

2011 NRC Written Examination
Waterford 3
Reactor Operator and Senior Reactor Operator

1.		<u>D</u>
2.	<u>A</u>	
3.		<u>D</u>
4.		<u>C</u>
5.		<u>C</u>
6.	<u>A</u>	
7.		<u>B</u>
8.		<u>B</u>
9.		<u>D</u>
10.		<u>B</u>
11.	<u>A</u>	
12.	<u>A</u>	
13.		<u>B</u>
14.	<u>A</u>	
15.		<u>C</u>
16.		<u>B</u>
17.		<u>D</u>
18.		<u>D</u>
19.	<u>A</u>	
20.		<u>D</u>
21.		<u>D</u>
22.		<u>C</u>
23.		<u>D</u>
24.		<u>C</u>
25.	<u>A</u>	
26.		<u>B</u>
27.		<u>D</u>
28.		<u>B</u>
29.		<u>D</u>
30.	<u>A</u>	
31.		<u>C</u>
32.		<u>D</u>
33.		<u>C</u>
34.		<u>B</u>
35.	<u>A</u>	
36.		<u>C</u>
37.		<u>B</u>
38.	<u>A</u>	
39.		<u>C</u>
40.		<u>B</u>
41.		<u>B</u>
42.		<u>D</u>
43.		<u>D</u>
44.	<u>A</u>	
45.	<u>A</u>	
46.		<u>D</u>
47.		<u>C</u>
48.	<u>A</u>	
49.		<u>D</u>
50.		<u>D</u>

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51.	<u>A</u>		
52.		<u>C</u>	
53.		<u>C</u>	
54.		<u>C</u>	
55.			<u>D</u>
56.	<u>A</u>		
57.		<u>B</u>	
58.		<u>C</u>	
59.		<u>B</u>	
60.	<u>A</u>		
61.	<u>A</u>		
62.			<u>D</u>
63.	<u>A</u>		
64.		<u>B</u>	
65.		<u>C</u>	
66.	<u>A</u>		
67.			<u>D</u>
68.		<u>C</u>	
69.		<u>B</u>	
70.		<u>B</u>	
71.			<u>D</u>
72.		<u>C</u>	
73.	<u>A</u>		
74.		<u>B</u>	
75.		<u>C</u>	
S1.			<u>C</u>
S2.		<u>B</u>	
S3.	<u>A</u>		
S4.	<u>A</u>		
S5.			<u>C</u>
S6.			<u>D</u>
S7.	<u>A</u>		
S8.			<u>C</u>
S9.		<u>B</u>	
S10.			<u>D</u>
S11.	<u>A</u>		
S12.		<u>B</u>	
S13.	<u>A</u>		
S14.			<u>C</u>
S15.	<u>A</u>		
S16.		<u>B</u>	
S17.			<u>D</u>
S18.		<u>B</u>	
S19.	<u>A</u>		
S20.			<u>C</u>
S21.			<u>D</u>
S22.		<u>B</u>	
S23.			<u>D</u>
S24.			<u>C</u>
S25.			<u>D</u>

2011 Written Exam Student References

Question Number	Reference
RO 10	OP-902-009, Att. 2A
RO 19	COLR Fig 3
RO 21	OP-901-110, Attachment 1 PDB Figure 1 RCS Temperature Bands vs Power
RO 24	Tech Spec 3.6.1.3
RO 33	OP-902-009 Attachment 2-E and 2-F
RO 53	Tech Spec 3.7.4
SRO 5	TRM 3.8.3.1, Amendment 111
SRO 6	Waterford Generator Capability Curve
SRO 10	Tech Spec 3.3.3.1
SRO 14	OP-100-014 Att 6.6 page 15 Tech Spec 3.6.3 Tech Spec 3.7.1.6
SRO 19	OP-010-004, Att 9.6, Fuel Preconditioning Guidelines
SRO 24	EP-001-001
SRO 25	EP-002-052

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Question 1

Given:

