

Final Submittal
(Blue Paper)

BF 2008-301

FINAL SRO
WRITTEN EXAMINATION
~~AND REFERENCES~~

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

Applicant Information

Name:	
Date: March 25, 2008	Facility/Unit: Browns Ferry
Region: I / II / III / IV	Reactor Type: W / 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. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

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

Applicant's Signature

Results	
RO/SRO-Only/Total Examination Values	____ / ____ / ____ Points
Applicant's Scores	____ / ____ / ____ Points
Applicant's Grade	____ / ____ / ____ Percent

ANSWER KEY REPORT
for 0610 SRO Final Exam Test Form: 0

Answers

#	ID	Points	Type	0
1	RO 203000A1.01 1	1.00	MCS	C
2	RO 205000K4.02 1	1.00	MCS	C
3	RO 206000K6.09 1	1.00	MCS	C
4	RO 209001K5.04 1	1.00	MCS	B
5	RO 211000AK2.01 1	1.00	MCS	A
6	RO 212000K6.03 1	1.00	MCS	B
7	RO 215003A4.04 1	1.00	MCS	D
8	RO 215004A3.03 1	1.00	MCS	D
9	RO 215005A2.03 1	1.00	MCS	D
10	RO 217000K2.03 1	1.00	MCS	C
11	RO 218000K1.05 1	1.00	MCS	B
12	RO 218000G2.1.24 2	1.00	MCS	C
13	RO 223002A2.06 1	1.00	MCS	A
14	RO 223002A3.01 2	1.00	MCS	D
15	RO 239002A3.03 1	1.00	MCS	B
16	RO 239002A4.08 1	1.00	MCS	B
17	RO 259002A4.03 2	1.00	MCS	A
18	RO 261000K3.03 1	1.00	MCS	A
19	RO 262001K4.04 1	1.00	MCS	B
20	RO 262002A1.02 1	1.00	MCS	C
21	RO 263000K1.02 1	1.00	MCS	D
22	RO 264000K5.06 2	1.00	MCS	A
23	RO 300000K2.02 1	1.00	MCS	D
24	RO 300000K3.01 1	1.00	MCS	C
25	RO 400000G2.4.31 1	1.00	MCS	A
26	RO 400000A2.02 1	1.00	MCS	D
27	RO 201003K3.03 2	1.00	MCS	A
28	RO 201006K4.09 1	1.00	MCS	B
29	RO 202001K6.09 1	1.00	MCS	A
30	RO 215001A1.01 1	1.00	MCS	D
31	RO 216000K1.10 1	1.00	MCS	D
32	RO 219000K2.02 1	1.00	MCS	C
33	RO 226001A4.12 1	1.00	MCS	B
34	RO 234000G2.4.50 1	1.00	MCS	C
35	RO 245000K6.04 1	1.00	MCS	B
36	RO 268000A2.01 2	1.00	MCS	B
37	RO 272000K5.01 1	1.00	MCS	A
38	RO 290003A3.01 2	1.00	MCS	D
39	RO 295001G2.1.14 1	1.00	MCS	A
40	RO 295001AK3.01 1	1.00	MCS	A
41	RO 295003AA2.01 1	1.00	MCS	B
42	RO 295004AK1.03 1	1.00	MCS	A
43	RO 295005AA1.04 1	1.00	MCS	C
44	RO 295006AK3.05 1	1.00	MCS	B
45	RO 295016AA2.04 2	1.00	MCS	D
46	RO 295018AK2.01 2	1.00	MCS	C

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for 0610 SRO Final Exam Test Form: 0

Answers

#	ID	Points	Type	0
47	RO 295019AA2.02 1	1.00	MCS	A
48	RO 295021G2.4.50 1	1.00	MCS	A
49	RO 295023AK1.02 1	1.00	MCS	C
50	RO 295024G2.1.33 2	1.00	MCS	D
51	RO 295025EK2.08 1	1.00	MCS	B
52	RO 295026EA2.01 2	1.00	MCS	A
53	RO 295028EK3.04 2	1.00	MCS	A
54	RO 295030EA1.06 2	1.00	MCS	D
55	RO 295031G2.4.6 1	1.00	MCS	A
56	RO 295037EK2.11 1	1.00	MCS	A
57	RO 295038EK1.01 1	1.00	MCS	C
58	RO 600000AA1.08 1	1.00	MCS	B
59	RO 295009AK2.01 1	1.00	MCS	D
60	RO 295012G2.2.22 2	1.00	MCS	A
61	RO 295015AK1.02 1	1.00	MCS	C
62	RO 295020AK3.08 1	1.00	MCS	B
63	RO 295032EA1.01 1	1.00	MCS	B
64	RO 295033EA2.01 1	1.00	MCS	D
65	RO 295035EA2.02 1	1.00	MCS	B
66	RO GENERIC 2.1.33 1	1.00	MCS	C
67	RO GENERIC 2.1.16 1	1.00	MCS	C
68	RO GENERIC 2.1.18 2	1.00	MCS	D
69	RO GENERIC 2.2.13 1	1.00	MCS	B
70	RO GENERIC 2.2.33 2	1.00	MCS	B
71	RO GENERIC 2.3.10 1	1.00	MCS	D
72	RO GENERIC 2.3.9 1	1.00	MCS	B
73	RO GENERIC 2.4.47 1	1.00	MCS	B
74	RO GENERIC 2.4.15 1	1.00	MCS	C
75	RO GENERIC 2.4.8 1	1.00	MCS	C
76	SRO 295006AA2.01 1	1.00	MCS	D
77	SRO 295021AA2.07 1	1.00	MCS	A
78	SRO 295024G2.1.28 1	1.00	MCS	C
79	SRO 295026EA2.01 1	1.00	MCS	B
80	SRO 295037EA2.05 2	1.00	MCS	A
81	SRO 295038G2.2.22 1	1.00	MCS	A
82	SRO 600000G2.2.24 1	1.00	MCS	D
83	SRO 295002G2.4.6 2	1.00	MCS	D
84	SRO 295009G2.4.31 2	1.00	MCS	C
85	SRO 500000EA2.02 2	1.00	MCS	A
86	SRO 203000A2.16 2	1.00	MCS	C
87	SRO 215003G2.1.14 1	1.00	MCS	C
88	SRO 259002G2.1.23 1	1.00	MCS	B
89	SRO 205000A2.06 2	1.00	MCS	B
90	SRO 212000A2.12 1	1.00	MCS	C
91	SRO 268000A2.01 2	1.00	MCS	D
92	SRO 271000G2.4.36 1	1.00	MCS	C

ANSWER KEY REPORT
for 0610 SRO Final Exam Test Form: 0

#	ID	Points	Type	Answers
93	SRO 288000A2.03 1	1.00	MCS	A
94	SRO GENERIC 2.1.12 1	1.00	MCS	B
95	SRO GENERIC 2.2.22 1	1.00	MCS	B
96	SRO GENERIC 2.2.24 1	1.00	MCS	B
97	SRO GENERIC 2.3.3 2	1.00	MCS	C
98	SRO GENERIC 2.3.9 1	1.00	MCS	D
99	SRO GENERIC 2.4.21 1	1.00	MCS	A
100	SRO GENERIC 2.4.30 2	1.00	MCS	B
SECTION 1 (100 items)		100.00		

Name: _____

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Form: 0

Version: 0

1. Given the following conditions:

- Unit 2 has experienced a Loss of Coolant Accident (LOCA).
- Drywell sprays are required in accordance with 2-EOI-2 flowchart.

Which ONE of the following plant conditions must exist prior to opening BOTH the Residual Heat Removal (RHR) SYS I Inboard AND Outboard Drywell Spray Valves?

- A. RPV level **MUST** be greater than (-)155 inches (Emergency Range) with **ONLY** the the CONT SPRAY VLV SEL SWITCH in SELECT.
- B. RPV level **MUST** be greater than (-)162 inches (Post Accident Range) with **ONLY** the CONT SPRAY VLV SEL SWITCH in SELECT.
- C. RPV level is greater than (-)183 inches (Post Accident Range) with **ONLY** the CONT SPRAY VLV SEL SWITCH in SELECT.
- D. RPV level is less than (-)200 inches (Post Accident Range) with **ONLY** the 2/3 CORE HEIGHT KEYLOCK BYPASS SWITCH in BYPASS.

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2. Given the following conditions on Unit 2:

- Reactor level (+)20 inches
- Reactor pressure 45 psig
- Drywell pressure 1.7 psig

Which ONE of the following describes which modes of Residual Heat Removal (RHR) are capable AND available for use?

- A. Low Pressure Coolant Injection (LPCI), Drywell Sprays, and Shutdown Cooling.
- B. Suppression Pool Cooling, Suppression Pool Sprays, and Shutdown Cooling.
- C. Suppression Pool Cooling, Low Pressure Coolant Injection, and Shutdown Cooling.
- D. Low Pressure Coolant Injection (LPCI), Drywell Sprays, and Supplemental Fuel Pool Cooling.

3. Given the following plant conditions:

- Unit 2 reactor water level initially lowered to (-)69 inches.
- Conditions required entry into EOI-1, "RPV Control" and EOI-2, "Primary Containment Control."
- After water level recovery, the High Pressure Coolant Injection (HPCI) Pump Injection Valve (FCV-73-44) was manually closed and HPCI was placed in pressure control to remove decay heat.
- Subsequently, Condensate Storage Tank (CST) level dropped below 6800 gallons.

Which ONE of the following describes the status of the HPCI system (assume no other operator actions have occurred)?

- A. HPCI would be operating in pressure control with suction from the CST.
- B. HPCI would be pumping to the CST with suction from the Suppression Pool.
- C. HPCI would be operating at shutoff head with suction from the Suppression Pool.
- D. The HPCI turbine would trip on overspeed due to loss of suction during the transfer.

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4. Which ONE of the following describes the basis for the reason that the Core Spray System is NOT on the list of preferred systems for low pressure injection for level restoration if all control rods are NOT inserted during EOI execution?
- A. Cold water from Core Spray creates a rapid pressure reduction and cooldown rates CANNOT be controlled.
 - B. Core Spray injects directly onto fuel bundles inside the shroud which could damage fuel and cause a power excursion.
 - C. Core Spray injection creates a steam blanket at the top of the fuel bundles which inhibits heat transfer via steam flow past the fuel.
 - D. Core Spray does NOT provide sufficient flow to maintain adequate core cooling if an ATWS power level greater than or equal to 80% occurs.

5. Given the following plant conditions:

- Unit 1 is operating at 100% power.
- A fire inside the board causes a loss of the '1B' 480V Shutdown Board.
- Fire Protection reports that the fire cannot be extinguished.
- The Unit Supervisor (US) directs a manual scram.
- NOT ALL control rods insert, and the following conditions are noted:
 - Reactor Power 15%
 - Suppression Pool Temperature 108°F and rising
- The 'A' 4kV Shutdown Board deenergized due to an electrical fault when '1A' RHR pump was started for Suppression Pool cooling IAW EOI-2.

Which ONE of the following describes the action and method of injecting boron into the reactor?

Transfer the _____ (1) _____ to alternate and inject Standby Liquid Control (SLC) using the _____ (2) _____.

(1)

(2)

- A. '1A' 480V Shutdown Board; '1A' SLC Pump.
- B. '1B' 480V Shutdown Board; '1B' SLC Pump.
- C. '1A' 480V Reactor MOV Board; '1A' SLC Pump.
- D. '1B' 480V Reactor MOV Board; '1B' SLC Pump.

6. Given the following plant conditions:

- Reactor Water Level Normal Control Range Instrument, 2-LIS-3-203A, has failed downscale.

Which ONE of the following describes the Analog Trip System Response?

The trip relay will be ____ (1) ____ and the contact in the Reactor Protection System (RPS) Logic will be ____ (2) ____.

