

Draft Submittal

**BRUNSWICK EXAM**

**50-2003-301**

**50-325 & 50-324**

**FEBRUARY 10 - 14 & 19, 2003**

1. Senior Reactor Operator Written Exam

Facility: <u>BRUNSWICK</u>		Date of Exam: <u>02/19/03</u>		Exam Level: <u>RO/SRO</u>																
Item Description						Initial														
						a	b*	c*												
1. Questions and answers technically accurate and applicable to facility						FSM	N/A	N/A												
2. a. NRC K/As referenced for all questions b. Facility learning objectives referenced as available						FSM		N/A												
3. RO/SRO overlap is no more than 75 percent, and SRO questions are appropriate per Section D.2.d of ES-401						FSM	↓	N/A												
4. Question selection and duplication from the last two NRC licensing exams appears consistent with a systematic sampling process								N/A												
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: <input type="checkbox"/> the audit exam was systematically and randomly developed; or <input type="checkbox"/> the audit exam was completed before the license exam was started; or <input checked="" type="checkbox"/> the examinations were developed independently; or <input type="checkbox"/> the licensee certifies that there is no duplication; or <input type="checkbox"/> other (explain)						FSM	N/A	N/A												
6. Bank use meets limits (no more than 75 percent from the bank at least 10 percent new, and the rest modified); enter the actual question distribution at right						<table border="1"> <tr> <td colspan="2">Bank</td> <td colspan="2">Modified</td> <td colspan="2">New</td> </tr> <tr> <td>34</td> <td>40</td> <td>10</td> <td>11</td> <td>56</td> <td>49</td> </tr> </table>			Bank		Modified		New		34	40	10	11	56	49
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34	40	10	11	56	49															
7. Between 50 and 60 percent of the questions on the exam (including 10 new questions) are written at the comprehension/analysis level; enter the actual question distribution at right						<table border="1"> <tr> <td colspan="2">Memory</td> <td colspan="2">CIA</td> </tr> <tr> <td>48</td> <td>43</td> <td>52</td> <td>57</td> </tr> </table>			Memory		CIA		48	43	52	57				
Memory		CIA																		
48	43	52	57																	
8. References/handouts provided do not give away answers						FSM		N/A												
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the Tier to which they are assigned; deviations are justified						FSM		N/A												
10. Question psychometric quality and format meet ES, Appendix B, guidelines						FSM		N/A												
11. The exam contains 100, one-point, multiple choice items; the total is correct and agrees with value on cover sheet						FSM	↓	N/A												
a. Author <u>Larry Mellen / Ramp S. Mellen</u> b. Facility Reviewer (*) <u>N/A</u> c. NRC Chief Examiner (#) <u>George T. Hopper / Mike Erntes</u> d. NRC Regional Supervisor <u>MIKE ERNTES / Mike Erntes</u>						Printed Name / Signature Date <u>2/10/03</u> <u>N/A</u> <u>2/10/03</u> <u>2/10/03</u>														
Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c;" chief examiner concurrence required.																				

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

**Applicant Information**

Name:	Region: II
Date: 02/19/03	Facility/Unit: Brunswick
License Level: SRO	Reactor Type: 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 six 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: \_\_\_\_\_ Points

Applicant's Score: \_\_\_\_\_ Points

Applicant's Grade: \_\_\_\_\_ Percent

1.

During a reactor startup, Control Rod 34-39 is selected to be NOTCHED OUT from Position 10 to Position 12. The RWM Withdraw Limit is Position 16.

After initiating ROD OUT NOTCH Sequence, the Operator observes:

Full Core Display white select light for Control Rod 34-39 is OFF.  
4-Rod Display indicates Control Rod 34-39 STOPPING at Position 14.  
Control Rod Select Matrix Backlighting is UNCHANGED  
Rod Drift alarm is sealed in

Which ONE of the following has occurred?

- A. The RMCS Timer has failed.
- B. The RPIS Reed Switch at Position 12 has failed.
- C. UPS supply breaker to rod select power has tripped.
- D. RWM is enforcing a Withdraw Block.

2.

Which ONE of the following describes the conditions under which the "Rod Select Permissive" light is illuminated?

- A. REFUEL only and indicates all control rods are fully inserted; rod select power is Off or rod select power is On with no rod selected.
- B. REFUEL only and indicates all control rods are fully inserted except for the selected rod; rod select power is On with only one rod selected.
- C. SHUTDOWN or REFUEL and indicates all control rods are fully inserted; rod select power is Off or rod select power is On with no rod selected.
- D. SHUTDOWN or REFUEL and indicates all control rods are fully inserted except for the selected rod; rod select power is On with only one rod selected.

3.

Unit Two was 95% power when annunciator A-07 2-2, REACTOR WATER LEVEL HIGH/LOW, alarmed. Feed pump "B" Flow Controller is in manual following erratic operation in automatic. Plant conditions are:

Reactor power	83% lowering
Reactor water level	+180 inches rising
Feedwater Flow A	5.3 Mlbs/hr
Feedwater Flow B	0.9 Mlbs/hr
Recirc Pump A Speed	63% lowering
Recirc Pump B Speed	70% lowering
Core Flow	59 Mlbs/hr lowering

Which ONE of the following describe the actions that should be taken?

- A. Lock the scoop tube for the 'A' Recirc pump; monitor for Thermal Hydraulic Instabilities.
- B. Lock the scoop tubes of both recirc pumps and then monitor for Thermal Hydraulic Instabilities.
- C. After level is restored, adjust recirc pump potentiometers to match demand and speed, and reset runback.
- D. Take manual control of recirc pump speeds and ensure that a mismatch of greater than 10% does not occur.

4.

Unit Two (2) is in Mode 1, in an active LCO for Recirculation Pump 2A out of service. Preparations are in progress to restart Recirculation Pump 2A per *OP-02, Reactor Recirculation System Operating Procedure*. The following data is recorded within 30 minutes of the planned start of Recirculation Pump 2A:

Reactor pressure	985 psig
Bottom head drain temp	410°F
Recirc loop A temp	486°F
Recirc loop B temp	522°F
Recirc loop B flow	25,800 gpm

Which ONE of the following is correct concerning the restart of Recirculation Pump 2A?

- A. It may continue, all requirements are met.
- B. It may NOT continue, the Delta T between the operating and the idle loop is excessive.
- C. It may NOT continue, the Delta T between the coolant in the dome and bottom head is excessive.
- D. It may NOT continue, the operating Recirc loop flow rate is excessive.

5.

Unit 2 was at 100% RTP when a small break LOCA concurrent with a loss of all high pressure makeup capability to the reactor occurred. The Reactor is being depressurized using the SRVs due to level not being able to be maintained above TAF. All RHR and Core Spray pumps have started as required with normal indications. Reactor pressure is approximately 400 psig at this time.

Concerning the "A" RHR system only, which ONE of the following describes the expected system parameters and configuration?

- A. Both LPCI "A" injection valves OPEN, "A" system flow indicates 0 gpm, "A" and "C" RHR Pump discharge pressures are approximately 200 psig.
- B. Both LPCI injection valves CLOSED, "A" system flow indicates 0 gpm, "A" and "C" RHR Pump discharge pressures are approximately 200 psig.
- C. Both LPCI "A" injection valves OPEN, "A" system flow indicates 12,000 gpm, "A" and "C" Pump discharge pressures are approximately 400 psig.
- D. Both LPCI "A" injection valves CLOSED, "A" system flow indicates 2300 gpm, "A" and "C" RHR Pump discharge pressures are approximately 200 psig.



6.

Following a reactor scram the Reactor operator attempts to place the RWCU in the reject mode of operation to aid in level control. Following the valve manipulation you note that: valve G31-F004 has closed, and the inboard isolation valve G31-F001 is opened and you have lost condenser vacuum.

Which ONE of the following could have caused the above?

- A. BOTH the Reject to Condenser Valve, F034 AND the Reject to Radwaste Valve, G31-F035 were opened simultaneously and there was a non-regenerative heat exchanger high temperature signal.
- B. BOTH the Reject to Condenser Valve, F034 AND the Reject to Radwaste Valve, G31-F035 were closed simultaneously and there was a non-regenerative heat exchanger high temperature signal.
- C. BOTH the Reject to Condenser Valve, F034 AND the Reject to Radwaste Valve, G31-F035 were opened simultaneously and there was a Local SLC pump start signal.
- D. BOTH the Reject to Condenser Valve, F034 AND the Reject to Radwaste Valve, G31-F035 were closed simultaneously and there was a Local SLC pump start signal.