- Feedwater Control System (FWCS) 1 was in AUTO with a setpoint of 68% when FWCS 1 Master Controller output failed to 0%
- The operator depresses the MANUAL pushbutton on the FWCS 1 Master Controller and manually raises the output of FWCS 1 Master Controller
- Prior to matching steam flow and feed flow, the reactor trips on S/G 1 Low Level
- Final FWCS 1 Master Controller flow demand is 50% in MANUAL
- Reactor Trip Override (RTO) actions are verified
- S/G 1 level is currently rising

When S/G 1 level exceeds the automatic setpoint of 68% NR, RTO will _____ (1) _____ in FWCS 1 and S/G 1 level will _____ (2) _____.

- | _____ (1) _____ | _____ (2) _____ |
|------------------|-----------------------|
| A. reset | stabilize at setpoint |
| B. remain active | stabilize at setpoint |
| C. reset | continue to rise |
| D. remain active | continue to rise |

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Question 2

Given:

- The plant is at 10% power following refueling
- A Pressurizer Relief Valve spuriously opens
- Reactor Coolant System pressure drops from 2250 PSIA to 1900 PSIA and then slowly recovers
- Quench Tank temperature rises to 135°F and stabilizes

The Pressurizer Relief Valve is currently ____ (1) _____. During this event, Pressurizer Level will _____ (2) _____.

- | | (1) | (2) |
|----|--------|---|
| A. | closed | lower due to mass loss |
| B. | closed | rise to 100% due to head bubble formation |
| C. | open | lower due to mass loss |
| D. | open | rise to 100% due to head bubble formation |

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Question 3

Given:

- A Small Break Loss of Coolant Accident with a concurrent Loss of Offsite Power has occurred
- OP-902-002, Loss of Coolant Accident Recovery, is being implemented
- Containment pressure is 17.3 PSIA
- Reactor Coolant System pressure is 1380 PSIA
- Reactor Coolant System T_{cold} temperatures are 550°F in loops 1 and 2
- A cooldown to Shutdown Cooling entry conditions is commencing

The ATC should reset _____ (1) _____ bistable setpoints during the cooldown to ensure continued _____ (2) _____ availability.

	(1)	(2)
A.	Pressurizer Pressure Low and Steam Generator Pressure Lo	Pressurizer Heater and Emergency Feedwater
B.	Steam Generator Pressure Low only	Pressurizer Heater and Emergency Feedwater
C.	Pressurizer Pressure Low and Steam Generator Pressure Low	Emergency Feedwater
D.	Steam Generator Pressure Low only	Emergency Feedwater

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Question 4

OP-902-002, Loss of Coolant Accident Recovery procedure requires sampling both Steam Generators for activity. The Shift Chemist should be notified that

_____ (1) _____ has occurred to ensure actions are taken to
_____ (2) _____.

- | _____ (1) _____ | _____ (2) _____ |
|---|--|
| A. Safety Injection Actuation Signal/Containment Isolation Actuation Signal | minimize the potential for radioactive release |
| B. Containment Spray Actuation Signal | establish alternate sample cooling |
| C. Safety Injection Actuation Signal/Containment Isolation Actuation Signal | establish alternate sample cooling |
| D. Containment Spray Actuation Signal | minimize the potential for radioactive release |

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Question 5

Given:

- The reactor was operating at 100%
- Reactor Coolant Pump 2B experienced a Locked Rotor event
- All other Reactor Coolant Pumps remain in service

Post trip, Steam Generator (1) level will be lower than the other Steam Generator due to a (2) rate of heat transfer to that Steam Generator.

- | | <u> (1) </u> | <u> (2) </u> |
|----|----------------|----------------|
| A. | 1 | lower |
| B. | 2 | lower |
| C. | 1 | higher |
| D. | 2 | higher |

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Question 6

Given:

- The reactor was operating at 100% steady state
- Pressurizer level starts to lower
- Regen HX Tube Outlet temperature rises from 220°F to 300°F
- Regen HX Shell Outlet temperature rises from 430°F to 460°F
- Letdown Flow is 38 GPM
- Charging Header flow is 44 GPM with one charging pump running

Determine the location of the leak.