(1) (2)

- A. de-energized; closed
- B. de-energized; open
- C. energized; closed
- D. energized; open

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7. Given the following plant conditions:

- Unit 3 reactor startup preparations are in progress with NO rods withdrawn.
- Instrument Mechanics are performing the Intermediate Range Monitor (IRM) functional surveillance.
- No IRMs are currently bypassed.
- The Instrument Mechanic technician has placed the "INOP INHIBIT" toggle switch for the 'H' Channel IRM in the "INHIBIT" position.

Which ONE of the following describes the IRM trip function that is bypassed as a result of this action?

- A. IRM "High Voltage Low" INOP TRIP is bypassed.
- B. IRM "Loss of ± 24 VDC" INOP TRIP is bypassed.
- C. IRM "Module Unplugged" INOP TRIP is bypassed.
- D. IRM "Mode Switch Out of Operate" INOP TRIP is bypassed.

8. Given the following plant conditions:

- A reactor startup is in progress following refueling, with ALL 8 Reactor Protection System (RPS) Shorting Links removed.
- The reactor is approaching criticality.
- An electronic failure in the 'B' Source Range Monitor (SRM) drawer results in an SRM HIGH/HIGH output signal.

Which ONE of the following describes the plant response?

- A. A Rod Out Block ONLY.
- B. A Rod Out Block and 1/2 Scram ONLY.
- C. A "SRM HIGH/HIGH" alarm ONLY.
- D. A Full Reactor Scram.

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9. Which ONE of the following describes the expected response due to a "FAULT" in an Average Power Range Monitor (APRM) channel and the required action(s) in accordance with OI-94B, "APRM System" to address this condition?

An APRM channel _____ (1) _____ will result in an INOP trip to _____ (2) _____.

To continue plant operation, bypassing the APRM _____ (3) _____ required.

(1)

(2)

(3)

- A. Critical Fault; ONLY the respective 2/4 logic module voters; is NOT
- B. Non-critical Fault; ONLY the respective 2/4 logic module voters; is NOT
- C. Non-critical Fault; ALL four of the 2/4 logic modules voters; is
- D. Critical Fault; ALL four of the 2/4 logic modules voters; is

10. Given the following Unit 2 conditions:

- The Control Room has been evacuated.
- Reactor Core Isolation Cooling (RCIC) is controlling reactor water level.
- A loss of the Division I Emergency Core Cooling System Inverter (Div 1 ECCS Inverter) occurs.

Assuming no further operator action, which ONE of the following describes the RCIC system response?

The RCIC Flow Controller_____.

- A. lowers to minimum in auto ONLY.
- B. raises to maximum in manual ONLY.
- C. lowers to minimum in either manual OR auto mode.
- D. raises to maximum in either manual OR auto mode.

11. Given the following plant conditions:

- The Unit 1 and 2 Control Rooms have been abandoned.
- ALL Panel 25-32 Safety Relief Valve (SRV) Transfer Switches have been placed in EMERGENCY.
- ALL Panel 25-32 SRV Control Switches have been verified in CLOSE.

Which ONE of the following describes the operation of the SRVs associated with the Automatic Depressurization System (ADS)?

The associated ADS valves will OPEN _____.

- A. upon receipt of an ADS initiation signal.
- B. in Safety mode, if their respective pressure setpoints are exceeded.
- C. in Relief mode, if reactor pressure exceeds the relief mode setpoint.
- D. if their respective control switches, on Panel 9-3, are placed in OPEN.

12. Given the following plant conditions:

- Unit 2 is at rated power.
- A loss of '2A' 250 Volt RMOV Board has occurred.

Which ONE of the following describes the effect on the Unit 2 Automatic Depressurization System (ADS) valves and ADS logic?

- A. BOTH Div I & II ADS logics are operable.
ALL ADS valves will operate automatically.
ALL ADS valves can be manually operated.
- B. BOTH Div I & II ADS logic is NOT operable.
NO ADS valves will operate automatically.
Four (4) ADS valves can be operated manually.
- C. Div I ADS logic operable; Div II ADS logic is NOT operable.
ALL ADS valves will actuate automatically.
ALL ADS valves can be operated manually.
- D. Div I ADS logic operable, Div II ADS logic is NOT operable.
ADS logic is ONLY capable of opening 4 ADS valves automatically.
Four (4) ADS valves can be operated manually.

13. Given the following plant conditions:

- During performance of 2-SR-3.3.1.1.13, "Reactor Protection and Primary Containment Isolation Systems Low Reactor Water Level Instrument Channel B2 Calibration," 2-LIS-3-203D fails to actuate.
- It is determined that the failure is due to an inoperable switch and a replacement is NOT available for 4 days.
- The Shift Manager has directed to place the inoperable channel in a tripped condition per 2-OI-99, "Reactor Protection System."

Which ONE of the following describes how this is accomplished per 2-OI-99, "Reactor Protection System" and the effect on Unit status?

- A. Remove the fuse associated with 2-LIS-3-203D. A half scram will result and NO Primary Containment Isolation Valves will realign.
- B. Remove the fuse associated with 2-LIS-3-203D. A half scram will result and PCIS Groups 2, 3 and 6 Inboard Isolation Valves will close.
- C. Place a trip into the Analog Trip Unit associated with 2-LIS-3-203D. NO half scram will result; however, ALL Primary Containment Isolation Valves will realign.
- D. Place a trip into the Analog Trip Unit associated with 2-LIS-3-203D. A half scram will result and PCIS Groups 2, 3 and 6 Outboard Isolation Valves will close.

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14. Accident conditions on Unit 1 have resulted in an EOI-directed Emergency Depressurization. Reactor pressure is currently 106 psig. ALL systems function as designed.

Regarding the High Pressure Coolant Injection (HPCI) System, which ONE of the following statements describes the current status of the respective indications on the Containment Isolation Status System (CISS) Panel and Panel 9-3 (assume ALL instruments/controls actuate at the setpoint)?

The 'amber' HPCI AUTO-ISOL LOGIC A/B lights, on Panel 9-3, are ____ (1) ____.

The 'amber' (HPCI) PCIS LOGIC A/B INTITIATION lights, on the CISS Panel, are ____ (2) ____.

The 'green' (HPCI) PCIS LOGIC A/B SUCCESS lights, on the CISS Panel, are ____ (3) ____.

- | | (1) | (2) | (3) |
|----|---------------|---------------|---------------|
| A. | Extinguished. | Extinguished. | Extinguished. |
| B. | Illuminated. | Illuminated. | Illuminated. |
| C. | Illuminated. | Extinguished. | Illuminated. |
| D. | Extinguished. | Illuminated. | Illuminated. |

15. Given the following plant conditions:

- The reactor is operating at 100% power and 1000 psig.
- A Turbine Control Valve malfunction resulted in Safety Relief Valve (SRV) '1-4' lifting and failing to reseal.

Which ONE of the following describes the expected SRV tailpipe temperature?

REFERENCE PROVIDED

- A. 212°F
- B. 290°F
- C. 345°F
- D. 545°F

16. Given the following plant conditions:

- Unit 2 is operating at 100% power.
- A complete loss of Drywell Control Air occurs (BOTH headers).
- NEITHER crosstie with Containment Atmosphere Dilution (CAD), nor plant Control Air, can restore system pressure.

Which ONE of the following statements describes the effect on pneumatically operated valves inside the Primary Containment in accordance with 2-AOI-32A-1, "Loss of Drywell Control Air?"

- A. ALL MSRVS can still be cycled five times due to the air system check valve arrangement.
- B. ONLY ADS MSRVS can still be cycled five times due to the air system accumulator and check valve arrangement.
- C. Inboard MSIVs can be opened one time due to the air system accumulator and check valve arrangement.
- D. Inboard MSIVs will remain OPEN due to spring pressure until closed by a valid isolation signal.

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17. Which ONE of the following describes the indications and controls available when the Unit Operator transfers the Unit 1 Reactor Feedwater Startup Level Controller from MANUAL to AUTO?

The Auto/Manual ____ (1) ____ light extinguishes and the ____ (2) ____ light illuminates. The controller is now controlling in ____ (3) ____ Element with the controller output changed from _____ (4) _____.

- | (1) | (2) | (3) | (4) |
|-----------|--------|---------|---|
| A. Amber; | Blue; | Single; | Demand output to Level Setpoint output. |
| B. Amber; | Blue; | Single; | Level Setpoint output to Demand output. |
| C. Blue; | Amber; | Three; | Level Setpoint output to Demand output. |
| D. Blue; | Amber; | Three; | Demand output to Level Setpoint output. |

18. Unit 2 has experienced a LOCA with the following plant conditions:

- Drywell pressure is 51 psig and rising.
- Suppression Chamber (Torus) water level is 18.5 feet.
- An Emergency Depressurization has been conducted.
- The Torus is being vented through Standby Gas Treatment (SGT) 'A' train.
- Standby Gas Trains 'B' and 'C' are INOPERABLE due to common mode failures.

IF Standby Gas Train 'A' were to suffer the same common mode failure under these conditions, which ONE of the following would be the next sequential, EOI-directed step to exhaust the primary containment atmosphere ?

Vent the _____ (1) _____ in accordance with 2-EOI Appendix 13, "Emergency Venting Primary Containment," _____ (2) _____.

REFERENCE PROVIDED

(1)

(2)

- A. Torus; via the Hardened Wetwell Vent System.
- B. Torus; allowing the Primary Containment Vent Ducts to fail.
- C. Drywell; via the Hardened Wetwell Vent System.
- D. Drywell; allowing the Primary Containment Vent Ducts to fail.

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19. Given the following plant electrical distribution alignment:

- 4kV Shutdown Bus 1 '43' Switch is in MANUAL.
- ALL 4kV Shutdown Board '43' Switches are in AUTO.
- A fault on 'A' 4kV Unit Board de-energizes 4kV Shutdown Bus 1.

Which ONE of the following represents how and when the 'A' 4kV Shutdown Board alternate supply breaker will auto close?

A (1) transfer occurs when (2) voltage decays to less than 30%.

(1) (2)

- A. fast; 4kV Shutdown Bus 1
- B. slow; 4kV Shutdown Bus 1
- C. fast; 'A' 4kV Shutdown Board
- D. slow; 'A' 4kV Shutdown Board

20. Given the following plant conditions:

- Unit 3 is in a normal lineup.
- The following alarm is received:
 - UNIT PFD SUPPLY ABNORMAL
- It is determined that the alarm is due to the Unit 3 Unit Preferred AC Generator Overvoltage condition

Which ONE of the following describes the result of this condition?

Unit 3 Breaker 1001 _____ (1) _____; Unit 2 Breaker 1003 _____ (2) _____; and the Motor-Motor-Generator (MMG) set _____ (3) _____.

- | | (1) | (2) | (3) |
|----|----------------------|----------------------|--------------------------------------|
| A. | trips OPEN; | is interlocked OPEN; | automatically shuts down. |
| B. | is interlocked OPEN; | trips OPEN; | automatically shuts down. |
| C. | trips OPEN; | is interlocked OPEN; | continues to run without excitation. |
| D. | is interlocked OPEN; | trips OPEN; | continues to run without excitation. |

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21. Which ONE of the following statements is correct regarding the '2B' 250VDC Battery Charger?

- A. The normal power supply is '2A' 480V Shutdown Board.
- B. Can supply (**directly** from the Unit 2 Battery Board Room) any of the six Unit & Plant 250VDC Battery Boards.
- C. Load shedding can NOT be bypassed until the Load Shed signal has been reset.
- D. Load shedding can be bypassed by placing the "Emergency ON Select Switch" in the "EMERGENCY ON" Position.

