2:

- A LOCA has occurred
- The crew is performing actions of 2-EOP-LOCA-2 "POST LOCA COOLDOWN AND DEPRESSURIZATION"
- After stopping ONE Charging pump the following parameters exist:
 - RCS pressure is 1025 psig stable
 - Pzr level is 28%
 - RCS temperature (CETs) are reading 480°F
 - Containment pressure is 4.4 psig

Which one of the following describes the action to be taken for these conditions?

- a. SI should be manually re-initiated.
- b. Re-start the Charging pump based on subcooling less than 38°F.
- c. Stopping of ONE SI Pump should be evaluated using NORMAL values for subcooling and Pzr level.
- d. Stopping of ONE SI Pump should be evaluated using ADVERSE values for subcooling and Pzr level.

Question: 97

Given the following conditions for Unit 2:

- Unit is in MODE 4 cooling down on RHR
- RCS Temperature - 340°F
- RCS pressure - 300 psig lowering
- PZR level - 22% lowering
- CNMT pressure - 0.2 psig
- 2R16, Plant Vent Effluent Monitor is in ALERT
- R41B, Plant Vent Iodine Monitor radiation levels are trending higher
- S/G levels stable at - 42% (21); 40% (22); 43% (23); 40% (24)
- S/G pressures stable at - 100 psig (21), 95 psig (22), 100 psig (23), 98 psig (24)

Which one of the following events is taking place?

- a. POPS actuated and one PORV is stuck open.
- b. A LOCA has occurred in the area of the Regenerative Heat Exchanger
- c. A LOCA has occurred on the suction of the RHR pump.
- d. Letdown line pressure control valve 2CV18 has failed open.

Question: 98

Which one of the following is the reason that 2-EOP-FRHS-1 "RESPONSE TO LOSS OF SECONDARY HEAT SINK" directs transition to the procedure and step in effect if RCS pressure is less than all intact or ruptured S/G pressures?

- a. Feeding S/Gs under these conditions may halt natural circulation core cooling
- b. Core decay heat is being removed by means other than the secondary heat sink
- c. Under these conditions, initiating feed flow can cause a substantial reverse delta-P that may result in a S/G tube rupture
- d. RCS subcooling must be restored prior to the initiation of feed and bleed

Question: 99

Which one of the following correctly describes a major philosophical difference between EOP-TRIP-5 (TRIP-5), Natural Circulation Rapid Cooldown Without RVLIS, and EOP-TRIP-6 (TRIP-6), Natural Circulation Rapid Cooldown With RVLIS?

- In TRIP-5 steps are taken to prevent bubble formation in the reactor vessel head. In TRIP-6 steps are taken if a bubble forms in the reactor vessel head.
- In TRIP-5 the cooldown rate is limited to 50°F/hr. In TRIP-6 the cooldown rate is 100°F/hr.
- In TRIP-5 the cooldown and depressurization is performed in discrete steps. In TRIP-6 the cooldown is continuous and steps are taken if RVLIS indicates excessive reactor vessel head bubble formation.
- TRIP-6 permits use of a PZR PORV for depressurization while TRIP-5 does NOT. Reactor vessel head bubble formation cannot be accurately inferred from indicated pressurizer level while a PORV is open.

Question: 100

Given the following conditions for Unit 2:

- A steamline break occurred on the 22 S/G 25 minutes ago
- All MSIVs failed to close
- RCS pressure is 1050 psig
- RCS temperature (SPDS) average 370°F
- RCS Tcolds: 310°F (21), 280°F (22), 320°F (23), 320°F (24)
- CNMT pressure has stabilized at 8 psig
- S/G WR levels - 50% (21); 8% (22); 48% (23); 55% (24)

The operating crew is performing the Safeguards Reset Actions in accordance with 2-EOP-LOSC-2, "MULTIPLE STEAM GENERATOR DEPRESSURIZATION" when the STA reports a PURPLE Path for Thermal Shock Status Tree.

Which one of the following correctly describes the AFW flow strategy for both procedures?

- Maintain flow at 1.0E04 lb/hr to each S/G, to limit cooldown and prevent S/G tube dryout.
- Maintain total flow >22E04 lb/hr but only feed 21, 23, 24 S/G's, to maintain an adequate heat sink but limit cooldown
- Maintain flow to 21, 23, 24 SG at 1.0E04 lb/hr each, to limit cooldown and prevent SG tube dryout
- Maintain total flow at 22E04 lb/hr, feeding all S/Gs to maintain an adequate heat sink but limit cooldown

Circle your answer, if you change your answer write it in the blank.

- 1. a b c d ___
- 2. a b c d ___
- 3. a b c d ___
- 4. a b c d ___
- 5. a b c d ___
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- 26. a b c d ___
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- 42. a b c d ___
- 43. a b c d ___
- 44. a b c d ___
- 45. a b c d ___
- 46. a b c d ___
- 47. a b c d ___
- 48. a b c d ___
- 49. a b c d ___
- 50. a b c d ___

Answer A questions N2 28, 59, 77 and 94 changed A w. to more evenly balance the answers. Changes were made by the licensee.

Answer A question 15 changed A to B, the technically correct answer.

JE Briggs, Chief Examiner.

74B

KEY

Circle your answer, if you change your answer write it in the blank.

- 51. (a) b c d ___
- 52. a (b) c d ___
- 53. a b (c) d ___
- 54. a b c (d) ___
- 55. a b (c) d ___
- 56. (a) b c d ___
- 57. a b c (d) ___
- 58. a b c (d) ___
- 59. (a) b c ~~(d)~~ a *uh*
- 60. a b c (d) ___
- 61. a (b) c d ___
- 62. a (b) c d ___
- 63. a (b) c d ___
- 64. a b c (d) ___
- 65. a b (c) d ___
- 66. a (b) c d ___
- 67. a (b) c d ___
- 68. (a) b c d ___
- 69. (a) b c d ___
- 70. a b (c) d ___
- 71. (a) b c d ___
- 72. a (b) c d ___
- 73. a b c (d) ___
- 74. a (b) c d ___
- 75. a b c (d) ___
- 76. a b c (d) ___
- 77. (a) ~~(b)~~ c d a *uh*
- 78. a (b) c d ___
- 79. a b (c) d ___
- 80. (a) b c d ___
- 81. a b c (d) ___
- 82. a b (c) d ___
- 83. a b (c) d ___
- 84. a (b) c d ___
- 85. a b c (d) ___
- 86. a (b) c d ___
- 87. a (b) c d ___
- 88. (a) b c d ___
- 89. a b c (d) ___
- 90. a b c (d) ___
- 91. a b (c) d ___
- 92. a (b) c d ___
- 93. a b (c) d ___
- 94. (a) ~~(b)~~ c d a *uh*
- 95. a b (c) d ___
- 96. a b c (d) ___
- 97. a b (c) d ___
- 98. a (b) c d ___
- 99. a b (c) d ___
- 100. (a) b c d ___

KEY