- A. Charging header upstream of the Regenerative HX
- B. Charging header downstream of CVC-218A, Charging Line 1A Shutoff Valve
- C. Letdown header upstream of the Regenerative HX
- D. Letdown header downstream of CVC-140, Ion Exchanger Bypass Valve

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Question 7

Given:

- The reactor is at 100% power
- A leak occurs in Component Cooling Water (CCW) that closes the A and B train CCW supply and return valves for the AB Loop

If neither train of Component Cooling Water (CCW) can be restored to the AB Loop within (1) minutes, trip the reactor, secure all Reactor Coolant Pumps (RCPs). Isolation of the Component Cooling Water AB loop also causes loss of cooling to the (2).

	<u>(1)</u>	<u>(2)</u>
A.	3	Containment Fan Coolers
B.	3	Letdown Heat Exchanger
C.	10	Containment Fan Coolers
D.	10	Letdown Heat Exchanger

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Question 8

Given:

- The plant was operating at 2250 PSIA when the selected Pressurizer Pressure Control Channel, RC-IPT-0100X failed high.
- Operator action was taken to stabilize RCS pressure
- The lowest pressure seen was 2235 PSIA
- Backup Heater Bank 3 is in ON
- Backup Heaters Banks 1,2, 4-6 are in AUTO

Pressurizer backup heater capability will be restored when the Pressurizer Pressure Channel selector switch (1) the Lo Level Heater Cutout selector switch is(are) transferred to the non-faulted channel and (2) will energize.

- | | <u>1</u> | <u>2</u> |
|----|----------|-------------------------|
| A. | or | Backup Heater Bank 3 |
| B. | and | Backup Heater Bank 3 |
| C. | or | all Backup Heater Banks |
| D. | and | all Backup Heater Banks |

Question 9

Which of the following describes how the Diverse Reactor Trip System (DRTS) interrupts power to the Control Element Drive Mechanism (CEDM) Coils during an Anticipated Transient Without Scram (ATWS) condition?

- A. The shunt trip coils of the Reactor Trip Breakers are energized.
- B. The undervoltage (UV) coils of the Reactor Trip Breakers are de-energized.
- C. The CEDM Motor-Generator Set feeder breakers on busses 32A and 32B open.
- D. The CEDM Motor-Generator Set output load contactors open.

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Question 11

OP-902-004, Excess Steam Demand Recovery Procedure, requires verifying no more than two Reactor Coolant Pumps running if Tcold is less than ____ (1) ____ °F to _____ (2) _____.

- | | (1) | (2) |
|----|----------|--|
| A. | 382[384] | prevent generating excessive core uplift forces |
| B. | 382[384] | aid in stabilizing Reactor Coolant System temperature after Steam Generator dryout |
| C. | 500[502] | prevent generating excessive core uplift forces |
| D. | 500[502] | aid in stabilizing Reactor Coolant System temperature after Steam Generator dryout |

Question 12

- 1) What is the operational concern with feeding a dry Steam Generator?
- 2) **AND** Describe the appropriate method for restoring feedwater if both Steam Generators are dry.
 - A. 1) Steam Generator internal component damage
2) Slowly restore feed to only ONE Steam Generator.
 - B. 1) Steam Generator internal component damage
2) Slowly restore feed to BOTH Steam Generators.
 - C. 1) Rapid cooldown of the RCS
2) Slowly restore feed to only ONE Steam Generator.
 - D. 1) Rapid cooldown of the RCS
2) Slowly restore feed to BOTH Steam Generators.

Question 13

Given:

- A Station Blackout occurred
- Offsite power is now available
- A Probable Maximum Precipitation (PMP) event just commenced

Power must be restored to the non-safety section of Motor Control Center _____(1)_____ and at least one Dry Cooling Tower Motor Driven Sump Pump aligned for operation within _____(2)_____ of the PMP event.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | 312A or B | 30 minutes |
| B. | 314A or B | 30 minutes |
| C. | 312A or B | 3 hours |
| D. | 314A or B | 3 hours |

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Question 14

The Undervoltage Override feature of the Load Sequencer provides protection against degraded voltage resulting from _____ (1) _____.