22. Given the following plant conditions:

- Unit 2 is operating at 100% Power.
- No Equipment is Out of Service.
- A large-break LOCA occurs in the drywell and the following conditions exist:
 - Drywell Pressure peaked at 28 psig and is currently at 20 psig.
 - Reactor Pressure is at 110 psig.
 - Reactor Water Level is at (-)120 inches.
 - Offsite power is available.

Which ONE of the following describes the associated equipment and proper loading sequence?

- A. '2B' RHR Pump and '2B' Core Spray Pump start 7 seconds after the accident signal is received.

RHRSW pumps lined up for EECW start 28 seconds after the accident signal is received.

- B. '2C' RHR Pump and '2C' Core Spray Pump start 7 seconds after the accident signal is received.

RHRSW pumps lined up for EECW start 28 seconds after the accident signal is received.

- C. '2A' RHR Pump starts immediately and '2A' Core Spray Pump starts 7 seconds after the accident signal is received.

RHRSW pumps lined up for EECW start 14 seconds after the accident signal is received.

- D. '2C' RHR Pump and '2C' Core Spray Pump start 14 seconds after the accident signal is received.

RHRSW pumps lined up for EECW start 14 seconds after the accident signal is received.

23. Which ONE of the following lists the current power supplies to the Control and Service Air Compressor motors?

- A. 'A' and 'B' are fed from 480V Common Board #1
'C' and 'D' from 480V Shutdown Boards '1B' & '2B', respectively
'G' from 4KV Shutdown Board 'B' and 480V Shutdown Board '2A'
'E' from 480V Common Board #1
- B. 'A' and 'D' are fed from 480V Common Board #1
'B' and 'C' from 480V Shutdown Boards '1B' & '2B', respectively
'G' from 4KV Shutdown Board 'B' and 480V RMOV Board '2A'
'F' from 480V Common Board #3
- C. 'A' is fed from 480V Shutdown Board '1B'
'B' and 'F' from 480V Common Board #3
'C' from 480V Shutdown Board '1A'
'D' from 480V Shutdown Board '2A'
'G' from 4KV Common Board #2
- D. 'A' is fed from 480V Shutdown Board '1B'
'B' and 'C' from 480V Common Board #1
'D' from 480V Shutdown Board '2A'
'G' from 4KV Shutdown Board 'B' and 480V RMOV Board '2A'
'E' from 480V Common Board #3

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24. A LOCA has occurred on Unit 1 and the Drywell is being vented to the Standby Gas Treatment System (SBGT), when a loss of the Control Air System occurs.

Which ONE of the following describes the impact of the loss of air, on the operation of DRYWELL VENT INBD ISOL VALVE (1-FCV-64-29), and PATH 'B' VENT FLOW CONT VALVE (1-FCV-84-19)?

Both vent valves 1-FCV-64-29 & 1-FCV-84-19 will fail CLOSED and _____

- A. will automatically re-open as soon as INST GAS SELECTOR VALVE (1-PCV-84-33) automatically swaps to CAD Nitrogen Storage Tank 'A.'
- B. must be manually re-opened as soon as INST GAS SELECTOR VALVE (1-PCV-84-33) automatically swaps to CAD Nitrogen Storage Tank 'A.'
- C. will automatically re-open as soon as CAD SYSTEM 'A' N2 SHUTOFF VALVE (0-FCV-84-5) is manually opened from Main Control Room Panel 1-9-54.
- D. must be manually re-opened as soon as CAD SYSTEM 'A' N2 SHUTOFF VALVE (0-FCV-84-5) is manually opened from Main Control Room Panel 1-9-54.

25. Unit 3 is at rated power with the following indications:

- RECIRC PUMP MTR 'B' TEMP HIGH (3-XA-9-4B, Window 13).
- RBCCW EFFLUENT RADIATION HIGH (3-XA-9-3A, Window 17).
- RBCCW SURGE TANK LEVEL HIGH (3-XA-9-4C, Window 6).
- RX BLDG AREA RADIATION HIGH (3-XA-9-3A, Window 22).
- Recirc Pump Motor '3B' Winding and Bearing Temperature Recorder (3-TR-68-84) is reading 170°F and rising.
- RBCCW Pump Suction Header Temperature Indicator (3-TIS-70-3) is reading 104°F and rising.
- RWCU NON-REGENERATIVE HX DISCH TEMP HIGH (3-XA-9-4C, Window 17).
- Area Radiation Monitor RE-90-13A and RE-90-14A are in alarm reading 55 mr/hr and rising.

Which ONE of the following describes the actions that should be taken in accordance with plant procedures?

REFERENCE PROVIDED

Enter 3-EOI-3, "Secondary Containment Control" and _____

- A. Trip and isolate '3B' Recirc Pump.
Enter 3-AOI-68-1A "Recirc Pump Trip/Core Flow Decrease OPRMs Operable."
- B. Trip and isolate '3B' Recirc Pump.
Commence a normal shutdown in accordance with 3-GOI-100-12A, "Unit Shutdown."
- C. Trip RWCU pumps and isolate the RWCU system.
Commence a normal shutdown in accordance with 3-GOI-100-12A, "Unit Shutdown."
- D. Trip RWCU pumps and isolate the RWCU system.
Close RBCCW Sectionalizing Valve 3-FCV-70-48 to isolate non-essential loads and maximize cooling to '3B' Recirc Pump.

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26. Unit 2 is operating at 100% power, and the following annunciators are received:

- DRYWELL EQPT DR SUMP TEMP HIGH (2-XA-55-4C, Window 16)
- RBCCW SURGE TANK LEVEL LOW (2-XA-55-4C, Window 13)
- RBCCW PUMP DISCH HDR PRESS LOW (2-XA-55-4C, Window 12)
- RBCCW 2-FCV-70-48 CLOSED (2-XA-55-4C, Window 19)

Which ONE of the following describes the impact on the Reactor Building Closed Cooling Water (RBCCW) System and the required actions?

- A. RBCCW flow to the RWCU Non-Regenerative Heat Exchanger has been lost. Enter 2-AOI-70-1, "Loss of RBCCW" and immediately trip the RWCU pumps and ISOLATE the RWCU system.
- B. RBCCW flow to the Drywell has been lost. Enter 2-AOI-70-1, "Loss of RBCCW" and remove the RWCU pumps from service IF RBCCW suction temperature cannot be maintained below 105°F.
- C. RBCCW flow to the Drywell has been lost. Enter 2-AOI-70-1, "Loss of RBCCW" and immediately trip the RWCU pumps.
- D. RBCCW flow to the RWCU Non-Regenerative Heat Exchanger has been lost. Enter 2-AOI-70-1, "Loss of RBCCW" and remove the RWCU pumps from service IF RBCCW suction temperature cannot be maintained below 105°F.

27. Unit 1 has experienced a failure of both CRD pumps.

Which ONE of the following PROCEDURAL reactor pressure limits should be adhered to, as required by 1-AOI-85-3, "CRD System Failure," and what is the basis for the limit?

A. 890 psig reactor pressure.

This would be the lowest pressure a scram can be ensured due to the loss of accumulators.

B. 890 psig reactor pressure.

This would be the lowest pressure a scram can be ensured in the event of a loss of CRD pumps.

C. 940 psig reactor pressure.

This would be the lowest pressure a scram can be ensured due to the loss of accumulators.

D. 940 psig reactor pressure.

This would be the lowest pressure a scram can be ensured in the event of a loss of CRD pumps.

28. Which ONE of the following describes how the Rod Worth Minimizer (RWM) System INITIALIZATION is accomplished?
- A. INITIALIZATION occurs automatically when the RWM is unbypassed.
 - B. INITIALIZATION must be performed manually when the RWM is unbypassed.
 - C. INITIALIZATION occurs automatically every 5 seconds while in the transition zone.
 - D. INITIALIZATION must be performed manually when power drops below the Low Power Setpoint (LPSP).

29. Given the following plant conditions:

- Unit 3 is operating at 35% power with 'A' & 'C' Reactor Feed Pumps (RFP) running and 'B' RFP idling.
- Both Recirculation Pump speeds are 53%.
- The 'A' RFP trips, resulting in the following conditions:
 - REACTOR WATER LEVEL ABNORMAL (2-ARP-9-5A Window 8).
 - REACTOR CHANNEL 'A' AUTO SCRAM (2-ARP-9-5B Window 1).
 - REACTOR CHANNEL 'B' AUTO SCRAM (2-ARP-9-5B Window 2).
- Indicated Reactor Water Level drops to (-)43 inches before 'B' RFP is brought on line to reverse the level trend and level is stabilized at (+)33 inches.

Which ONE of the following describes the final condition of both Recirculation Pumps?

- A. Running at 28% speed.
- B. Running at 45% speed.
- C. Running at 53% speed.
- D. Tripped on ATWS/RPT signal.

30. Given the following Unit 2 conditions:

- Preparations are in progress to commence a startup following a refueling outage.
- The Drywell Close-out inspection is in progress with three personnel inside the Drywell.
- Reactor Engineers have begun running Traversing In-Core Probe (TIP) traces.
- RX BLDG AREA RADIATION HIGH (2-XA-9-3A, Window 22) is in alarm.
- Area Radiation Monitor 2-RM-90-23, "TIP Drive Area R.B" indicates 16 mr/hr.

Which ONE of the following describes the required actions?

- A. This is an expected indication while running TIP traces, therefore TIP operation may continue.
- B. Verify the TIP mechanism automatically shifts to REVERSE mode and begins a full retraction.
- C. Manually retract the detector in FAST speed to the In-Shield position and close the ball valve.
- D. This is NOT an expected indication while running TIP traces. Evacuate the Unit-2 Drywell and Reactor Building.

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31. Which ONE of the following indicates how raising recirculation flow affects the Emergency System (Wide Range) 3-58A/58B and Normal Control Range Level Indicators (e.g., LI-3-53) on Panel 9-5?

Emergency System Range indication will _____ (1) _____ and the Normal Control Range indication will _____ (2) _____.

(1)

(2)

- | | | |
|----|------------------|------------------|
| A. | indicate lower; | indicate lower. |
| B. | NOT be affected; | indicate higher. |
| C. | indicate higher; | NOT be affected. |
| D. | indicate lower; | NOT be affected. |

32. Given the following plant conditions:

- Unit 2 is at 100% rated power with Residual Heat Removal (RHR) Loop II in Suppression Pool Cooling.
- A Loss of Off-Site Power has occurred.
- Unit 1 experiences a LOCA which results in a Common Accident Signal (CAS) initiation on Unit 1.

Which ONE of the following describes the current status of Unit 2 RHR system and what actions must be taken to restore Suppression Pool Cooling on Unit 2?

- A. ALL four RHR pumps receive a trip signal. Place RHR Loop II in Suppression Pool Cooling IMMEDIATELY.
- B. '2A' and '2C' RHR Pumps are tripped. '2B' and '2D' pumps are unaffected. NO additional action is required.
- C. ALL four RHR pumps receive a trip signal. Place RHR Loop II in Suppression Pool Cooling after a 60-second time delay.
- D. '2B' and '2D' RHR Pumps are tripped. '2A' and '2C' pumps are unaffected. Place RHR Loop I in Suppression Pool Cooling IMMEDIATELY.

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33. Which ONE of the following sets of parameters below must ALWAYS be addressed to determine when it is appropriate to spray the drywell?

- A. - Drywell pressure
- Drywell temperature
- Suppression Chamber Air Space temperature
- Suppression Pool Temperature
- B. - Drywell pressure
- Drywell temperature
- Suppression Pool level
- Reactor water level
- C. - Drywell pressure
- Drywell temperature
- Reactor water level
- Suppression Chamber Air Space temperature
- D. - Drywell pressure
- Drywell temperature
- Reactor water level
- Suppression Pool Temperature

34. Given the following Unit-1 plant conditions:

- Fuel movement is in progress for channel change-out activities in the Fuel Prep Machine.
- Gas bubbles are visible coming from the de-channeled bundle.
- An Area Radiation Monitor adjacent to the Spent Fuel Storage Pool begins alarming.