7.

Unit 2 is at 10% power with RWCU filter demin in service and RWCU reject flow in progress.

Which ONE of the following is correct concerning the PPC heat balance if Process Computer Point B074, RWCU Inlet Flow, is NOT available?

The PPC heat balance will be:

- A. up to 3 CMWT lower than actual reactor power because computer points only get input from RWCU filter demin flow.
- B. up to 6 CMWT lower than actual reactor power because computer points only get input from RWCU temperature.
- C. up to 3 CMWT higher than actual reactor power because computer points only get input from RWCU filter demin flow.
- D. up to 6 CMWT higher than actual reactor power because computer points only get input from RWCU temperature.

8.

Which ONE of the following components prevents water from being forced up the HPCI exhaust line as the suppression pool pressurizes during a LOCA?

- A. HPCI exhaust line vacuum breakers.
- B. HPCI exhaust line T-quencher.
- C. HPCI exhaust isolation valve.
- D. HPCI exhaust drain pot.

9.

With Unit 1 operating at rated conditions and Unit 2 at 75% power, Unit 2 annunciator A3 2-6; CORE SPRAY SYS 2 LOGIC PWR FAILURE, is received. Investigation reveals a tripped circuit breaker in Panel 4B which powers CORE SPRAY SYS 2 LOGIC.

Which ONE of the following describes the effect this has on a subsequent Unit 2 LOCA initiation?

- A. DIV II Emergency diesel generators will not auto start.
- B. DIV II Non Interruptible RNA isolation valve will not isolate and DIV II N2 BU isolation valve will not open.
- C. Drywell coolers B and C will not trip.
- D. DIV II RHR pumps will not auto start.

10.

Which ONE of the following contains a correct list of indications that are used to verify the Standby Liquid Control System is operating properly once the system has been initiated? (Not necessarily all the indications)

- A. Squib valve loss of continuity alarm annunciated, storage tank level decreasing, discharge pressure slightly lower than reactor pressure.
- B. Red light indicating pump is running, reactor water level will increase, squib valve status lights are illuminated.
- C. Storage tank level decreasing, RWCU suction valve G31-F004 opens, squib valve status lights are extinguished.
- D. Indicated SLC pump discharge pressure will increase to greater than reactor pressure, squib valve status lights are extinguished, RWCU suction valve G31-F004 closes.

11.

Unit two is operating at 100% power when there is a loss of 125 VDC distribution panel 4B on the Unit 2 Reactor Protection System.

Which ONE of the following describes the direct effect of this loss on the RPS?

- A. All ARI valves fail open, venting the scram air header.
- B. Outboard ARI valves fail open, venting the scram air header through the inboard ARI bypass check valves.
- C. Both backup scram valves remain as is, scram air header remains pressurized.
- D. Upstream backup scram valve fails open, venting the scram air header through the downstream backup scram valves bypass check valve.

12.

Which ONE of the following explains why a "ROD DRIFT" alarm is received after moving a control rod using the "EMERGENCY IN" switch?

- A. "EMERGENCY IN" bypasses the Rod Position Indication System.
- B. The sequence timer is bypassed causing an insert and withdraw signal at the same time.
- C. The rod is at an even reed switch and none of the selected relay busses are energized (insert, withdraw or settle).
- D. The rod is at an odd reed switch and none of the selected relay busses are energized (insert, withdraw or settle).

13.

Unit 1 is in the process of performing *OGP-01, Prestartup Checklist step 6.2.9, Source Range Monitor Checks*.

Which ONE of the following describes the minimum requirements for the SRM's?

- A. Ensure at least 2 SRM channels are OPERABLE and indicate  $\geq 5$  cps.
- B. Ensure at least 2 SRM channels are OPERABLE and indicate  $\geq 10$  cps.
- C. Ensure at least 3 SRM channels are OPERABLE and indicate  $\geq 5$  cps.
- D. Ensure at least 3 SRM channels are OPERABLE and indicate  $\geq 10$  cps.



14.

Unit 1 is in Mode 2 with the Mode Switch in START/HOT STBY. Annunciator *APP A-05 2-2, ROD OUT BLOCK*, is in alarm. APRM readings are as follows:

APRM 1	13%
APRM 2	Downscale
APRM 3	15%
APRM 4	14%

Which ONE of the following describes the effect on the plant for these conditions and the reason for the response?

- A. A scram should have occurred due to APRM 2 being Downscale and APRM 3 at the Upscale Trip setpoint.
- B. A 1/2 scram should have occurred on RPS Channel A due to APRM 3 at the Upscale Trip setpoint.
- C. A 1/2 scram should have occurred on RPS Channel B due to APRM 2 being downscale.
- D. The ROD OUT BLOCK alarm is the only expected actuation due to the position of the Mode Switch.

15.

If the Topaz Inverter in Analog Trip Cabinet XU-68 (RPS B-2) had an open circuit and failed, then which ONE of the following should occur?

- A. There will be no interruption of power to cabinet XU-68 as the power supply in XU-67 (RPS B-1) will provide power to both cabinets.
- B. There will be no interruption of power to cabinet XU-68 as there is a second Topaz Inverter in panel XU-68 that is in parallel with the Topaz Inverter that failed.
- C. All associated instruments will lose power generating a trip signal. There will be a 1/2 scram and Group 1 PCIS as well as valve actuation for PCIS Groups 2, 6 and 8.
- D. All associated instruments will lose power but will not generate any trip signals. The plant will continue to operate, but Tech Specs should be addressed for each instrument.

16.

Which ONE of the following is correct concerning the RCIC Steam Supply Inboard Isolation Valve (E51-F007)?

- A. AC powered due to less likely to spark during operation and more reliable in a hostile environment.
- B. DC powered due to less likely to spark during operation and more reliable in a hostile environment.
- C. Cannot be powered from an Alternate Safe Shutdown Feeder since the valve is normally in the Open position.
- D. May be throttled closed or open if isolation signal is not present to slowly warm the RCIC steam line.

17.

Unit 2 is operating at 80% RTP. The RCIC system is in standby with a suction from the CST. The quarterly HPCI flow rate test is in progress and is taking longer than expected. Torus level has reached -24" and preparations are being made to pump the torus down to normal level within the 2 hour Tech Spec time limit.

Which ONE of the following describes the effect high Torus level had on RCIC?

- A. No effect since the RCIC suction valves do not transfer on high torus level.
- B. The Torus suction valves (F029 & F031) received an open signal and once both valves were full open then the CST suction valve (F010) received a closed signal.
- C. The Torus suction valves (F029 & F031) received an open signal at the same time the CST suction valve (F010) received a closed signal.
- D. The CST suction valve (F010) received a closed signal and when it was full closed then the Torus suction valves (F029 & F031) received an open signal.

18.

Unit Two just entered a shutdown LCO due to HPCI and RCIC being inop, when a Loss-of-Off-site Power occurs. EDGs 3 and 4 fail to start. Unit One buses E1 and E2 remain energized throughout the event. Pressure is being maintained 800 - 1000 psig using SRVs. Level has been below 45 inches for 5 minutes and is currently +25 on the N026's.

Assuming ADS was NOT inhibited, which ONE of the following describes how ADS would respond to #4 EDG starting?

7 ADS valves would auto open \_\_\_\_\_ seconds after the diesel tied to E4.

- A. 10
- B. 15
- C. 83
- D. 93

19.

Unit Two is in RHR/LPCI suppression pool cooling mode with an elevated suppression pool temperature of 180 °F. The VITAL Service Water Header supply valve was inadvertently closed. The valve was manually opened 10 minutes later.

Which ONE of the following occurred before the valve was reopened?

- A. ONLY RHR Pump Seal temperatures increased.
- B. ONLY RHR SW Pump Motor temperatures increased.
- C. BOTH RHR Pump Seal temperatures and RHR SW Pump Motor temperatures increased.
- D. NEITHER RHR Pump Seal temperatures NOR RHR SW Pump Motor temperatures all have increased.

20.

Following a LOCA, Unit Two has been Emergency Depressurized during a high power ATWS and all control rods are now fully inserted. Injection with the only available injection systems (2A Core Spray, and B Loop RHR) has been maximized to raise RPV level and adequate core cooling is assured.