The Undervoltage Override feature is active between the _____ (2) _____ second load blocks.

	(1)	(2)
A.	the start of large transformer (inductive) loads	0.5 to 17
B.	failure of the Emergency Diesel Generator excitation system	0.5 to 17
C.	the start of large transformer (inductive) loads	17 to 200
D.	failure of the Emergency Diesel Generator excitation system	17 to 200

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Question 15

Given:

- Reactor Coolant System Cooldown is in progress using the Atmospheric Dump Valves (ADVs)
- The Main Condenser is unavailable
- Static Uninterruptible Power Supply (SUPS) SMC inverter fails

Due to the failure of SUPS SMC, Atmospheric Dump Valve 1 must be operated manually using the _____(1)_____, because Atmospheric Dump Valve 1 failed ____ (2) ____.

- | | (1) | (2) |
|----|--------------------------------|--------|
| A. | handwheel only | closed |
| B. | handwheel only | open |
| C. | local air station or handwheel | closed |
| D. | local air station or handwheel | open |

Question 16

Comparing a loss of the Train B DC Safety Busses to a loss of the Train AB DC Safety Busses, select the problem that occurs ONLY for a loss of Train B.

- A. Emergency power to a Static Uninterruptible Power Supply is lost.
- B. A reactor trip occurs due to loss of power to Reactor Trip Breaker UV coils.
- C. Overcurrent protection is lost for associated 4.16 KV bus loads.
- D. Control Power is lost to the associated 480V switchgear loads.

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Question 17

In accordance with OP-002-001, Auxiliary Component Cooling Water (ACCW) A header flow should be at least _____ (1) _____ GPM flow to minimize _____ (2) _____.

	<u>(1)</u>	<u>(2)</u>
A.	100	ACC-126A, ACC Header A CCW HX Outlet Temp Control Valve seat and disc erosion
B.	100	ACC Pump A vibration
C.	1000	ACC-126A, ACC Header A CCW HX Outlet Temp Control Valve seat and disc erosion
D.	1000	ACC Pump A vibration

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Question 18

Given:

- The plant is at 100% Power
- Instrument Air pressure is 63 PSIG and lowering rapidly

The crew should:

- A. Direct the turbine building watch to suspend all operations involving the condensate polisher operations.
- B. Commence a rapid down power IAW OP-901-212, Rapid Plant Power Reduction.
- C. Commence a normal plant shutdown when MSR temperature control valves fail closed to maintain Rx Power less than 100% Power.
- D. Trip the reactor and enter OP-902-000, Standard Post Trip Actions.

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Question 19

Given:

- The reactor was operating at 80%
- Control Element Assembly (CEA) 20 drops to 0.0"

Within 15 minutes, turbine load will be reduced at a rate of approximately _____ (1) _____ MW/MINUTE. 45 minutes from the time the CEA dropped, reactor power must be reduced to _____ (2) _____ %.

	<u> (1) </u>	<u> (2) </u>
A.	30	60
B.	30	70
C.	60	60
D.	60	70

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Question 20

Given:

- The plant is at 55% performing a power ascension
- Group P is at 140 INCHES for ASI control
- At 0335 Group P Control Element Assembly (CEA) 35 slips to 125"
- Power is stabilized at 55%
- The crew implements OP-901-102, CEA or CEDMCS Malfunction
- Attempts to move the CEA are unsuccessful, CEA 35 is declared INOPERABLE
- At 0420
 - Malfunctioning Automatic Control Timing Module (ACTM) card is replaced and
 - CEA 35 was realigned to 140" and CEA 35 is declared OPERABLE

The earliest that the crew can re-commence the power ascension is _____ (1) _____
to _____ (2) _____.