Which ONE of the following describes the IMMEDIATE action(s) to take per 1-AOI-79-1, "Fuel Damage During Refueling?"

Immediately STOP fuel handling, then _____.

- A. notify the Control Room to sound the Containment Evacuation Alarm.
- B. notify RADCON to monitor & evaluate radiation levels.
- C. evacuate ALL non-essential personnel from the Refuel Floor.
- D. obtain Reactor Engineering Supervisor's recommendation for movement and sipping of the damaged fuel assembly.

35. Given the following plant conditions:

- Unit 2 is operating at 100% power.
- Main Generator is at 1150 MWe.
- The Chattanooga Load Coordinator requires a 0.95 lagging power factor.
- Generator hydrogen pressure is 65 psig.

Which ONE of the following describes the required action and reason if Generator hydrogen pressure drops to 45 psig?

REFERENCE PROVIDED

- A. Reduce generator load below 1000 MWe. Pole slippage may occur at this generator load.
- B. Reduce generator load below 1000 MWe. Sufficient cooling capability still exists at this hydrogen pressure.
- C. Reduce excitation to obtain a power factor of 1.00 to maintain current generator load. Pole slippage may occur at this power factor.
- D. Reduce excitation to obtain a power factor of 1.00 to maintain current generator load. Sufficient cooling capability still exists at this hydrogen pressure.

36. Given the following plant conditions:

- BFN is in the process of discharging the Waste Sample Tank to the Unit 1 Condensate Storage Tank.
- While moving resin containers, a forklift operator accidentally punctures the discharge line 4 feet downstream of 0-RR-90-130 (Radwaste Effluent Radiation Monitor).
- Water immediately begins spraying out of the rupture.

Which ONE of the following describes the expected system response?

The discharge will _____ (1) _____ because the _____ (2) _____.

- A. (1) automatically terminate without any additional operator action;
(2) Radwaste Discharge Isolation Valve will ONLY auto close on HIGH effluent radiation.
- B. (1) continue until manually terminated per 0-OI-77a, "Waste Collector/Surge System Processing;"
(2) Radwaste Discharge Isolation Valve will auto close on LOW CCW flow or HIGH effluent radiation.
- C. (1) automatically terminate without any additional operator action;
(2) Radwaste Discharge Isolation Valve will ONLY auto close on LOW CCW flow.
- D. (1) continue until manually terminated per 0-OI-77a, "Waste Collector/Surge System Processing;"
(2) Radwaste Discharge Isolation Valve will ONLY auto close on HIGH effluent radiation.

37. Given the following plant conditions:

- The operator has transferred the hydrogen controller from "Power Determined Setpoint" mode to "Operator Determined Setpoint" mode.
- Hydrogen flow is set at 14 SCFM.

Which ONE of the following describes the plant response if reactor power is reduced?

Main Steam Line radiation levels will _____ (1) _____ the lowering of reactor power due to _____ (2) _____.

(1)

(2)

- A. rise in opposition to; a rise in volatile Ammonia production.
- B. lower in response to; a reduction in Nitrogen concentration.
- C. lower in response to; a reduction in Hydrogen concentration.
- D. rise in opposition to; a rise in Nitrite and Nitrate production.

38. Given the following plant conditions:

- High radiation has been detected in the air inlet to the Unit 3 Control Room.
- Radiation Monitor RE-90-259B is reading 275 cpm above background.

Which ONE of the following describes the Control Room Emergency Ventilation (CREV) System response?

- A. NEITHER CREV unit will automatically start at the current radiation level.
- B. BOTH CREV units will automatically start with suction from the normal outside air path to Elevation 3C.
- C. The Selected CREV unit will automatically start and will continue to run until Control Bay Ventilation is restarted; then, it will automatically stop.
- D. The Selected CREV unit will automatically start. The Standby CREV unit will begin to auto-start; but, will ONLY run if the selected CREV unit fails to develop sufficient flow.

39. Given the following plant conditions:

- You are the At-The-Controls (ATC) operator on Unit 1.
- Unit 1 is operating at full power when 1A Recirculation pump tripped.
- The Unit Supervisor has directed you to carry out the actions of 1-AOI-68-1A, "Recirc Pump Trip/Core Flow Decrease OPRMs Operable."

Which ONE of the following describes the action(s) that require assistance from outside organizations?

- A. Perform the actions of 1-SR-3.4.1(SLO), "Reactor Recirculation System Single Loop Operation."
- B. Use the ICS screens VFDPMPA(VFDPMPB) and VFDAAL(VFDBAL) to determine the cause of the Recirc Pump trip/core flow decrease.
- C. Perform the actions of 0-TI-464, Reactivity Control Plan.
- D. Use the ICS screens associated with the Recirc Drive and Recirc Pump/Motor 1A(1B) on ICS and RECIRC PMP MTR 1A & 1B WINDING & BRG TEMPS, 1-TR-68-71 to determine the cause of the Recirc Pump trip.

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40. Which ONE of the following describes the Reactor Water Level response following a single Recirc Pump trip from 100% power?

- A. Rises initially due to swell, then returns to normal.
- B. Lowers initially due to shrink, then returns to normal.
- C. Rises initially due to swell and remains high due to a lower power level.
- D. Lowers initially due to shrink and remains lower due to the loss of core voids.

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41. Given the following plant conditions:

- All three units were at 100% rated power when the 500KV PCB 5234 (Trinity 1 feed to Bus 1 Section 1) tripped and failed to auto close.
- The signal which caused the Power Circuit Breaker (PCB) trip can NOT be reset.
- The Chattanooga Load Coordinator has issued a Switching Order directing BFN to open Motor Operated Disconnect (MOD) 5233 and 5235 to isolate 500KV PCB 5234 for troubleshooting.

Which ONE of the following describes your response to this Switching Order and the basis for that response?

ENSURE the PK block for PCB 5234 is (1) to prevent (2).

(1)

(2)

- A. removed; electrical arcing across the MOD contacts while being opened.
- B. removed; actuating the breaker failure logic and tripping the remainder of the PCBs on Bus 1.
- C. installed; actuating the breaker failure logic and tripping the remainder of the PCBs on Bus 1.
- D. installed; electrical arcing across the MOD contacts while being opened.

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42. Given the following plant conditions:

- A reactor startup is in progress on Unit 3 and reactor power is on IRM Range 7.
- The operator observes the following indications:
 - SRM DOWNSCALE (3-XA-9-5A, Window 6)
 - IRM CH 'A', 'C', 'E', 'G' HI-HI / INOP (3-XA-9-5A, Window 33)
 - IRM CH 'A', 'C', 'E', and 'G' indicate downscale.

Which ONE of the following power sources, if lost, would cause these failures?

- A. +/-24V DC Power Distribution Panel
- B. +/-48V DC Power Distribution Panel
- C. 120V AC RPS Power Supply Distribution Panel
- D. 120V AC Instrument and Control Power Distribution Panel

43. Given the following plant conditions:

- Unit 1 is at 100% rated power when the Desk Unit Operator notices that number 3 Main Turbine Stop Valve (MTSV) position indication is reading 50%.
- Numbers 1, 2, and 4 MTSV position indications all read 100%.
- Maintenance investigation determines that the cause of the MTSV position indicator failure is due to a mechanical failure of the Linear Variable Differential Transformer (LVDT).
- The Unit 1 Main Turbine later receives a trip signal.

Which ONE of the following describes the effect on Main Turbine/Generator operation?

- A. The RPS logic contact for the #3 MTSV will NOT function so a turbine trip will NOT initiate a scram.
- B. The RPS logic contact is already OPEN for the #3 MTSV so a turbine trip will initiate a scram.
- C. The Generator output breaker will NOT automatically open on a turbine trip.
- D. The Generator output breaker will automatically open on a turbine trip.

44. Given the following plant conditions:

- Power ascension is in progress on Unit 3 with the Main Turbine on line.
- Control Rods are being withdrawn to increase power.
- As reactor power approaches 35%, the Shift Technical Advisor (STA) notes that two (2) Turbine Bypass Valves are OPEN.

Which ONE of the following describes the effect on the plant?

Regarding the UFSAR Chapter 14 analyses for a turbine trip, the above condition is

_____ (1) _____ conservative than the assumptions used in the UFSAR because
_____ (2) _____.

(1)

(2)

- A. more; it lowers the peak vessel pressure for a design basis transient in regard to peak cladding temperature.
- B. less; it raises the actual power level at which the RPS reactor scram on turbine trip is enabled.
- C. more; it lowers the peak vessel pressure for a design basis transient in regard to transition boiling.
- D. less; it raises the actual power level for a design basis transient in regard to peak cladding temperature.

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45. In accordance with 3-AOI-100-2, "Control Room Abandonment", a Suppression Pool Temperature limit of less than or equal to (1) °F has been established. The basis for this limit is _____ (2) _____ ?

(1)

(2)

- A. 110 °F; to prevent damage to the RCIC turbine from overheated lube oil, which is cooled by the Suppression Pool water.
- B. 110 °F; to prevent exceeding the design basis maximum allowable values for primary containment temperature or pressure.
- C. 120 °F; to prevent damage to the RCIC turbine from overheated lube oil, which is cooled by the Suppression Pool water.
- D. 120 °F; to prevent exceeding the design basis maximum allowable values for primary containment temperature or pressure.

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46. Which ONE of the following lists of components would lose cooling upon closure of valve 2-FCV-70-48, "RBCCW NON-ESSENTIAL LOOP ISOLATION VALVE?"

- A. Recirculation Pump Seals
Reactor Building Equipment Drain Sump
RWCU Sample Cooler
- B. Drywell Atmospheric Coolers
Recirculation Pump Seals
Drywell Equipment Drain Sump Heat Exchanger
- C. Spent Fuel Pool Cooling Heat Exchanger
Reactor Building Equipment Drain Sump
RWCU Sample Cooler
- D. Drywell Equipment Drain Sump Heat Exchanger
Reactor Building Equipment Drain Sump
Recirculation Pump Seals

47. Given the following plant conditions:

- Unit 2 was at 100% power when a transient occurred which resulted in a reactor scram.
- After stabilizing the unit, the scram signal is RESET.
- All eight (8) Scram Solenoid Group lights are ON.
- Approximately ten minutes later, the following conditions are present:
 - Raw Cooling Water (RCW) Low Pressure Alarm
 - CRD charging water High Pressure Alarm
 - Outboard MSIVs CLOSED, Inboard MSIVs are OPEN
 - Scram Discharge Volume (SDV) Vents and Drain Valves are CLOSED
 - Scram Solenoid Air Valves are OPEN

Which ONE of the following describes the cause for the event?

- A. Loss of Control Air.
- B. Loss of both RPS busses.
- C. Loss of Drywell Control Air.
- D. Loss of 9-9 cabinet 5, Unit Non-Preferred.

48. Given the following plant conditions:

- Unit 2 is aligned with RHR Loop I in Shutdown Cooling and RHR Loop II in standby readiness.
- A leak occurs in the RPV, which results in the following conditions:
 - RPV level at 0 inches and slowly lowering
 - Drywell Pressure at 3.0 psig and slowly rising
 - RHR Pumps 'A' and 'C' TRIPPED

Which ONE of the following describes the **minimum** actions required to align RHR Loop II for injection to the RPV?