Plant conditions are:

Torus Pressure	19 psig, slowly lowering
Torus Level	-5.5 feet, slowly lowering
Torus Water Temp.,	220 °F, steady
Drywell Avg. Temp.	287 °F, lowering
Reactor Level	-35 ", rapidly rising
Reactor Pressure	50 psig

The operating crew should do which ONE of the following per Emergency Operating Procedures?

- A. Continue with maximum injection until above the top of active fuel.
- B. Secure the B Loop of RHR and continue to raise level with the 2A Core Spray Pump.
- C. Reduce injection flow from Core Spray to maintain the minimum containment cooling requirements.
- D. Secure the 2A Core Spray Pump and continue to raise level with the B Loop of RHR.

21.

Unit 2 was in an extended shutdown. A startup has been conducted and reactor power is at 47%. A position indicator for one of the Suppression Chamber-to-Drywell Vacuum Breakers indicates that the vacuum breaker is OPEN. Alternate vacuum breaker position indication is not available.

Which ONE of the following statements is correct?

- A. Continued operation is allowed as long as the other vacuum breakers indicate closed and the containment differential pressure test is proven acceptable within 4 hours.
- B. Begin a normal reactor shutdown within 8 hours. Be in HOT SHUTDOWN within the next 12 hours. Initiate repairs to the vacuum breaker to restore the breaker to operation prior to restart.
- C. Immediately begin a plant shutdown and cooldown. Be in HOT SHUTDOWN within 12 hours and be in COLD SHUTDOWN within the next 24 hours. Initiate repairs to restore the vacuum breaker to operation.
- D. Initiate a manual reactor scram. Conduct a drywell entry to initiate repairs to the vacuum breaker as soon as possible. If repairs are not completed within 8 hours, place the plant in COLD SHUTDOWN within the next 24 hours.



22.

An Instrument Tech mistakenly throttles the bypass valves on an MSIV's hydraulic dash pot.

Which ONE of the following describes the effect of this manipulation?

It will result in a change in:

- A. closing torque.
- B. packing leakage.
- C. closing time.
- D. closing setpoint.

23.

U-2 RCIC System is running with the following conditions present 10 minutes after the event:

Reactor Water Level	-38 inches
Drywell Pressure	+1.5 psig
Suppression Chamber Ambient Temp.	170°F
RCIC Steam Line pressure	900 psig
RCIC Emergency Area Cooler Temp	100°F and rising slowly

An operator has been sent to the RCIC room and reports that there is a small steam leak on the line upstream of the Trip and Throttle valve. The Shift Supervisor orders the Reactor Operator to manually isolate RCIC.

Which ONE of the following describes the effect on RCIC when the manual isolation pushbutton is depressed?

- A. Inboard and Outboard Steam Supply Isolation valves F007 and F008 close and the RCIC turbine trips.
- B. Inboard Steam Supply Isolation valve F007 closes and the RCIC turbine trips.
- C. Outboard Steam Supply Isolation valve F008 closes and the RCIC turbine trips.
- D. No effect on RCIC since the system should already be isolated.

24.

Unit 1 was operating at 100%, when a loss of EHC caused a turbine trip without bypass valves. SRVs operated as required, and pressure crested at 1142 psig.

Disregarding the setpoint drift tolerance, which ONE of the following indicates how many SRVs opened in response to the pressure transient?

- A. 4
- B. 7
- C. 8
- D. 11

25.

During an overpressure transient, an operator has opened an SRV to control pressure. RPV pressure is 1005 psig.

Which ONE of the following is the expected tail pipe temperature for the SRV that is open, as indicated on ERFIS?

A. 212 °F

B. 300 °F

C. 350 °F

D. 545 °F

26.

Unit 2 is holding load at 75% Reactor Power when the operator receives the "Turbine Vacuum Low" alarm.

Which ONE of the following describes the expected sequence of actions as condenser vacuum continues to decrease from 24.7" Hg Vac (alarm setpoint) to 0" Hg Vac?

- A. 1st - Main Turbine trips.  
2nd - Main Turbine Bypass Valves close.  
3rd - MSIV's close.
- B. 1st - MSIV's close.  
2nd - Main Turbine trips.  
3rd - Main Turbine Bypass Valves close.
- C. 1st - Main Turbine trips.  
2nd - MSIV's close.  
3rd - Main Turbine Bypass Valves close.
- D. 1st - Main Turbine Bypass Valves close.  
2nd - MSIV's close.  
3rd - Main Turbine trips.

27.

Assume the Unit 2 Main Generator is operating with the following conditions:

- 800 MWe
- 400 MVARs out
- 60 psig Hydrogen Pressure

To facilitate an on-line adjustment to the Hydrogen Sealing system the Hydrogen pressure is lowered to 48 psig.

Which ONE of the following describes the effect on the Main Generator?

- A. Main Generator operation will be unaffected.
- B. Main Generator armature will begin to overheat.
- C. Main Generator armature core end will begin to overheat.
- D. Main Generator field windings will begin to overheat.

28.

Unit One and Unit Two are operating at 100% power. The following annunciators are received on Unit One.

UA-13 3-9 SAT Fault Pressure  
UA-13 1-9 SAT Lockout

Which ONE of the following describes which Condensate Transfer Pump(s) will have power?

- A. Unit One only.
- B. Unit Two only.
- C. Both Unit One and Unit Two.
- D. Neither Unit One nor Unit Two.

29.

Unit One is at 100% power with Feedwater level control (FWLC) in 3 ELEM and the Reactor Water Level Select Switch in LEVEL A (N004A).

Which ONE of the following describes how the DFWLC system will respond to the B level instrument (N004B) failing high?

- A. Transfer to 1 ELEMENT and utilize the C level instrument (N004C) for level control.
- B. Remain in 3 ELEMENT control and continue utilizing the A level instrument (N004A) for level control.
- C. Transfer to 1 ELEMENT control and continue utilizing the A level instrument (N004A) for level control.
- D. Remain in 3 ELEMENT and utilize the C level instrument (N004C) for level control.



30.

Which ONE of the following describes the effect that a loss of SBTG would have on the RCIC and HPCI systems?

- A. There would be no effect since the SBTG system is not connected to HPCI or RCIC.
- B. Both the RCIC Barometric Condenser and the HPCI Vacuum Pump Discharge line would be effected.
- C. Only the RCIC Barometric Condenser would be effected.
- D. Only the HPCI Vacuum Pump Discharge line would be effected.

31.

The following conditions exist on Unit 2:

Reactor Power	50%
Stator Water Coolant Pumps A/B	De-energized 3 minutes ago
Rapid power reduction	In-progress for 3 minutes
Generator output	400 MWe
Stator amps	9800 A
Turbine Bypass Valves	CLOSED

Which ONE of the following describes how the plant would respond if all four of the Unit 2 incoming 230 KV lines were suddenly lost?

- A. A turbine trip due to failure to meet runback criteria, and a reactor scram.
- B. A generator load reject will occur but the reactor will stay on line.
- C. A generator load reject causes a TCV fast closure and a reactor scram.
- D. A TCV fast closure causes an APRM setdown and an SRI initiation, but the reactor will stay on line.

32.

Unit One is operating at 100% and the following annunciators are received:

GEN LOSS OF EXC (UA-13 3-1)  
VOLT BALANCE RELAY A OPERATION (UA-23 6-6)  
GENERATOR AUTO TRIP TO MANUAL (UA-13 1-4)

Which ONE of the following describes the plant response to these conditions?

- A. The generator remains on line and the voltage regulator will maintain generator field voltage constant.
- B. A generator lockout is received with a turbine trip. Four EDGs AUTO start and a reactor scram occurs.
- C. The generator remains on line. The voltage regulator will maintain generator terminal voltage constant.
- D. A generator lockout is received with a turbine trip. No EDGs AUTO start and a reactor scram occurs.

33.

Which ONE of the following is the power supply to the Outboard MSIV's DC solenoids on Unit One (1)?

- A. Div 1 Switchboard 21A.
- B. Div 2 Switchboard 22B.
- C. Div 1 Switchboard 1A.
- D. Div 2 Switchboard 1B.

34.

During an ATWS on Unit Two (2), RPV level is being controlled at Top of Active Fuel (TAF).

Actions to terminate and prevent RHR injection have been completed. A fault on Bus 2C results in LOSS of Bus E4.

Which ONE of the following describe the RHR pump response as DG4 re-energizes bus E4?