_____ (1) _____ (2) _____

- A. 0535 minimize the effects of Xenon redistribution
- B. 0535 allow for clad relaxation
- C. 0620 minimize the effects of Xenon redistribution
- D. 0620 allow for clad relaxation

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Question 21

Given:

- The plant is at 50% power
- Tave and Tref are matched and stable
- The Standby Charging Pump Selector Switch is in AB-A
- Due to a PAC card failure the output of the Pressurizer Level Controller auto output failed to the high limit.
- The crew entered OP-901-110, took manual control of the Pressurizer Level Controller and stabilized level at 41% (lowest level attained)
- Charging Pumps B and AB are running

Charging pump A _____(1)_____ be running. The lowest pressurizer level the crew should maintain while operating is _____(2)_____%.

	(1)	(2)
A.	should	25
B.	should NOT	25
C.	should	30
D.	should NOT	30

Question 22

Given:

- A reactor startup is in progress

Startup Channel 2 high voltage is automatically removed when power exceeds approximately (1) % on ENI Logarithmic Channel A, if the HV Control Switch in Startup Channel 2 is selected to (2) .

	<u> (1) </u>	<u> (2) </u>
A.	1.0×10^{-4}	Primary
B.	1.0×10^{-4}	Alternate
C.	5.3×10^{-6}	Primary
D.	5.3×10^{-6}	Alternate

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Question 23

Given:

- Primary-to-Secondary leakage in Steam Generator 1 has changed over the last hour with a rate and value that requires the plant to be at 50% in one hour and MODE 3 in a total of 3 hours

Waterford 3 is designed for a ramp load change of (1) %/MINUTE between 100% and 15%; however, the target shutdown rate will be approximately (2) MW/MINUTE provided pressurizer level can be maintained.

	<u> (1) </u>	<u> (2) </u>
A.	10	60
B.	5	60
C.	10	30
D.	5	30

Question 24

Concerning Tech Spec Containment Integrity in Mode 1, which of the following conditions would require action within 24 hours?

- A. The Personnel Air Lock outer door is found closed and unlocked.
- B. The Escape Air Lock outer door seal is failed with the operable inner door verified locked closed.
- C. The Personnel Air Lock door interlocks are inoperable, allowing both doors to be open at the same time.
- D. The Escape Air Lock door position indications are inoperable on CP-8 and on the Plant Monitoring Computer.

Question 25

Given:

- The plant was in MODE 3 at Normal Operating Temperature and Pressure
- A steam line break occurs on Main Steam Line 1 outside Containment upstream of the Main Steam Isolation Valve
- After 5 minutes Steam Generator 1 completely blows down
- Representative Core Exit Thermocouple (CET) lower to 460°F
- T_{cold} lowers to 430°F

With Reactor Coolant Pumps in operation _____ (1) _____ should be used to monitor RCS cooldown limits. The Reactor Coolant System cooldown limits _____ (2) _____ been exceeded.

- | _____ (1) _____ | _____ (2) _____ |
|-----------------------|-----------------|
| A. T_{cold} | have |
| B. T_{cold} | have NOT |
| C. Representative CET | have |
| D. Representative CET | have NOT |

Question 26

Given:

- RCS Tavg is 574°F and stable
- Letdown flow is 28 GPM
- All Charging Pumps are OPERABLE
- Annunciator Panel H Window B1, Pressurizer Level HI/LO is actuated
- Pressurizer level is 49% and slowly lowering

Based on these conditions, pressurizer level will _____ (1) _____ and the crew should _____ (2) _____.