- A. After FCV-74-47 OR FCV-74-48 is closed, push the RHR SYS II SD CLG INBD INJECT ISOL RESET 2-XS-74-132.
- B. After FCV-74-47 AND FCV-74-48 are closed, start RHR Loop II pumps, reset PCIS, and open the inboard injection valve.
- C. After FCV-74-47 OR FCV-74-48 is closed; reset PCIS, push the RHR SYS II SD CLG INBD INJECT ISOL RESET 2-XS-74-132, and open the inboard injection valve.
- D. After FCV-74-47 AND FCV-74-48 are closed, reset PCIS, push the RHR SYS II SD CLG INBD INJECT ISOL RESET 2-XS-74-132, and open BOTH injection valves.

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49. Fuel loading is in progress on Unit 1 when you notice an unexplained rise in Source Range Monitor (SRM) count rate and an indicated positive reactor period after lowering a fuel bundle into the core.

Which ONE of the following actions is an appropriate response in accordance with 1-AOI 79-2, "Inadvertent Criticality During Incore Fuel Movements?"

- A. EVACUATE all personnel from the refuel floor ONLY.
- B. Manually SCRAM the reactor ONLY.
- C. Move the fuel assembly away from the reactor core.
- D. EVACUATE all personnel from the refuel floor AND manually SCRAM the reactor.

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50. During operation at 100% power a complete failure of both seals on Recirculation Pump 'B' increases Drywell Pressure to 2.0 psig.

Which ONE of the following is the Reactor Coolant System status resulting from this condition?

The amount of the leak is approximately (1) and is classified as (2) leakage in accordance with Technical Specifications.

(1)

(2)

- A. 30 gpm; Identified leakage
- B. 30 gpm; Unidentified leakage
- C. 60 gpm; Identified leakage
- D. 60 gpm; Unidentified leakage

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51. Unit 2 has experienced an inadvertent Main Steam Isolation Valve (MSIV) closure and subsequent reactor scram. Consequently, RCIC was placed in level control and is also maintaining reactor pressure 900 to 1000 psig with the MSIVs still isolated.

Given these plant conditions, the digital Electro-Hydraulic Control (EHC) System is in _____ (1) _____ Pressure Control mode with the pressure setpoint set at _____ (2) _____ psig.

(1) (2)

- A. Reactor; 700
- B. Header; 700
- C. Reactor; 970
- D. Header; 970

52. Given the following plant conditions:

- Unit 2 is currently testing SRVs at full power with current conditions as follows:
 - Suppression pool level: 15 feet
 - Reactor pressure: 980 psig
 - Suppression pool single element temperature: 112°F
 - Suppression pool bulk temperature: 96°F

Which ONE of the following describes the required action?

- A. Enter EOI-2, "Primary Containment Control" and Operate ALL available Suppression Pool Cooling.
- B. Enter EOI-1, "RPV Control" then SCRAM the reactor ONLY.
- C. Enter EOI-2, "Primary Containment Control" and suspend testing of SRVs.
- D. Enter EOI-1, "RPV Control" then SCRAM the reactor and inject SLC.

53. Given the following plant conditions:

- A Loss of Off-site power has occurred in conjunction with a small LOCA on Unit 2.
- Plant conditions are as follows:
 - Reactor Water Level (+) 20 inches, steady
 - Average Drywell Temperature 189°F, slowly rising
 - Suppression Chamber Pressure 9 psig , steady rising
 - Emergency Diesel Generators Connected to 4 KV Sd Bds
 - Reactor pressure 800 psig
- The Unit Supervisor directs you to ensure all DW cooling is in service.

Which ONE of the following conditions would you expect for the drywell cooling systems?

- A. ALL Drywell coolers are operating;
Both RBCCW pumps are operating.
- B. No Drywell coolers are operating;
Only 1 RBCCW pump is operating.
- C. ALL Drywell coolers are operating;
Only 1 RBCCW pump is operating.
- D. No Drywell coolers are operating;
Both RBCCW pumps are operating.

54. Given the following plant conditions:

- A LOCA has caused gross fuel failure due to sustained level below TAF on Unit 3.
- The Site Emergency Director (SED) / SRO has approved implementation of EOI Appendix 18, "Suppression Pool Water Inventory Removal and Makeup." to return level to the normal band for implementation of SAMG strategies.
- While performing EOI Appendix 18 via the RHR Drain Pump, the RHR Drain pump inadvertently tripped.
- Suppression Pool level is (-)3.5 inches and steady.

Which ONE of the following describes the next appropriate action(s)?

- A. Open the HPCI Min Flow Valve.
- B. Continue draining the Suppression Pool by directing the water to Radwaste.
- C. Continue draining the Suppression Pool by directing the water to the Main Condenser.
- D. Secure the drain path alignment.

55. Given the following plant conditions:

- Unit 2 was operating at 98% power when an automatic scram occurs due to a Group I Isolation.
- ALL control rods fully insert as reactor water level immediately drops below Level 2.
- BOTH Recirc Pumps trip.
- HPCI automatically initiates but immediately isolates due to a ruptured inner turbine exhaust rupture diaphragm.
- RCIC is currently tagged out of service to repair an oil leak.
- ALL other systems are operable.
- EOI-1, RPV Control, is entered.
- Pressure control was established with Safety Relief Valves (SRVs).

The remaining high pressure injection systems are unable to maintain reactor water level which is currently at (-)150 inches and lowering.

Which ONE of the following contingency procedures would be the **next** EOI procedure to execute?

- A. 2-EOI-C1, "Alternate Level Control."
- B. 2-EOI-C2, "Emergency RPV Depressurization" ONLY.
- C. 2-EOI-C4, "RPV Flooding."
- D. 2-EOI-C5, "Level/Power Control."

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56. A hydraulic ATWS has occurred on Unit 2 and the Operator At-The-Controls is inserting control rods in accordance with the following:

- EOI Appendix 1D, "Insert Control Rods Using Reactor Manual Control System,"
- EOI Appendix 1F, "Manual Scram," and
- EOI Appendix 2, "Defeating ARI Logic Trips."

During execution of these appendices, _____.

- A. ALL potential Control Rod Insert Block signals are bypassed.
- B. Rod Drift indication is received once rod motion has begun.
- C. Stabilizing Valves are OPEN to provide increased drive water pressure.
- D. ALL Reactor Manual Control System (RMCS) timer functions are bypassed except for the Settle Bus Timer.

57. Given the following plant conditions:

- Unit 2 has experienced a LOCA with a loss of Primary Containment.
- You have volunteered for a team, dispatched from the Operations Support Center (OSC), that will enter the Reactor Building and attempt to energize '2D' 480V RMOV board.
- Due to environmental and radiological conditions present in the Reactor Building, Radiation Protection personnel provide each team member with a Sodium Chloride (NaCl) and Potassium Iodide (KI) tablet during the briefing.

Which ONE of the following describes the benefit of ingesting Potassium Iodide prior to the Reactor Building entry?

Potassium Iodide will reduce the (1) and Sodium Chloride will reduce the (2).

- A. (1) risk of dehydration and heat stress.
(2) absorption of radioactive Iodine by the thyroid.
- B. (1) absorption of radioactive Iodine in the lungs.
(2) absorption of radioactive Strontium in the bones.
- C. (1) absorption of radioactive Iodine by the thyroid.
(2) risk of dehydration and heat stress
- D. (1) absorption of radioactive Strontium in the bones.
(2) absorption of radioactive Iodine in the lungs.

58. Which ONE of the following describes the **appropriate** fire extinguishing agent for the specific class of fire that will **minimize** subsequent damage to equipment?

- A. Water used on Class 'B' fires.
- B. Low pressure CO₂ used on Class 'C' fires.
- C. Dry Chemical (PKP) used on Class 'C' fires.
- D. Aqueous Film Forming Foam (AFFF) used on Class 'A' fires.

59. Given the following Unit 1 plant conditions:

- Due to multiple high pressure injection system failures, 1-EOI-C1, "Alternate Level Control" has been entered.
- RHR Pump '1A' is running and lined up for LPCI injection.
- Core Spray Pumps '1B' and '1D' are running and lined up for injection.
- Drywell Temperature is 240 °F and rising slowly.

Which ONE of the following conditions describes the appropriate point where Emergency Depressurization may be performed in accordance with 1-EOI-C1, "Alternate Level Control?"

Post Accident Flooding Range Level Instrument, 3-LI-3-52, is reading (1) with reactor pressure at (2).

REFERENCES PROVIDED

- | | (1) | (2) |
|----|----------------|----------|
| A. | (-)205 inches; | 350 psig |
| B. | (-)210 inches; | 500 psig |
| C. | (-)220 inches; | 900 psig |
| D. | (-)225 inches; | 800 psig |

60. Given the following plant conditions:

- Unit 2 is Operating at full power.
- Ground isolation is in progress on 2C 480 Volt RMOV Board.
- Troubleshooting will require the Drywell Blowers, that are powered from this board, be removed from service .

Which ONE of the following is the highest Drywell Air Temperature before troubleshooting should be stopped and the reason for this limitation.

Maintain Drywell Air Temperature at or below (1) to ensure (2).

- A. (1) 150 °F;
(2) the Design Basis Analysis remains valid by limiting the initial conditions.
- B. (1) 150 °F;
(2) equipment for accident mitigation is available under accident conditions.
- C. (1) 160 °F;
(2) the Design Basis Analysis remains valid by limiting the initial conditions.
- D. (1) 160 °F;
(2) equipment for accident mitigation is available under accident conditions.

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61. Which ONE of the following describes why the Automatic Depressurization System (ADS) is inhibited once Standby Liquid Control injection has begun in accordance with EOI-1, "RPV Control" path RC/Q?
- A. The operator can control reactor vessel pressure better than ADS.
 - B. ADS actuation would impose a severe pressure and temperature transient on the reactor vessel.
 - C. Severe core damage from a large power excursion could result.
 - D. If only steam driven high pressure injection systems are available, an ADS actuation could lead to a loss of adequate core cooling.

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62. Unit 2 was at 100% rated power when a spurious Group I Isolation occurred. The pressure transient caused a small-break LOCA to occur inside the Drywell.

Which ONE of the following describes the basis for actions with respect to 12 psig Suppression Chamber Pressure?

- A. Drywell sprays must be initiated prior to this pressure to prevent opening the Suppression Chamber to Reactor Building vacuum breakers and de-inerting the containment.
- B. Drywell sprays must be initiated above this pressure because almost all of the nitrogen and other non-condensable gases in the drywell have been transferred to the torus and chugging is possible.
- C. Above this pressure indicates that almost all of the nitrogen and other non-condensable gases in the torus have been transferred to the drywell air space and Suppression Chamber Sprays will be ineffective.
- D. Above this pressure indicates that almost all of the nitrogen and other non-condensable gases in the drywell have been transferred to the torus so initiating Drywell Sprays may result in containment failure.

63. Given the following plant conditions:

- Unit 2 experiences a Main Steam Line break at full power.
- Both Inboard and Outboard Main Steam Isolation Valves (MSIVs) on the 'B' steam line fail to isolate.
- The reactor scrams and ALL rods fully insert.
- Steam Leak Detection Panel 9-21 indications are as follows:
 - 2-TI-1-60A 320 °F
 - 2-TI-1-60B 323 °F
 - 2-TI-1-60C 337 °F
 - 2-TI-1-60D 318 °F
- NO other temperature indications are alarming.
- Area Radiation Monitor indications are as follows:
 - 2-RM-90-22A indicates 1000 mr/hr
 - 2-RM-90-21A indicates 730 mr/hr
 - 2-RM-90-20A indicates 800 mr/hr
- NO other Area Radiation Monitors are alarming.

Which ONE of the following describes the appropriate operator actions and the reason for those actions?

REFERENCE PROVIDED

- A. Emergency depressurize the reactor due to two (2) areas being above Max Safe in 2-EOI-3, "Secondary Containment Control."
- B. Enter 2-EOI-1, "RPV Control" due to one (1) area being above Max Safe in 2-EOI-3, "Secondary Containment Control."
- C. Rapidly depressurize the reactor due to one (1) area above Max Safe and one (1) area approaching Max Safe in 2-EOI-3, "Secondary Containment Control."
- D. Enter 2-GOI-100-12A, "Unit Shutdown" and commence a normal cooldown due to a primary system discharging outside Primary Containment.