- A. RHR pumps 2B and 2D both remain overridden off.
- B. RHR pumps 2B and 2D both restart 10 seconds later.
- C. RHR pump 2D restarts 10 seconds later, RHR pump 2B remains off.
- D. RHR pump 2B restarts 10 seconds later, RHR pump 2D remains off.

35.

Unit 2 experiences a Loss of Off-Site Power (LOOP) with EDG #4 under clearance.

Which ONE of the following describes how the Nuclear Service Water (NSW) and Conventional Service Water (CSW) pumps will respond as EDG #3 output breaker closes and energizes bus E3?

- A. NSW pump 2A and CSW pump 2A start immediately.
- B. NSW pump 2A starts immediately and CSW pump 2A does not start.
- C. NSW pump 2A and CSW pump 2A start after a 5 second time delay.
- D. NSW pump 2A starts after a 5 second time delay and CSW pump 2A does not start.

36.

During a radwaste discharge to the Unit One weir, a Radwaste Effluent RAD Hi Hi alarm annunciates. Which one of the following describe the actions, if any, that must be taken if you desire to close both Unit's Radwaste Discharge valves (D12-V27A and D12-V27B) and the Radwaste Flow Control valve (G16-FCV-189)?

- A. Valves D12-V27A, D12-V27B, and G16-FCV-189 must be closed manually, no auto signal.
- B. Valves D12-V27A and D12-V27B receive a close signal. Valve FCV-189 must be manually closed, no auto signal.
- C. Valve FCV-189 receives a close signal. D12-V27A and D12-V27B must be manually closed, no auto signal.
- D. No actions required, all three valves receive a close signal.

37.

During Unit One operation at 100% power, the control operator is performing OPT-04.1.7, Main Condenser Air Ejector Radiation Monitor Functional Test. The backpanel operator places the "A" Steam Jet Air Ejector (SJAE) rad monitor NUMAC drawer (D12-RM-K601A) "INOP/OPER" keylock switch to the "INOP" position.

Which one of the following is the expected plant response?

- A. AOG bypass valve, HCV-102, immediately closes ONLY.
- B. AOG bypass valve, HCV-102, immediately closes AND main condenser vacuum begins to degrade.
- C. PROCESS OFFGAS RAD MONITOR DOWNSCALE/INOP alarm is received and the process offgas timer initiates.
- D. PROCESS OFFGAS RAD MONITOR DOWNSCALE/INOP alarm is received and the process offgas timer does NOT initiate.



38.

You are the Shift Supervisor on Unit 1. Following a LOCA, plant conditions are:

Reactor water level	+200 inches
Drywell pressure	28 psig
Rx Bldg Vent Radiation	12 mR/hr
Primary Containment H <sub>2</sub> O <sub>2</sub>	Cannot be determined

You direct a containment purge using the CAD system. The CAC DIV I and DIV II Isolation (Soft) Override Switches and the CAC Purge Vent Isolation (Hard) Override Switch, CAC-CS-5519, are placed in OVERRIDE.

The CAC isolation valves that you directed opened earlier are still under override to OPEN, but have closed automatically.

Which ONE of the following caused this to occur?

- A. Reactor water level has dropped an additional 50 inches.
- B. Main stack radiation has risen to the Hi-Hi setpoint.
- C. Reactor Building ventilation radiation has increased by an additional 8 mR/hr.
- D. Reactor Building ventilation exhaust temperature has risen to 140 °F.

39.

Unit 2 is in single loop operation at 45% RTP. Preparations are being made to restart the idle Recirculation Pump. The Control Operator reduces the operating Recirc Pump speed so that core flow is less than 40% rated core flow prior to starting the idle Recirc Pump.

Which ONE of the following describes the affect on the plant if this condition is maintained for an extended period of time?

- A. The operating recirc pump seals may be damaged due to operating at the lower pump speed.
- B. Thermal hydraulic instabilities may develop due to the increased natural circulation at the lower core flow.
- C. The bottom head temperature will increase due to increased natural circulation at the lower core flow.
- D. The idle loop temperature may decrease such that the 50 °F differential temperature limit between the operating loop and idle loop is exceeded.

40.

The reactor is at 30% power. Which ONE of the following describes the impact on continued plant operation during a complete loss of the Conventional Service Water system?

- A. The plant should commence a shutdown immediately due to loss of cooling water to all of the ECCS Room coolers.
- B. The plant should commence a shutdown immediately due to loss of cooling to the RBCCW Heat Exchangers.
- C. The plant should reduce power as necessary to maintain equipment operating that is supplied by TBCCW.
- D. The reactor must be scrammed due to imminent loss of condenser vacuum.

41.

Which ONE of the following describes why the Main Turbine automatically trips on lowering condenser vacuum?

- A. Lowering condenser vacuum decreases the NPSH to the condensate pumps and the turbine is tripped to prevent a loss of feedwater to the reactor due to the Condensate pumps tripping on low suction pressure.
- B. Lowering condenser vacuum reduces the amount of energy that can be removed from steam entering the turbine which causes increased dynamic loading on the last stage blades and increases turbine vibration.
- C. The turbine is tripped on lowering condenser vacuum to prevent a steam leak into Secondary Containment due to a positive pressure occurring within the condenser and rupturing the turbine casing overpressure discs.
- D. The turbine is tripped on lowering condenser vacuum to prevent damage to the turbine shaft due to increased torque from trying to push the steam through the turbine.

42.

A LOCA has occurred on Unit 1 which requires the E1 Emergency Bus to be supplied by Diesel Generator #1.

Which ONE of the following describes the sequence of events that prevents the Diesel Generator from being overloaded?

- A. Bus E1 load shed occurs and then the following pumps start in the given order at 5 second intervals: RHR pump 1C, Core Spray pump 1A, NSW pump 1A.
- B. Bus E1 load shed occurs and then the following pumps start in the given order at 5 second intervals: NSW pump 1A, RHR pump 1C, Core Spray pump 1A.
- C. Bus E1 sheds all loads except RHR pump 1C and then the following pumps start in the given order at 5 second intervals: Core Spray pump 1A and NSW pump 1A.
- D. Bus E1 sheds all loads except Core Spray pump 1A and then the following pumps start in the given order at 5 second intervals: RHR pump 1C and NSW pump 1A.

43.

During a Station Blackout, RPV cooldown is in progress on the Blacked Out Unit with the following RPV pressures recorded at the indicated times:

0100	540 psig
0115	420 psig
0130	300 psig
0145	210 psig
0200	150 psig

Per AOP-36.2, the cooldown rate is:

- A. satisfactory but the cooldown must be stopped.
- B. satisfactory and the cooldown should be continued.
- C. too low and the cooldown rate should be increased.
- D. excessively high and the cooldown rate should be lowered.

44.

The following conditions exist on Unit 1:

- HPCI system will not auto initiate, HPCI flow controller indication is lost.
- B logic is lost for the ADS system.
- RCIC will not trip on Hi water level and the inboard isolation logic is lost.
- Core Spray Loop A will not auto initiate.
- Inboard MSIV DC solenoids de-energize.

Which ONE of the following 125 VDC Distribution Panels was lost?

- A. 3A.
- B. 11A.
- C. 1XDA.
- D. 1XDB.

45.

Unit 2 was operating at 100% RTP when the reactor scrammed due to a turbine trip.

In addition to the Turbine Stop Valves closing, which ONE of the following correctly describes the remaining turbine valve response?

- A. Turbine Control Valves - Closed  
Intercept Valves - Closed  
Intermediate Stop Valves - Open  
Bypass Valves - One or more may be open depending on throttle pressure
- B. Turbine Control Valves - Open  
Intercept Valves - Closed  
Intermediate Stop Valves - Closed  
Bypass Valves - All open initially; throttle closed to control Rx pressure.
- C. Turbine Control Valves - Closed  
Intercept Valves - Open  
Intermediate Stop Valves - Closed  
Bypass Valves - One or more may be open depending on throttle pressure
- D. Turbine Control Valves - Closed  
Intercept Valves - Closed  
Intermediate Stop Valves - Closed  
Bypass Valves - All open initially; throttle closed to control Rx pressure.



46.

The following conditions exist on Unit 2:

Reactor power	23%
Reactor water level	160 inches
Reactor pressure	980 psig
Drywell pressure	1.3 psig
Drywell temperature	145 °F
Reactor Bldg Vent Exhaust Rad Monitor	2.5 mR/hr
Main Steam Line Rad Monitor	1.3 times normal full power reading

Which ONE of the following indicates which EOP's should be entered at this time?

- A. EOP-01-LPC, Level/Power Control;  
EOP-03-SCCP, Secondary Containment Control Procedure.
- B. EOP-01-LPC, Level/Power Control ONLY.
- C. EOP-01-RVCP, Reactor Vessel Control Procedure ONLY.
- D. EOP-01-RVCP, Reactor Vessel Control Procedure;  
EOP-04-RRCP, Radioactivity Release Control Procedure.

47.

Unit Two has inserted a manual Reactor scram due to lowering condenser vacuum. Control rods failed to insert on the scram. Plant conditions:

Reactor power	31%
Steam flow	3.2 Mlbm/hr.
Reactor pressure	960 psig, controlled by EHC
Drywell pressure	0.6 psig
Mode Switch	RUN
Main Turbine	Tripped on low vacuum

The operator is performing LEP-02, Section 3 to reset and scram the Reactor. Jumpers to bypass RPS trip signals have been requested but NOT yet installed.

Which ONE of the following would prevent the operator from resetting RPS prior to jumper installation?

- A. Scram discharge volume Hi Hi level RPS trip sealed in.
- B. Turbine stop valves closed with reactor power above 30%.
- C. Reactor water level is controlling at the setdown setpoint.
- D. IRMs upscale Hi Hi due to being inserted but not ranged up.

48.

Unit 2 is operating at 80% power when INBOARD MSIV B21-F022A fails closed.

Which ONE of the following describes the effect on Reactor Pressure and Pressure Averaging Manifold (PAM) Pressure after conditions stabilized, relative to the 80% power?

- A. Reactor pressure would have increased, and PAM Pressure would have increased.
- B. Reactor pressure would have remained the same, and PAM Pressure would have increased.
- C. Reactor pressure would have increased, and PAM Pressure would have remained the same.
- D. Reactor pressure would have remained the same, and PAM Pressure would have remained the same.

49.

Which ONE of the following is the reason the Reactor Feed Pumps are required by Technical Specifications to automatically trip on high reactor water level?

- A. Tripping the feedwater pumps prevents vessel level from exceeding the high level trip setpoints for HPCI and RCIC only, so that they remain available if necessary.
- B. Tripping the feedwater pumps prevent damage to the feedwater pump turbines by limiting water addition to the vessel.
- C. Tripping the feedwater pump turbines limits further vessel level increase thereby terminating the overfeed event.
- D. Tripping the feedwater pump turbines limits further vessel level increase and is the only means of preventing water from entering the main turbine.

50.

Which ONE of the following is the basis for lowering RPV water level during an ATWS condition?

- A. Reduces reactor power by reducing the natural circulation driving head.
- B. Reduces steam generation rate which reduces the moderator temperature.
- C. Prevents thermal stratification which prevents localized power peaks.
- D. Reduces reactor pressure which allows more injection from low pressure systems.

51.

Reactor water level has just dropped suddenly to 158 inches. Control rod position indications are unavailable. APRMs are down scale and periods indicate -80 seconds.

Which one of the following describes correct EOP pathway(s) that must be executed?

- A. Enter RSP then go to RVCP.
- B. Enter RSP then go to L/PC.
- C. Enter L/PC then go to RVCP and execute RC/L and RC/P concurrently.
- D. Enter RVCP then execute L/PC, RC/L and RC/P concurrently.

52.

The following conditions exist on Unit 1:

Drywell pressure	2.0 psig
Drywell temperature	180 °F
Reactor water level	+55 inches
Reactor pressure	400 psig
Drywell Cooler Override Switch position	NORMAL

Which ONE of the following describes the condition of the Drywell Cooler fans?

- A. All cooling fans are tripped.
- B. Div I cooling fans tripped, Div II cooling fans running.
- C. Div I cooling fans running, Div II cooling fans tripped.
- D. All cooling fans running.

53.

A DBA LOCA has occurred on Unit 2 and the following conditions exist:

Drywell Pressure	62 psig and increasing at 2 psig/min
Reactor Water Level	-20 inches and increasing at 10 "/min with RHR pumps
Average Drywell Temp	280 °F
PC Water Level	20 ft and increasing slowly

Which ONE of the following should be ordered by the Shift Supervisor?

- A. Vent the Torus. Do not exceed ODCM limits for radiological release rates.
- B. Vent the Drywell IRRESPECTIVE of offsite radiological release rates.
- C. Spray the Drywell after verifying within Drywell Spray Initiation Limit.
- D. Enter the Severe Accident Guidelines (SAG's).



54.

Following a reactor scram, drywell temperature is 225 °F. Which ONE of the following describes the position of the MIN/MAX control switch on Panel XU-3 for the Drywell Lower Vent dampers, the reason it is in that position, and the actual damper position?

Assume NO operator actions:

- A. MIN position so that the Reactor Building Closed Cooling Water system is not overloaded. Dampers will actually be in the MIN position.
- B. MAX position to minimize DP between the torus and the drywell. Dampers will actually be in the MIN position.
- C. MIN position to prevent extreme temperature excursions in the upper drywell regions during normal operation. Dampers will actually be in the MAX position.
- D. MAX position to maximize drywell cooling AND to distribute the air flow in all portions of the drywell evenly. Dampers will actually be in the MAX position.

55.

During Unit 1 operation at rated power, annunciator A-03.1-1, SAFETY OR DEPRESS VLV LEAKING was received. SRV sonics indicate the valve is OPEN. A check of the Suppression Pool parameters indicate an average temperature of 93 °F with a steady, rising trend.

Which one of the following describe the actions that should be immediately taken?

- A. Cycle the control switch of the affected SRV to OPEN and CLOSE/AUTO several times while maintaining Suppression Pool temperature below 110 °F.
- B. Commence a reactor shutdown per 0GP-05 and perform an inspection of the drywell and suppression pool in the area of the failed SRV prior to startup.
- C. Manually scram the reactor and enter EOP-01 and 0AOP-14.0 due to the increasing Suppression Pool temperature from the stuck open SRV.
- D. Commence a reactor shutdown per 0GP-05 and place RHR Suppression Pool Cooling in service as required.

56.

Unit 1 has been operating at 75% RTP with a leaking Safety/Relief valve (the valve is still OPERABLE). This has caused the local Suppression Pool temperature in the area around the T-quencher to reach 111°F. The average Suppression Pool temperature is steady at 93°F.

Which ONE of the following describes the effect, if any, on continued plant operation?

- A. The Tech Spec limit for Suppression Pool average temperature has been exceeded. Average temperature must be lowered to  $\leq 90$  °F within 24 hours.
- B. No TS limit has been exceeded. However, Supression Pool Cooling **MUST** be placed in service to restore the T-quencher to  $\leq 110$  °F.
- C. The Suppression Pool temperature Tech Spec limit of 110 °F has been exceeded. The reactor must be scrammed immediately.
- D. No TS limit has been exceeded.

57.

During a Unit 2 main turbine trip, reactor pressure peaked at 1145 psig and reactor water level lowered to 125 inches. While responding to the transient, the reactor operator reports both Reactor Recirculation pumps are running. He is directed to trip both pumps. Which one of the following is the basis for these actions?

- A. Add negative reactivity counteracting the positive reactivity addition resulting from the pressure rise during the turbine trip ONLY.
- B. Promote level swell in the reactor vessel counteracting the level shrink effects caused by the turbine trip ONLY.
- C. Add negative reactivity counteracting the positive reactivity addition resulting from the pressure rise AND promote level swell in the reactor vessel counteracting the level shrink effects caused by the turbine trip.
- D. Protect the recirculation pumps from inadequate NPSH due to the level shrink caused by the turbine trip.

58.

Which ONE of the following describes the Abnormal Operating Occurrences (Plant Transients) which increase fuel temperature?

- A. Recirc Flow Control Failure-Increasing Flow, Loss of Feedwater Heating, Inadvertent start of HPCI.
- B. Loss of Shutdown Cooling, Loss of Condenser Vacuum, Recirc Flow Control Failure-Decreasing Flow.
- C. Loss of Feedwater Heating, Trip of one Recirc Pump, Startup of idle Recirc Pump.
- D. Recirc Flow Control Failure-Increasing Flow, Loss of Condenser Vacuum, Turbine Trip with Bypass Valves available.

59.