64. Given the following plant conditions:

- Unit 2 is at 100% rated power.
- A Reactor Water Cleanup (RWCU) drain line cracks and is spilling into the Reactor Building.
- Area Radiation Monitors in the Reactor Building read as follows:

Reactor Building Elevation 593	>1000 mR/hr
Reactor Building Elevation 565 West	800 mR/hr
Reactor Building Elevation 565 East	850 mR/hr
Reactor Building Elevation 565 Northeast	>1000 mR/hr
All other Reactor Building areas	NOT ALARMED

- Approximately one (1) minute later, RWCU is successfully isolated.

Which ONE of the following describes the required action that MUST be directed by the Unit Supervisor and/or Shift Manager?

REFERENCE PROVIDED

- A. Enter 2-EOI-1, "RPV Control" and initiate a Reactor Scram.
- B. Scram the reactor and Emergency Depressurize the reactor.
- C. Rapidly depressurize the reactor, to the Main Condenser, with the Main Turbine Bypass Valves.
- D. Enter 2-GOI-100-12A, "Unit Shutdown" and commence a normal shutdown / cooldown.

65. Given the following plant conditions:

- Unit 2 is at 100% power.
- During the backwash of a Reactor Water Cleanup (RWCU) Demineralizer, the Backwash Receiving Tank ruptured.
- The RWCU system has been isolated.
- Secondary Containment conditions are as follows:
 - ALL Reactor and Refuel Zone radiation monitors trip on high radiation.
 - ONLY Standby Gas Treatment (SGT) train 'C' can be started. It is operating at 10,000 scfm and taking suction on the Refuel and Reactor Zones.
 - Refuel zone pressure: (-)0.12 inches of water
 - Reactor zone pressure: (+)0.02 inches of water
 - AREA RADIATION LEVELS

RB EL 565 W, 565 E, 565 NE:	250 mr/hr
RB EL 593	upscale
RB EL 621	upscale

Which ONE of the following describes the required action and the type of radioactive release in progress?

REFERENCE PROVIDED

- A. Initiate a shutdown per 2-GOI-100-12A, "Unit Shutdown." An Elevated radiation release is in progress.
- B. Initiate a shutdown per 2-GOI-100-12A, "Unit Shutdown." A Ground-level radiation release is in progress.
- C. Scram the reactor and Emergency Depressurize the RPV. An Elevated radiation release is in progress.
- D. Scram the reactor and Emergency Depressurize the RPV. A Ground-level radiation release is in progress.

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66. Which ONE of the following describes the protective function(s) required to be OPERABLE for the specified mode and/or condition?

(Each list is NOT all inclusive)

- A. Starting up in Mode 2 with IRM's on range 1 to 2:
IRM Hi Scram function
Banked Position Withdrawal Sequence (BPWS)
Rod Block Monitor (RBM)
APRM Hi (setdown - 15%).
- B. Starting up in Mode 2 with APRM downscaler clear:
APRM Hi (setdown - 15%)
APRM Hi (120%)
Mode Switch - Shutdown position
Rod Worth Minimizer (RWM).
- C. Shutting down in Mode 2 with IRM's on range 1 to 2:
IRM Hi Scram function
Banked Position Withdrawal Sequence (BPWS)
Manual Scram pushbuttons
Rod Worth Minimizer (RWM).
- D. Shutting down in Mode 2 with average SRM readings at $\sim 5 \times 10^4$ cps:
IRM Hi Scram function
APRM Hi (setdown - 15%)
OPRM upscale trip
Rod Worth Minimizer (RWM).

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67. Which ONE of the following announcements is the correct method for making an announcement using the Plant Paging System in accordance with OPDP-1, "Conduct of Operations?"
- A. "This is a drill. All personnel evacuate the Unit 2 Reactor Building due to high radiation, all personnel evacuate the Unit 2 Reactor Building due to high radiation."
 - B. "This is a drill. All personnel evacuate the Unit 2 Reactor Building due to high radiation. This is a drill."
 - C. "This is a drill. All personnel evacuate the Unit 2 Reactor Building due to high radiation, all personnel evacuate the Unit 2 Reactor Building due to high radiation. This is a drill."
 - D. "All personnel evacuate the Unit 2 Reactor Building due to high radiation. This is a drill. All personnel evacuate the Unit 2 Reactor Building due to high radiation. This is a drill."

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68. Which ONE of the following is the appropriate method for documenting a "Late Entry" in the Operator's Station Log in accordance with OPDP-1, "Conduct of Operations" after the log turnover has been completed?

Each "Late Entry" SHALL contain the words LATE ENTRY, ____ (1) ____, ____ (2) ____, and the entry that was missed from the previous shift.

- A. (1) The Current Time.
(2) The operator's name who missed the original entry.
- B. (1) The operator's name on shift when the "Late Entry" was made.
(2) The time the entry should have been made.
- C. (1) The operator's name on shift when the "Late Entry" was made.
(2) The operator's name who missed the original entry.
- D. (1) The Current Time.
(2) The time the entry should have been made.

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69. In accordance with SPP-10-2, "Clearance Procedure to Safely Control Energy," which ONE of the following describes the requirements when placing a clearance on Air-Operated Valves (AOVs)?

An Air-Operated Valve that fails _____.

- A. "OPEN" on loss of air, shall have its air supply electrically or mechanically isolated and the air supply must be tagged.
- B. "OPEN" on loss of air, shall be held closed with a gagging device that is tagged as a clearance boundary.
- C. "AS-IS" on loss of air shall NOT be used for blocking purposes until it is verified closed and a gagging device installed.
- D. "CLOSED" on loss of air shall NOT be considered closed for blocking purposes unless it is held closed with a gagging device.

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70. Given the following plant conditions:

- A reactor startup is in progress with power currently at 3%
- Rod Worth Minimizer (RWM) is latched into Group 8 (12 control rods)
- Group 9 rods are the same rods as Group 8.
- Sequence Control: ON
- Group 8 Limits: 08-12
- Group 9 Limits: 12-16

Which ONE of following sets of conditions describes when the RWM will automatically latch up to Group 9?

- A. ALL rods EXCEPT 1 in group 8 are withdrawn to Notch 12 and the final rod is withdrawn to Notch 14.

ALL rods EXCEPT 2 in group 8 are withdrawn to Notch 12, and a rod in group 9 is selected.

- B. ALL rods in group 8 have been withdrawn to Notch 12 and a rod in group 9 is selected.

ALL rods EXCEPT 2 in group 8 are withdrawn to Notch 12, and a rod in group 9 is selected.

- C. ALL rods EXCEPT 1 in group 8 are withdrawn to Notch 12 and the final rod is withdrawn to Notch 14.

All rods in group 8 are withdrawn to Notch 12 and the in-sequence rod in group 9 has NOT been selected.

- D. All rods in group 8 are withdrawn to Notch 12 and the in-sequence rod in group 9 has NOT been selected.

ALL rods EXCEPT 1 in group 8 are withdrawn to Notch 12 and the final rod is withdrawn to Notch 14.

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71. Given the following conditions at a work site.

Airborne activity:	3 DAC
Radiation level:	40 mr/hr
Radiation level with shielding:	10 mr/hr
Time to place shielding:	15 minutes
Time to conduct task with respirator:	1 hour
Time to conduct task without respirator:	30 minutes

Assume the following:

- the airborne dose with a respirator will be zero (0).
- a dose rate of 40 mr/hr will be received while placing the shielding.
- all tasks will be performed by one worker.
- shielding can be placed in 15 minutes with or without a respirator.

Which ONE of the following would result in the lowest whole body dose?

- A. Conduct the task WITHOUT a respirator or shielding.
- B. Conduct the task with a respirator and WITHOUT shielding.
- C. Place the shielding while wearing a respirator and conduct the task with a respirator.
- D. Place the shielding while wearing a respirator and conduct the task WITHOUT a respirator.

72. Unit 2 reactor shutdown is in progress and primary containment de-inerting has been authorized.

Which ONE of the following is the basis for preventing the simultaneous opening of BOTH the SUPPR CHBR ATM SPLY INBD ISOLATION VLV (2-FCV-64-19) and the DRYWELL ATM SUPPLY INBD ISOLATION VLV (2-FCV-64-18) during the performance of this evolution?

- A. To prevent the high flow rate from causing unplanned damage to the non-hardened ventilation ducts during a LOCA.
- B. To prevent the possibility of overpressurizing the primary containment during a LOCA.
- C. To prevent release of the drywell atmosphere through an unmonitored ventilation flow path during a LOCA.
- D. To prevent creating a high differential pressure between the drywell and the torus air space during a LOCA.

73. Given the following plant conditions:

- Reactor pressure is being maintained at 25 psig.
- Temperature near the water level instrument run in the Drywell is 265 °F.
- The Shutdown Vessel Flooding Range Instrument (LI-3-55) is reading (+)35".

Which ONE of the following describes the **highest** Drywell Run Temperature at which the LI-3-55 reading (+)35 inches is considered valid?

REFERENCE PROVIDED

- A. 200 °F
- B. 250 °F
- C. 265 °F
- D. 300 °F

74. Given the following plant conditions:

- Unit 2 has scrammed and multiple control rods failed to insert.
- The Unit Supervisor has entered 2-EOI-1, "RPV Control", and 2-EOI-C-5, "Level/Power Control."
- You have been designated to assist the crew by performing EOI Appendicies as they are assigned.

Which ONE of the following **precludes** the use of a handheld radio to communicate with Control Room personnel?

- A. 2-EOI Appendix 2 in the 2A Electrical Board Room.
- B. 2-EOI Appendix 16H at the '2C' 250V RMOV Board.
- C. 2-EOI Appendix 1C in the Auxiliary Instrument Room.
- D. 2-EOI Appendix 1B on the Reactor Building 565' Elevation.

75. Which ONE of the following describes the use of Event-Based procedures during Symptom-Based Emergency Operating Instructions (EOI) execution?

Event-Based procedures are _____.

- A. NOT used during Symptom-Based EOI execution.
- B. ONLY used if specifically directed by an EOI flowchart step.
- C. ONLY used if they do NOT interfere with EOI implementation.
- D. MUST be used if equipment or plant status require their implementation.

76. Given the following plant conditions:

- Unit 1 was at 100% power with RPS 'A' on Alternate due to problems with the MG set.
- A fault on '1B' 480V RMOV Board causes a loss of the board.
- The following conditions are observed:
 - Multiple control rods failed to insert on the scram.
 - Reactor pressure is 960 psig and slowly rising with 1 SRV open.

Which ONE of the following describes the approximate value of reactor power, the appropriate actions and the basis for the actions?

Reactor power is _____ (1) _____. Maintain RPV level between _____ (2) _____.

- | (1) | (2) |
|---------------------|--------------------------|
| A. less than 5%. | (-)50 and (-)100 inches. |
| B. greater than 5%. | (+)2 and (+)51 inches. |
| C. less than 5%. | (+)2 and (+)51 inches. |
| D. greater than 5%. | (-)50 and (-)100 inches. |

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77. Unit 2 is in Mode 5 with a fuel shuffle in progress. Alternate Decay Heat Removal (ADHR) is in service. Technical Specification Required Action 3.9.7.C.1 states:

"Verify reactor coolant circulation by an alternate method."

Which ONE of the following conditions would satisfy this action statement with Jet Pump Plugs installed?

- A. Verify RPV level is greater than or equal to (+)70 inches.
- B. Verify a Recirculation Pump is in service at 480 RPM.
- C. Verify ADHR is in service with a minimum of one pump.
- D. Verify vessel bottom head to feedwater nozzle ΔT is within 5°F.

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78. An ATWS and LOCA have occurred on Unit 2, resulting in the following plant conditions:

- Suppression Chamber pressure is 51 psig and rising 1 psig every 5 minutes.
- Drywell temperature is 325°F and rising 1°F every 15 minutes.
- Suppression Pool level is 19 ft. and steady.

Which ONE of the following describes the appropriate response in accordance with 2-EOI-2, "Primary Containment Control?"

- A. Initiate Drywell Sprays ONLY.
- B. Initiate Drywell Sprays AND vent the Suppression Chamber.
- C. Vent the Suppression Chamber ONLY.
- D. Vent the Drywell ONLY.

79. Unit 2 is at 15% power following a refueling outage.

- Surveillance 2-SR-3.5.1.8, "HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Pressure" is in progress.
- The Unit Operator announces "SUPPR POOL AVERAGE TEMP HIGH" Alarm and bulk pool temperature is 96°F and rising at approximately 1°F every 3 minutes.
- RHR System I is in Suppression Pool Cooling.

Which ONE of the following describes the minimum required actions in accordance with Emergency Operating Instructions and Technical Specifications?

REFERENCE PROVIDED

A. Maximize RHRSW flow on the inservice RHR Heat Exchangers.

NO Tech Spec Actions required at this time.

B. Place additional RHR Pumps in suppression pool cooling .

NO Tech Spec actions required at this time.

C. Place additional RHR Pumps in suppression pool cooling.

Verify suppression pool temp is below 110°F and reduce suppression pool temp to less than 95°F within 24 hours.

D. Maximize RHRSW flow on the inservice RHR Heat Exchangers.

Verify suppression pool temp is below 110°F and reduce suppression pool temp to less than 95°F within 24 hours.

80. Given the following Unit 1 conditions:

- A Loss of off-site power has occurred.
- OATC reports 26 control rods are at position 02 and the remaining rods are at position 00.
- APRM indications are NOT available.
- RPV pressure is being maintained between 800 to 1000 psig.
- RPV level is (-)20 inches and steady.
- Suppression Pool temperature is 102 °F and steady.

Which ONE of the following describes the appropriate actions to be performed in accordance with Emergency Operating Instructions?

- A. Level band is (+)2 to (+)51 inches.
SLC should NOT be initiated.
RPV cooldown is permitted.
- B. Level band is (-)50 to (-)100 inches.
SLC should be initiated.
RPV cooldown is NOT permitted.
- C. Level band is (+)2 to (+)51 inches.
SLC should be initiated.
RPV cooldown is NOT permitted.
- D. Level band is (-)50 to (-)100 inches.
SLC should NOT be initiated.
RPV cooldown is permitted.

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81. Unit 1 is operating at 59% power with ONE Recirc Pump out of service . Actual Minimum Critical Power Ratio (MCPR) is determined to be 1.10.

Which ONE of the following describes the required operator actions and the possible consequences of this condition?

Restore MCPR to (1) insert all operable control rods within 2 hours. Possible consequences of this condition are that high offsite releases may result during a transient due to (2) .

(1)

(2)

- A. 1.11 AND; perforations in the fuel cladding safety barrier.
- B. 1.09 OR; perforations in the fuel cladding safety barrier.
- C. 1.11 OR; pellet-clad interaction.
- D. 1.09 AND; pellet-clad interaction.

82. All Units are in Mode 1.

Corrective Maintenance is in progress for 'C' Fire Pump Control Room handswitch. Delays in parts delivery will result in inability to replace the handswitch for another 130 days.

Which ONE of the following describes the required compensatory actions?

Establish Fire Watches in _____ (1) _____. PORC review of compensatory actions will be required ____ (2) ____.

REFERENCE PROVIDED

- | (1) | (2) |
|----------------------------------|--------|
| A. Fire Area 16. | once. |
| B. Fire Area 16. | twice. |
| C. Fire Areas 21, 22, 23 and 24. | once. |
| D. Fire Areas 21, 22, 23 and 24. | twice. |

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83. Unit 3 is operating at full power when a condensate leak results in the following plant conditions:

- The reactor scrams and condensate pumps are removed from service.
- Water level lowered to (-)115 inches then was restored and maintained with HPCI and RCIC.

The unit operator reports a lowering condenser vacuum.

Which ONE of the following describes the reason for lowering condenser vacuum and the procedure guidance required to continue the cooldown?

Condenser vacuum is lowering due to a loss of _____ (1) _____. Continue the cooldown by performing the following: _____ (2) _____.

(1)

(2)

- | | |
|-------------------------------|--|
| A. hotwell level. | Re-open MSIVs per 3-EOI Appendix 8B. |
| B. the Steam Jet Air Ejector. | Re-open MSIVs per 3-EOI Appendix 8B. |
| C. hotwell level. | Exit 3-EOI-1 RC/P and enter 3-GOI-100-12A. |
| D. the Steam Jet Air Ejector. | Exit 3-EOI-1 RC/P and enter 3-GOI-100-12A. |

84. Given the following plant conditions:

- Unit 2 is operating at full power with RCIC suction aligned to the Suppression Pool due to a flange leak on the CS&S suction valve.
- The Main Turbine trips due to an EHC logic failure.
- The Bypass Valves do **not** open.
- Some control rods fail to insert from the scram signal.
- The UO notes the following conditions:
 - Reactor Power 4%.
 - Suppression Pool Temperature 142°F.
 - Drywell Pressure 8 psig.
 - Reactor Water Level -140 inches slowly lowering.
 - RCIC injecting.
 - 250V DC RMOV Board 2A is de-energized.
 - SLC injecting with Tank level at 70%.
 - Appendix 8B in progress, MSIV dp is 150 psig.

Which ONE of the following describes the required operator action?

REFERENCE PROVIDED

- A. When SLC tank level reaches 43%, exit C5 and control RPV water level per RC/L.
- B. Using RCIC, restore RPV water level to between +2 inches and +51 inches.
- C. Using RCIC, maintain RPV water level between -180 inches and level to which it was lowered.
- D. Inject with HPCI in MANUAL control.

85. Unit 2 has experienced a LOCA with the following plant conditions:

- RPV level dropped below Top of Active Fuel (TAF) and Emergency Depressurization was performed at (-)170 inches.
- Reactor water level has been raised to (+)32 inches.
- Venting per 2-EOI-2, "Primary Containment Control" has reduced Drywell pressure to 3 psig.

Which ONE of the following describes how monitoring of the containment H₂ and O₂ concentrations is accomplished and what methods of control are used during this condition?

In accordance with 2-EOI-2, "Primary Containment Control", monitoring is accomplished by _____ (1) _____. Control is accomplished by use of the _____ (2) _____.

- A. (1) the use of the Containment H₂/O₂ Monitors.
(2) Nitrogen Makeup System using 2-EOI Appendix 14A.
- B. (1) the use of the Containment H₂/O₂ monitors.
(2) Containment Atmosphere Dilution (CAD) system using 2-SAMG Appendix-CNP.
- C. (1) Chemistry Department sampling due to PCIS isolation of the H₂/O₂ monitors.
(2) Nitrogen Makeup System using 2-EOI Appendix 14A.
- D. (1) Chemistry Department sampling due to PCIS isolation of the H₂/O₂ monitors.
(2) Containment Atmosphere Dilution (CAD) system using 2-SAMG Appendix-CNP.

86. Given the following plant conditions:

- Unit-3 was at 100% rated power near EOL.
- A LOCA resulted in the following plant conditions:
 - All control rods are fully inserted.
 - RPV level is -120 inches and slowly lowering.
 - RPV pressure is 750 psig and slowly lowering.
 - Drywell pressure is 8.5 psig and slowly lowering.
 - RHR Loop I is aligned for Suppression Chamber Spray in accordance with 3-EOI Appendix 17C.
 - RHR Loop II is aligned for Drywell Spray in accordance with 3-EOI Appendix 17B.
 - Both loops of Core Spray are running on minimum flow with injection valves closed.
 - All three condensate pumps are running and available for injection.
 - 3-EOI C-1 flowchart transition has just been performed.

Which ONE of the following describes the required procedure executions and the basis for that decision?

REFERENCE PROVIDED

- A. - Direct 3-EOI Appendices 16F and 16G be complete to enable RHR injection valve closure.
 - Drywell and Suppression Pool Sprays may be continued in accordance with 3-EOI-C1.
- B. - Direct LPCI SYS I and II OUTBD INJ VLV BYPASS SEL switches be placed in **BYPASS**.
 - Drywell and Suppression Pool Sprays may be continued in accordance with 3-EOI-C1.
- C. - Direct 3-EOI Appendices 16F and 16G be complete to enable RHR injection valve closure.
 - Drywell and Suppression Pool Sprays may NOT be continued.
- D. - Direct LPCI SYS I and II OUTBD INJ VLV BYPASS SEL switches be placed in **BYPASS**.
 - Drywell and Suppression Pool Sprays may NOT be continued.

87. Given the following plant conditions:

- Unit 3 is performing a startup and heatup in accordance with 3-GOI-100-1A, "UNIT STARTUP."
- IRM 'B' is in BYPASS.
- No IRM Range Switches are being manipulated.
- All OPERABLE IRMs are on Range 7 when a half-scam occurs on RPS 'A'.
- The Reactivity Manager reports the cause of the half-scam was due to a momentary Upscale Trip on IRM 'G;' but, the IRM is currently reading normally.

Whose approval, if any, is required in accordance with 3-GOI-100-1A to bypass IRM 'G', and what are the required actions per Technical Specifications, if any?

- A. Plant Manager or designee approval is required.
NO Tech Spec action is required.
- B. Plant Manager or designee approval is required.
Place ONE IRM channel in the TRIP condition.
- C. NO approvals are required.
NO Tech Spec action is required.
- D. NO approvals are required.
Place ONE IRM channel in the TRIP condition.

88. Given the following Unit 2 conditions:

- Reactor pressure: 10 psig
- Drywell temperature: 250°F
- Secondary Containment temperatures:

74-95F	220°F
74-95C & D	245°F
69-835A thru D	260°F
69-29F, G & H	200°F

- Reactor water level indications:

LI-3-58A & B	Erratic
LI-3-52	(-)140 inches
LI-3-62A	(-)160 inches
LI-3-53, 60 & 206	0 inches
LI-3-55	0 inches

Which ONE of the following describes the required action and the basis for that action?

Enter _____ (1) _____ due to _____ (2) _____ in the reference legs of LI-3-58A & B.

REFERENCE PROVIDED

- | | (1) | (2) |
|----|---------------------------------------|---|
| A. | 2-EOI-C-1, "Alternate Level Control;" | flashing steam |
| B. | 2-EOI-C-4, "RPV Flooding;" | flashing steam |
| C. | 2-EOI-C-1, "Alternate Level Control;" | noncondensable gases coming out of solution |
| D. | 2-EOI-C-4, "RPV Flooding;" | noncondensable gases coming out of solution |

89. Given the following plant conditions:

- Unit 1 is in Mode 4 at 195 °F following a shutdown 18 hours earlier for refueling.
- RPV Level is (+)80 inches and steady.
- BOTH Recirc Variable Frequency Drives (VFD) are tagged for maintenance.
- RHR Loop II is in Shutdown Cooling when a loss of RPS 'B' occurs.

Which ONE of the following describes the effects on core circulation and decay heat removal in accordance with 1-AOI-74-1, "Loss of Shutdown Cooling," and the required actions to restore a PRIMARY decay heat removal method in accordance with 1-AOI-99, "Loss of RPS Bus?"

A. ONLY an alternate method of decay heat removal is required.

Align RHR Loop II for Shutdown Cooling then manually transfer RPS 'B' to alternate and reset PCIS.