Which ONE of the following describes the reason a cooldown is NOT initiated prior to the Cold Shutdown Boron Weight (CSBW) being injected during an ATWS condition?

- A. The cooldown will cause an increase in reactor power which will require more boron to be injected to maintain the reactor in an analyzed condition.
- B. Initiating a cooldown while injecting boron is an uncontrolled reactivity manipulation and it will prevent the boron from being uniformly mixed.
- C. Core reactivity response is unpredictable in a partially borated core and subsequent EOP steps may not provide the correct actions for such conditions.
- D. Cooldown is not allowed at this time to ensure that low pressure injection systems cannot inject into the vessel and add positive reactivity.

60.

A chlorine tank car rupture has made the Control Room inaccessible. If possible, prior to leaving the Control Room the Control Operator inserts a manual Scram per 0AOP-32.0, *PLANT SHUTDOWN FROM OUTSIDE CONTROL ROOM*.

Which ONE of the following describes why the procedure also has steps to Scram the reactor by de-energizing the RPS EPA's?

- A. The Technical Requirements Manual requires the capability to Scram the reactor from outside the Control Room.
- B. The Technical Specifications require that Reactor Scram capability from outside the Control Room be maintained.
- C. The FSAR requires the ability for prompt hot shutdown of the reactor from locations outside the Control Room.
- D. The capability for prompt hot shutdown of the reactor from outside the Control Room is not required but is a safe operating practice.

61.

Fuel bundles are being moved in the Unit 1 Fuel Pool when alarm *UA-03 3-5, PROCESS-RX-BLDG. VENT-RAD HI-HI* is received followed by a report that an irradiated fuel assembly has been dropped and damaged. The Control Operator notes that the Reactor Building ventilation failed to isolate on Unit 1 and manual actions to close the isolation valves have been unsuccessful. Radiation levels at the site boundary have started to increase.

Which ONE of the following is an **immediate** operator action for these conditions per 0AOP-05.0, Radioactive Spills, High Radiation, High Airborne Activity?

- A. Ensure the Control Room Emergency Ventilation System (CREVS) is in operation.
- B. Notify E&RC to perform surveys, post the area and control access to the affected area.
- C. Evacuate unnecessary personnel from the affected area.
- D. Stop all fuel movements.



62.

The Unit 2 Reactor Instrument Air Non-Interruptible/Pneumatic Nitrogen Supply (RNA/PNS) header pressure has dropped to 70 psig.

Which ONE of the following describes the effect this will have on the Inboard MSIV's?

- A. The Inboard MSIV's will not be affected due to the Backup Nitrogen valves SV-5481 and SV-5482 opening.
- B. The Inboard MSIV's should not be affected due to the accumulators associated with the valve operators.
- C. The Inboard MSIV's may start drifting closed due to a sustained low header pressure.
- D. The Inboard MSIV's will close immediately after RNA/PNS header pressure drops below 80 psig.

63.

A partial Group 2 isolation has just occurred on Unit 2.

Which ONE of the following conditions initiated the isolation?

- A. Drywell pressure at 1.5 psig.
- B. Reference leg leaks that lower reference leg pressure for Reactor Vessel Water Level LL#1 transmitters, *LT-N017C-1* and *LT-N017D-1*.
- C. A variable leg leak that lowers variable leg pressure for Reactor Vessel Water Level LL#1 transmitters, *LT-N017A-1* and *LT-N017B-1*.
- D. Drywell temperature at 155 °F.

64.

Which ONE of the following indications is used to monitor plant heatup/cooldown rate while in Alternate Shutdown Cooling with the SRVs?

- A. Recirculation loop suction line temperature.
- B. Safety relief valve tailpipe temperature.
- C. Steam dome pressure using steam table conversion.
- D. The running ECCS pump local suction temperature.

65.

Unit 1 is in Mode 4 with Shutdown Cooling established with the A Loop of RHR. Both Recirc Pumps are out of service at this time. A spurious signal has caused a Group 8 isolation which cannot be reset. Reactor vessel water level has been raised to +210".

Which ONE of the following describes the the most accurate method for determining if a Mode Change has occurred under these conditions?

- A. Verifying that the bottom head temperature is less than 212 °F ensures the Unit has not entered Mode 3.
- B. Verifying that the recirc loop suction temperatures are less than 212 °F ensures the Unit has not entered Mode 3.
- C. Verifying an increasing trend in reactor pressure has not been established ensures the Unit has not entered Mode 3.
- D. Verifying reactor vessel level has been raised to > 200" ensures natural circulation has been established and the Unit has not entered Mode 3.

66.

The Unit 1 Control Operator is walking down his panels when he notices that the CRD Flow Control Valve controller, C11-FC-R600 has failed such that the demand is 0 gpm. Flow Control Valve C11-F002A was in automatic at 60 gpm prior to the failure.

Which ONE of the following describes how Flow Control Valve C11-F002A can be controlled under these conditions?

- A. The Flow Control Valve will continue to operate at 60 gpm due to the local controller taking over control automatically.
- B. The Flow Control Valve will close until local controller C11-FK-D009A is taken to manual and adjusted as necessary.
- C. The Flow Control Valve will fully open until local controller C11-FK-D009A is taken to manual and adjusted as necessary.
- D. The Flow Control Valve will close and cannot be operated until controller C11-FC-R600 is repaired.

67.

Unit 2 is in Mode 5 with the fuel pool gates removed. Fuel Handlers are verifying the Refueling Interlocks after maintenance on the refuel bridge. 2A Core Spray pump is running for a flow rate surveillance when the operator inadvertently opens the Core Spray Injection Valve F005B. (Assume F004B is open)

Which ONE of the following describes the effect on the plant under these conditions?

- A. Fuel Pool water level will fill the skimmer surge tanks and cause the Fuel Pool Cooling Pumps to trip on high level.
- B. Reactor cavity water will drain to Radwaste through adjustable weirs located around the cavity walls.
- C. Fuel Pool water level will overflow into the Reactor Building Ventilation system.
- D. Fuel Pool water level will rise to the high level alarm setpoint at which time the Fuel Pool Cooling Pumps will trip.

68.

Which ONE of the following describes why Drywell Sprays are not initiated until Suppression Chamber pressure reaches 11.5 psig?

- A. This ensures that Suppression Chamber sprays are attempted before operation of Drywell sprays.
- B. This ensures that 100% of the non-condensibles are in the Suppression Chamber.
- C. This prevents opening of the Suppression Chamber to Drywell vacuum breakers when sprays are initiated.
- D. This prevents opening of the Reactor Building to Suppression Chamber vacuum breakers when Drywell sprays are initiated in a 100% steam atmosphere.

69.

Unit 1 was operating at 80% RTP when a loss of feedwater heating occurred.

Which ONE of the following describes the effect on the main turbine controls provided no operator action is taken?

PAM (Throttle) Pressure will \_\_\_\_\_ and send a signal to the Control Valves to \_\_\_\_\_.

- A. increase, close
- B. increase, open
- C. decrease, close
- D. decrease, open



70.

Which ONE of the following conditions would require entry in the Emergency Operating Procedures?

- A. Unit 1 Reactor Water Level at +168 inches following a Reactor Feed Pump trip.
- B. Unit 2 HPCI flow rate test in progress and Suppression Pool temperature at 102 °F.
- C. Unit 1 Reactor Pressure at 1065 psig following a spurious Group 1 isolation.
- D. Units 1 and 2 in Mode 4 with new fuel being moved into Unit 2 fuel pool and Reactor Building pressure cannot be maintained negative.

71.

Unit 2 is operating at 100% RTP. The HPCI system is currently running for an OPERABILTY flow test after maintenance has been performed. The Control Operator notes that Suppression Pool temperature is 96 °F.

Which ONE of the following indicates the event status and the color code displayed by the Safety System Parameter Display System (SPDS) with regards to the Suppression Pool temperature?

Event Status = \_\_\_\_\_; Color Code = \_\_\_\_\_

- A. Safe; Green.
- B. Caution; Yellow.
- C. Alarm; Red.
- D. Inactive; Cyan.

72.

Unit 2 was operating at 100% RTP when a LOCA occurred. Water level is being maintained above TAF with the HPCI system. The following conditions exist in the Drywell:

Drywell pressure	8.0 psig
Suppression Chamber pressure	7.5 psig
Drywell temperature	275 °F
Reactor pressure	700 psig
Suppression Chamber sprays	in progress

Which ONE of the following describes the effect on the indicated water level?

Assume the fuel zone level instrument reference leg piping height is longer than the variable leg piping height in the Drywell.

- A. Level indication will be reading lower than actual water level due to the reference leg having more water in it.
- B. Level indication will be reading lower than actual water level due to Drywell temperature being above 212 °F.
- C. Level indication will be reading higher than actual water level due to Drywell temperature being above 212 °F.
- D. Level indication will still read accurate level since the high Drywell temperature affects both the reference and variable legs equally.

73.

Unit 2 has developed an unisolable leak on the ECCS Suction header. Suppression Pool level continues to lower.

Which ONE of the following corresponds to the minimum level at which the HPCI System must be isolated irrespective of adequate core cooling?

- A. -2 feet and 7 inches
- B. -5 feet and 6 inches
- C. -6 feet and 5 inches
- D. -9.0 feet

74.

Unit 2 experienced a scram due to the loss of the Reactor Feedwater Pumps. Reactor water level initially dropped to +90 inches and has been restored to +150 inches and increasing slowly. The following conditions are present at this time:

HPCI system	currently injecting
RCIC system	in Standby alignment
Secondary Containment	isolated
SBGT system	operating normally
Group 2	isolated
Group 3	RWCU system in operation
Group 6	isolated
Group 8	isolated

Which ONE of the following describes the actions that should be taken at this time?

- A. Continue to monitor HPCI operation and restore reactor water level to the normal band. RCIC operation is not required.
- B. Start RCIC manually and then secure HPCI. Increase reactor water level to the normal operating band. All required PCIS Group isolations have occurred.
- C. Reset the Group 2 isolation immediately to prevent high drywell pressure and continue to monitor HPCI while restoring reactor water level to the normal band.
- D. Isolate the RWCU System, start RCIC manually, if possible, and continue to monitor reactor water level to ensure the normal operating band is obtained.

75.

Secondary Containment Control Procedure, EOP-03-SCCP, requires Emergency Depressurization if 2 or more areas exceed the Maximum Safe Operating Temperature and a primary system is discharging reactor coolant into secondary containment.

Which ONE of the following statements explain the reason for this action?

- A. The rise in secondary containment parameters indicate a wide-spread problem which may pose a potential threat to secondary containment integrity or preclude personnel access required for the safe operation of the plant.
- B. The rise in secondary containment parameters indicate substantial degradation of the primary system and may lead to fuel failure if the leaks are not isolated.
- C. The rise in secondary containment parameters indicate a wide-spread problem which may pose a direct and immediate threat to secondary containment integrity or equipment located in secondary containment.
- D. The rise in secondary containment parameters indicate substantial degradation of the primary system and emergency depressurization effectively isolates the leak.

76.

Unit 2 is operating at 50% RTP when alarm AREA RAD RX BLDG HIGH annunciates. Upon investigation the operator notes that the alarm is received from the Spent Fuel Cooling System (Channel 30) which is reading 95 mR/HR. Reactor Building Exhaust Radiation levels are 2 mR/HR with the system unisolated. The Equipment Operator reports that the Fuel Pool Heat Exchanger is leaking approximately 50 gpm from the end bell.

Which ONE of the following describes the actions required for this situation?

- A. Isolate all systems discharging into the area except those required to shutdown the reactor, assure adequate core cooling, or suppress a fire.
- B. Emergency Depressurize the reactor per the RC/P section of EOP-01.
- C. Shutdown the reactor by manual scram or GP-05 as directed by the SRO.
- D. Perform actions required by the Annunciator Response procedure since an entry condition to the EOP's does not exist.

77.

Unit 1 is operating at 100% RTP when a high radiation condition occurs in the Reactor Building. The following conditions exist in the Reactor Building:

Reactor Building Supply and Exhaust Fans	tripped
Both SBGT trains	running
Reactor Building vent isolation dampers (BFIVs)	open
Reactor Building Dp	zero

Which ONE of the following describes the impact on the plant due to the above conditions?

- A. An elevated release of radioactivity from the main stack could occur.
- B. A release of radioactivity outside containment will NOT occur due to both SBGT trains running.
- C. A release of radioactivity outside containment will NOT occur since the Reactor Building Supply and Exhaust fans have tripped.
- D. A ground level release of radioactivity could occur.



78.

Unit 2 has scrammed due to low reactor water level. Multiple control rods did not insert and the ATWS procedure is being directed by the Shift Supervisor. Current power level following the ATWS is 12% RTP. The Shift Supervisor has ordered the RO to insert control rods by increasing CRD cooling water differential pressure (dp).

Which ONE of the following describes how this action causes control rods to insert?

Increased cooling water dp:

- A. puts additional pressure on the underside of the CRDM drive pistons.
- B. puts additional pressure on the top of the CRDM drive pistons.
- C. causes driving flow to increase.
- D. causes driving flow to decrease.

79.

Unit 2 is executing EOP-04, Radiation Release Control Procedure. During the release, the radiation level has exceeded the ALERT Emergency level. The crew is directed to restart the Turbine Building Air Filtration Unit. Which one of the following is the reason for this action?

To ensure:

- A. any release to the Turbine Building can be routed through Standby Gas Treatment.
- B. any release to the Turbine Building is exhausted via an elevated release path.
- C. that the integrity of the Turbine Building is maintained.
- D. that accessibility to the Turbine Building is preserved.

80.

A loss of the Interruptible Instrument Air System has just occurred.

Which ONE of the following describe how the Reactor Feed Pump (RFP) recirculation valves and Startup Level Control Valve (SULCV) will be affected?

The RFP recirculation valves:

- A. and the SULCV fail open.
- B. and the SULCV fail closed.
- C. fail open and the SULCV fails closed.
- D. fail closed and the SULCV fails open.

81.

Unit One is in shutdown. You are reviewing a proposed special test of a Circulating Water Ocean Discharge (CWOD) Pump. The test has the Caswell Beach Local Control Panel control switch placed in the STOP position. The next step requires that an operator place the LOCAL/REMOTE control switch for the operating CWOD Pump in the LOCAL position.

Which ONE of the following describes the consequences of this action?

This will initiate:

- A. pump discharge valve closure with a pump trip when the discharge valve is less than 50% open.
- B. pump discharge valve closure with a pump trip when the discharge valve is less than 90% open.
- C. an immediate pump trip due to undervoltage but will NOT close pump the discharge valve.
- D. an immediate pump trip due to undervoltage and will close the pump discharge valve.

82.

Unit 1 experienced a LOCA with the following conditions present:

Drywell pressure	8.5 psig
Drywell temperature	255 °F
Reactor water level	+100 inches
Hydrogen concentration	Unknown

No operator action has been taken up to this point.

Which ONE of the following describes the method for monitoring containment Hydrogen concentration in accordance with EOP-02-PCCP?

- A. Notify E&RC to coordinate with Chemistry to obtain containment atmosphere samples manually. Hydrogen monitors are isolated and cannot be overridden.
- B. Place CAC Div I/II AC ISOL OVRD switches, CS-4178 and CS-4179, to the Override position and re-open the CAM sample valves. Depress the "Sample Start" pushbutton.
- C. Place CAM Div I/II ISOL OVRD switches, CS-2986 and CS-3452, to the "ON" position. Place associated valve control switches to "close" and then to "open". Depress the "Sample Start" pushbutton.
- D. The containment is not required to be sampled for Hydrogen concentration unless reactor water level drops below Top of Active Fuel (TAF).

83.

Which ONE of the following conditions will cause the Control Room ventilation system to enter into Fire Protection mode?

- A. Smoke detected in Unit 2 Electronic Equipment room.
- B. Smoke detected in the Unit 1 Electronic Equipment room AND the manual pull station tripped in the Unit 2 Electronic Equipment Room.
- C. Manual pull station tripped in Unit 1 Electronic Equipment room.
- D. Manual pull station tripped in Unit 2 Cable Spread room.

84.

If operating in the Scram Avoidance Region of the Flow Control Operational Map, which one of the following will reduce the likelihood of an instability event?

- A. Control rod withdrawal.
- B. Reducing recirculation flow.
- C. Increasing recirculation flow.
- D. Removing a feedwater heater string from service.

85.

Which ONE of the following changes in plant operating conditions will result in a higher MCPR operating limit as specified in the COLR?