B. Alternate methods of decay heat removal AND core circulation are required.

Manually transfer RPS 'B' to alternate, reset PCIS and align RHR Loop II for Shutdown Cooling.

C. ONLY an alternate method of core circulation is required.

Manually transfer RPS 'B' to alternate, reset PCIS and align RHR Loop II for Shutdown Cooling.

D. EITHER an alternate method of decay heat removal OR core circulation is required.

Align RHR Loop II for Shutdown Cooling then manually transfer RPS 'B' to alternate and reset PCIS.

90. Unit 2 is at 40% power following a refueling outage.

Testing on the Main Turbine Stop Valves (TSV) reveal TSV number 4 limit switches for BOTH RPS trip systems are INOPERABLE. ALL other valves function normally.

Which ONE of the following describes the effect on the RPS trip function associated with the main turbine trip in this condition and the maximum time allowed to complete the required remedial action?

The SCRAM function due to Main Turbine trip above 30% power _____ (1) _____.

Remove fuses for RPS A and B, associated with TSV number 4, _____ (2) _____.

REFERENCE PROVIDED

(1)

(2)

- | | |
|-----------------------|-----------------|
| A. is maintained; | within 1 hour. |
| B. is NOT maintained; | within 1 hour. |
| C. is maintained; | within 6 hours. |
| D. is NOT maintained; | within 6 hours. |

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91. Given the following plant conditions:

- BFN is in the process of discharging the Waste Sample Tank to the river in accordance with an approved Discharge Permit.
- The discharge has been in progress for 90 minutes when Security reports that water is bubbling up from the ground in the vicinity of the SGT Building.
- 0-RR-90-130 (Radwaste Effluent Radiation Monitor) is currently reading the same as the initial background radiation level prior to commencing the discharge.

Which ONE of the following describes the appropriate action and the basis for this action?

Terminate the discharge and _____ (1) _____. Enter procedure EPIP-1 in order to determine _____ (2) _____.

- A. (1) have Radcon survey the area of the leak.
(2) an Offsite Dose Assessment.
- B. (1) have Radcon survey the area of the leak.
(2) area dose rates and posting requirements.
- C. (1) have Chemistry sample the spilled water.
(2) the source and isotopic analysis of the leak.
- D. (1) have Chemistry sample the spilled water.
(2) if the Effluent Concentration Limits have been exceeded.

92. Given the following plant conditions:

- A transient has occurred on Unit 1 resulting in the following annunciators in alarm:
 - STACK GAS RADIATION HI (1-RA-90-147B)
 - STACK GAS RADIATION HIGH-HIGH (1-RA-90-147A)
 - OG PRETREATMENT RADIATION HIGH (1-RA-90-157A)
 - RX BLDG, TURB BLDG, RF ZONE EXH RADIATION HIGH (1-RA-90-250A)

Which ONE of the following describes the required operator action?

Declare a/an _____ (1) _____. Fifteen minutes later you determine you must notify _____ (2) _____ to implement EPIP-13, for dose assessment.

REFERENCE PROVIDED

- | | (1) | (2) |
|----|--------------------------------|--------|
| A. | Notification of Unusual Event; | SED |
| B. | Alert; | TSC |
| C. | Notification of Unusual Event; | Radcon |
| D. | Alert; | CECC |

93. Given the following Unit 3 conditions:

- Unit 3 was at 100% power
- A Loss of Coolant Accident occurred resulting in the following plant indications:
 - Reactor water level is (-)130 inches and steady with RCIC injecting.
 - Reactor pressure is 750 psig and lowering slowly.
 - Drywell pressure is 5.0 psig and rising slowly.
 - Reactor Zone exhaust radiation is 65 mR/hr.
 - Refuel Zone exhaust radiation is 4 mR/hr.
 - SGT trains 'A', 'B' and 'C' are running.

Which ONE of the following describes the status of Reactor and Refuel Zone ventilation and the corrective actions required for these conditions?

Reactor and Refuel Zone ventilation systems are _____ (1) _____. Performing 3-EOI Appendix 8E and restarting ventilation per 3-EOI Appendix 8F is required to _____ (2) _____.

(1)

(2)

- A. isolated. maintain the availability of systems in the Reactor Building.
- B. isolated. maintain Secondary Containment differential pressure.
- C. NOT isolated. maintain the availability of systems in the Reactor Building.
- D. NOT isolated. maintain Secondary Containment differential pressure.

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94. Unit 1 has just completed a shutdown for a forced maintenance outage, with the following plant conditions:

- Recirc Pump '1A' has been removed from service in preparation for Shutdown Cooling to be placed in service.
- RPV pressure is 40 psig and ALL other parameters are normal.

The Unit Operator reports that the Recirc Pump '1A' Discharge Valve will not close.

Which ONE of the following describes the required Technical Specification and operational actions?

RHR _____ (1) _____ per LCO _____ (2) _____. Additionally, direct the Unit Operator to close Recirc Pump '1A' Suction Valve and place _____ (3) _____ in Shutdown Cooling.

- | | (1) | (2) | (3) |
|----|------------------------|--------------------------|-------------|
| A. | Loop I is INOPERABLE; | 3.5.2, "ECCS Shutdown." | RHR Loop I |
| B. | Loop II is INOPERABLE; | 3.5.1, "ECCS Operating." | RHR Loop II |
| C. | Loop I is OPERABLE; | 3.5.2, "ECCS Shutdown." | RHR Loop I |
| D. | Loop II is OPERABLE; | 3.5.1, "ECCS Operating." | RHR Loop II |

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95. Unit 1 was operating at 100% power when a catastrophic failure of the EHC system occurs. Post trip reviews of the transient reveal a pressure spike as follows:

- Steam Dome 1300 psig
- Bottom head 1330 psig

Determine if the RPV Safety Limit was violated and the basis for the conclusion.

The RPV Safety Limit was _____ (1) _____, because the Safety Limit is provided for the _____ (2) _____. The NRC must be notified within _____ (3) _____.

- | (1) | (2) | (3) |
|------------------|---------------------------|----------|
| A. violated; | Steam Dome. | 1 hour. |
| B. NOT violated; | Steam Dome. | 4 hours. |
| C. violated; | entire Pressure boundary. | 4 hours. |
| D. NOT violated; | entire Pressure boundary. | 1 hour. |

96. Given the following plant conditions:

- Unit 2 is 100% RTP.
- Unit 1 is in Mode 5, with initial fuel loading in progress.
- Unit 3 is in Mode 5, Control Rod Drive replacement in progress after first series of fuel moves.
- 'B1' RHRSW pump is tagged for impeller replacement.
- '2C' RHR Heat Exchanger tagged for eddy current testing.
- The Outside Auxiliary Unit Operator (AUO) reports that BOTH Sump Pumps in the 'D' RHRSW Pump Room have failed to start. Initial troubleshooting reveals a shorted motor on BOTH Sump Pumps .

Which ONE of the following describes the minimum required actions imposed by Unit 2 Technical Specifications?

Restore Suppression Pool Cooling, Suppression Chamber Sprays, and Drywell Sprays in (1). Restore RHRSW System and Ultimate Heat Sink in (2).

REFERENCE PROVIDED

- | | (1) | (2) |
|----|----------|----------|
| A. | 7 days. | 8 hours. |
| B. | 7 days. | 30 days. |
| C. | 30 days. | 8 hours. |
| D. | 30 days. | 30 days. |

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97. A Hi-Storm has just been placed on the Independent Spent Fuel Storage Installation (ISFSI) pad and the Shift Manager is provided with the following data:

- The Multi-Purpose Canister (MPC) Overpack ID number is BFN-0-CASK-079-0100/8.
- The MPC Model is 68FF.
- Helium Backfill pressure is 31.2 psig.
- Helium Leak Rate is less than $2.0 \text{ E-6 atm cc/sec}$.
- Helium purity is 98.6%
- Average surface dose rates on the top of the MPC are 2 mrem/hour.
- Average surface dose rates on the side of the MPC are 12 mrem/hour.
- Inlet and outlet ducts are clear and reading 14 mrem/hour.

In accordance with the Technical Specifications for the Hi-Storm 100 Cask System, Which ONE of the following describes the status of Overpack BFN-0-CASK-079-0100/8.

The MPC storage conditions are _____ (1) _____. According to Technical Specifications for the Hi-Storm 100 Cask System, _____ (2) _____ is required.

REFERENCE PROVIDED

- | (1) | (2) |
|-----------------|---|
| A. acceptable | verifying surface dose rates within 24 hours after beginning storage operations |
| B. acceptable | verifying all overpack inlet and outlet air ducts are free of blockage every 24 hours |
| C. unacceptable | initiating actions to return the MPC to an analyzed condition within 14 days |
| D. unacceptable | administratively verifying fuel loading within 24 hours |

98. Given the following plant conditions:

- Unit 2 is commencing a scheduled reactor shutdown due to a leak in the Drywell.
- The Operations Manager has directed that the Drywell and Torus be de-inerted so that an entry team can inspect the Drywell .
- Containment entry is scheduled 22 hours after reactor shutdown.
- The unit is currently at 25% power.

Which ONE of the following describes the earliest time and preferred method for purging the containment to allow for Drywell entry?

Purging of containment _____ (1) _____. The preferred method of purging the atmosphere is using the _____ (2) _____.

- A. (1) CANNOT begin until reactor power is less than or equal to 15%.
(2) Standby Gas Treatment System.
- B. (1) CANNOT begin until reactor power is less than or equal to 15%.
(2) Primary Containment Purge Fans and normal Reactor Building Ventillation.
- C. (1) can begin IMMEDIATELY.
(2) Standby Gas Treatment System.
- D. (1) can begin IMMEDIATELY.
(2) Primary Containment Purge Fans and normal Reactor Building Ventillation.

99. Given the following plant conditions:

- During Unit 3 normal full power operation, RHR System I (Div I) Logic Power Failure Alarm annunciates.
- Prior to any corrective action being taken, a Loss of Coolant Accident results in the following plant conditions:

RPV Level	Below TAF
RPV Pressure	100 psig
Drywell Pressure	21 psig

Which ONE of the following describes the response of Loop I RHR Pumps and what subsequent actions must be taken to address these plant conditions?

- A. ALL four (4) RHR pumps auto start in the LPCI mode and should remain there until RPV level is above TAF.
- B. RHR Pumps '3A' and '3C' should be manually started in Drywell Spray mode. RHR Pumps '3B' and '3D' auto start in LPCI mode and should remain there until RPV level is above TAF.
- C. RHR Pump '3C' ONLY will auto start in LPCI mode. RHR Pump '3A' can be manually started in LPCI mode and should remain there until RPV level is above TAF. RHR Pumps '3B' and '3D' should be manually started in Drywell Spray mode.
- D. RHR Pump '3A' ONLY will auto start in LPCI mode. RHR Pump '3C' can be manually started in LPCI mode and should remain there until RPV level is above TAF. RHR Pumps '3B' and '3D' should be manually started in Drywell Spray mode.

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100. ALL three units are operating at full power when the ODS notifies the SM that a major blackout has occurred in the Northeastern part of the United States. Efforts thus far have failed to stabilize the grid. The ODS requests that BFN carry maximum outgoing VARs to hold system voltage constant.

Units 2 and 3 were successful in attaining VARs at "200 Outgoing." Unit 1 tripped on a generator fault.

Determine which ONE of the following describes the reporting requirements for these events and appropriate actions to ensure offsite power is available.

A (1) report is required to the NRC, and notification to the ODS (2) required to ensure the availability of offsite power for BFN.

REFERENCE PROVIDED

- | | (1) | (2) |
|----|----------|--------|
| A. | 1-hour; | is |
| B. | 4-hour; | is |
| C. | 1- hour; | is NOT |
| D. | 4- hour; | is NOT |

You have completed the test!