- A. Operation at the end of cycle vs. the beginning of cycle.
- B. Operation at 90% power vs. 100% power for a given core flow.
- C. Operation at 100% core flow vs. 90% core flow for a given power.
- D. Setting the mechanical stop of the Reactor Recirculation Pumps to a lower setpoint.



86.

Unit 2 is operating at 14% power with the Drywell de-inerted for mechanical maintenance to repack a valve. When exiting the Primary Containment Air Lock the outer door was damaged such that the door cannot be closed at this time.

Which ONE of the following describes the actions that are required?

- A. The Inner Air Lock door must be verified closed and locked. Be in MODE 3 within 12 hours and in MODE 4 within 36 hours.
- B. The Inner Air Lock door must be verified closed and locked. Operation may continue until the next overall airlock leakage test provided the operable door is verified locked every 31 days.
- C. Either door must be verified closed. Action must be initiated to verify overall containment leakage immediately. The Primary Containment Air Lock door must be restored to OPERABLE status within 24 hours.
- D. The Inner Air Lock door must be verified closed and locked. The outer door must have a security guard posted or must be blocked to prevent entry. Repair the inoperable door within 31 days or be in MODE 3 within 12 hours.

87.

Which ONE of the following describes why the plant must be placed in HOT SHUTDOWN with an inoperable jet pump?

- A. There is an increased possibility of thermal hydraulic instabilities outside the defined region.
- B. An inoperable jet pump is sufficient reason to declare the recirculation loop inoperable.
- C. Blowdown area is increased or reflood capability eliminated in the event of a DBA.
- D. To prevent undue stress on the reactor vessel nozzles and in the bottom head region.

88.

You are the SCO and have just given interim approval of a temporary procedure change.

Which ONE of the following describes the expiration date?

The date shall not to exceed:

- A. 14 days from the interim approval date.
- B. 14 days from the procedure's periodic review date.
- C. 4 months from the interim approval date.
- D. 4 months from the procedure's periodic review date.

89.

You are the Unit 2 SS. During movement of material through the HPCI Room, insulation has been damaged. A repair crew has been assembled.

The wet-bulb temperature is 103.1 °F

The work requires single cotton Blend PCs.

The work will take 2 man hours.

You have 3 mechanics plus an HP available.

Assume that HP will not participate in the repairs and that the actual exposure time to the hot environment is the actual stay time.

Using the recommended action times of OAI-107, which ONE of the following is the shortest duration for this task?

A. 20 minutes

B. 35 minutes

C. 80 minutes

D. 100 minutes

90.

You are the refueling floor SRO. Unit 1 is in refueling with all but four assemblies off loaded.

Supplemental Spent Fuel Pool Cooling System is operating as follows:

Primary Pump P-74A and both heat exchangers are in service  
Secondary pump P-82A and both cooling towers are in service

P-82A tripped due to a flexible coupling failure. Following the trip P-74A also tripped.

Which ONE of the following conditions must be satisfied prior to restarting P-74A?

- A. Secondary loop pressure must be restored.
- B. Primary pump seal water must be restored.
- C. One heat exchanger must be taken out of service.
- D. One fire pump must be started and aligned to the supplemental cooling header.

91.

Which one of the following is a feature of Unit 1 only?

- A. Select Rod Insert may be manually initiated by the operator at P603 by use of a single pushbutton.
- B. The fixed Scram point is setdown from 116% to 90%.
- C. The EOC-RPT is manually bypassed via administratively controlled key switches on P609 and P611.
- D. When not in "Run" an IRM upscale will provide an RPS trip. There is no APRM downscale RPS trip.

92.

A rupture has occurred on the end-bell (tube side) of a TBCCW heat exchanger.

Which ONE of the following color floor drain hubs should leakage be routed to?

A. YELLOW

B. BLACK

C. GREEN

D. RED

93.

You are the Site Emergency Coordinator. Following a LARGE Break LOCA you are considering attempting to save a 4 Million Dollar test rig that is just inside the containment access hatch. The task can be accomplished with a projected dose of approximately 7.5 REM TEDE.

Which ONE of the following statements regarding this task is correct?

- A. This exceeds the exposure limit listed in EPA 400 Emergency Work Limits to protect valuable equipment.
- B. While this exceeds the exposure limit listed in EPA 400 Emergency Work Limits to protect valuable equipment you can authorize a single exposure for this purpose.
- C. This does not exceed the exposure limit listed in EPA 400 Emergency Work Limits to protect valuable equipment and you have the authority to grant permission for this task.
- D. This does not exceed the exposure limit listed in EPA 400 Emergency Work Limits to protect valuable equipment. However, you do not have the authority to grant permission for this task, it must be granted by the site VP or his designee.



94.

Following an incomplete Reactor scram, the operating crew is executing EOP-01-LPC, Level/Power Control. A decision step is reached asking "Is The Reactor Shutdown?".

Which one of the following conditions would satisfy the definition of "SHUTDOWN" as it applies to the Reactor?

- A. All operable APRMs are downscale.
- B. The Reactor is subcritical on range 6 of IRMs.
- C. The entire SLC tank has been injected to the Reactor.
- D. Hot Shutdown Boron Weight has been injected to the Reactor.

95.

Unit heatup and pressurization is in progress per GP-02. Current plant conditions:

Reactor power	Range 9 on IRM's
RPV pressure	750 psig
RPV water level	187 inches

The operating CRD Pump trips on overcurrent. The operator attempts to start the standby CRD Pump, which fails to start.

Which ONE of the following describes why AOP-02.0 requires a manual scram if CRD pressure cannot be restored?

- A. Control rods may fail to fully insert on a reactor scram if the HCU accumulator pressure is lost.
- B. Control rods cannot be inserted by normal means in the event of a positive reactivity addition.
- C. Control rod drive temperatures will rise and may result in a measurable delay in scram response time.
- D. Recirculation pump seal temperatures will rise to the point requiring both Recirculation pumps to be tripped.

96.

Emergency Operating Procedure guidance is provided to trip the reactor recirculation pumps during an ATWS condition.

Which ONE of the following is the basis for taking this action?

- A. To rapidly reduce reactor power and potentially reduce the amount of heat that would be added to the containment.
- B. To avoid the area of thermal hydraulic instability.
- C. To promote the dispersion of the boron from Standby Liquid Control System.
- D. To decrease reactor pressure which increases CRD drive differential pressure.

97.

During a Station Blackout on Unit One HPCI, RCIC and LPCI have all become unavailable for injection to the RPV. Plant conditions:

RPV water level	-55 inches (N036)
RPV pressure	300 psig
Drywell ref leg temp	315 °F
Injection sources	None available

Which one of the following describes the current RPV water level?

- A. Above the Minimum Steam Cooling Reactor Water Level, adequate core cooling is assured.
- B. Above the Minimum Zero-Injection Reactor Water Level, adequate core cooling is assured.
- C. Below the Minimum Steam Cooling Reactor Water Level, adequate core cooling is NOT assured.
- D. Below the Minimum Zero-Injection Reactor Water Level, adequate core cooling is NOT assured.

98.

A fire in the Control Building requires Control Room evacuation and entry into ASSD-02.

ASSD-02 directs the Diesel Generator Operator to trip the Unit Two RPS MG Set output breakers and open the DC supply breakers to Distribution Panels 4A and 4B.

Failure to perform this action could result in which ONE of the following?

- A. misoperation of RCIC.
- B. loss of drywell cooling.
- C. inability to operate SRVs.
- D. spurious operation of MSIVs.

99.

Following a steam leak in the Unit Two Secondary Containment, a manual Reactor Scram has been inserted. Plant conditions:

RPV pressure	1000 psig
Drywell ref leg area temp	197 °F
Rx Bldg 50' temp	145 °F
Recirculation Pump	Running
RPV water level	+150" (N036/N037)
RPV water level	+170" (N026A/B)
RPV water level	+155" (N004A/B/C)
RPV water level	+160" (N027A/B)

RPV water level may be determined using which ONE of the following?

- A. N004A/B/C only.
- B. N004A/B/C and N026A/B only.
- C. N004A/B/C and N027A/B only.
- D. N004A/B/C and N036/N037 only.

100.

Unit 1 is operating at 100% power. The unit receives a Group 6 isolation and did NOT receive a Secondary Containment Isolation.

Which ONE of the following may have occurred?

- A. High Drywell Pressure.
- B. Rx Bldg Exhaust Radiation High.
- C. Rx Vessel Water Level Low LL2.
- D. Rx Vessel Water Level Low LL1.