- | (1) | (2) |
|----------------------|--------------------------|
| A. continue to lower | perform a rapid shutdown |
| B. continue to lower | trip the reactor |
| C. recover | perform a rapid shutdown |
| D. recover | trip the reactor |

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Question 27

Given:

- The reactor tripped due to a loss of offsite power
- On the trip, a Main Steam Safety Valve on Main Steam Line 1 opened and will not reseal
- Steam Generator 1 pressure is 500 PSIA and lowering
- Main Steam Line 1 and Blowdown Radiation Monitors are in Hi-Hi alarm
- RCS pressure is 1300 PSIA and lowering
- Pressurizer level is 0%
- All engineering safeguards equipment is operable
- OP-902-000, Standard Post Trip Actions is being implemented

After Standard Post Trip Actions are complete, the crew will implement:

- A. OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery
- B. OP-902-004, Loss of Excess Steam Demand Recovery
- C. OP-902-007, Steam Generator Tube Rupture Recovery
- D. OP-902-008, Functional Recovery Procedure

Question 28

Given:

- The reactor was at 100% power
- RCP 1A trips on overcurrent

___(1)___ RCP 1A Lift Oil Pump(s) started when RCP 1A ___(2)___.

- | (1) | (2) |
|---------|--------------------------|
| A. One | load breaker opened |
| B. Both | load breaker opened |
| C. One | speed lowered to 600 RPM |
| D. Both | speed lowered to 600 RPM |

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Question 29

Given:

- The reactor is operating at 100% power
- At 0100 RCP 1A Lower Seal fails and Controlled Bleedoff flow rises to 2.5 GPM
- OP-901-130, Reactor Coolant Pump Malfunction is implemented and the plant remains at 100% power
- At 0530 RCP 1A Middle Seal fails
- RCP 1A Controlled Bleedoff flow went out of range high and then went to 0 GPM

RCP 1A Controlled Bleedoff flow went low due to closure of _____ (1) _____.
The crew should _____ (2) _____ and secure RCP 1A.

- | _____ (1) _____ | _____ (2) _____ |
|--|--|
| A. a RCP Controlled Bleedoff Containment Isolation Valve | perform a shutdown to MODE 3 per OP-010-005, Plant Shutdown |
| B. a RCP Controlled Bleedoff Containment Isolation Valve | manually trip the reactor and perform Standard Post Trip Actions |
| C. the check valve on RCP 1A Controlled Bleedoff line | perform a shutdown to MODE 3 per OP-010-005, Plant Shutdown |
| D. the check valve on RCP 1A Controlled Bleedoff line | manually trip the reactor and perform Standard Post Trip Actions |

Question 31

Given:

- The plant has tripped from 100% power
- Reactor Coolant System pressure lowered and stabilized at 1500 psia
- Containment Pressure is 17.3 PSIA and rising

Which of the following describes the condition of the Chemical Volume Control system?

- A. CVC-101, Letdown Stop Valve is open.
- B. CVC-103 & CVC-109, Letdown Isolation Valves are open.
- C. CC-636, Component Cooling Water to Letdown Heat Exchanger is closed.
- D. Charging Pumps A, B, and AB are running.

Question 32

Given:

- The plant is in Mode 4
- Shutdown Cooling Train B is being placed in service

What would be an acceptable manipulation to compensate for the increased heat load on the Component Cooling Water system prior to starting LPSI Pump B?

- A. CC-963B, Shutdown HX B CCW Flow Control is placed to OPEN.
- B. CC-963B, Shutdown HX B CCW Flow Control is placed to SETPNT.
- C. Dry Cooling Tower fans are manually started in slow speed.
- D. Dry Cooling Tower fans are manually started in fast speed.

Question 33

Given:

- A Loss Of Cooling Accident is in progress
- Reactor Coolant System (RCS) pressure is 200 PSIA
- High Pressure Safety Injection Pump B trips shortly after starting
- All other equipment functions as designed

The minimum required Safety Injection flow for High Pressure Safety Injection is (1) and (2) is required for Low Pressure Safety Injection.

	<u>(1)</u>	<u>(2)</u>
A.	>185 GPM total flow to the cold legs	no flow
B.	>185 GPM total flow to the cold legs	>185 GPM flow to loop 2 cold legs
C.	>185 GPM to each cold leg	no flow
D.	>185 GPM to each cold leg	>185 GPM flow to loop 2 cold legs

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Question 34

Given

- Reactor Coolant System Code safety valve has been weeping for the past week
- Quench tank level is 81%
- Quench tank temperature is 147°F

Control Room Supervisor orders the ATC operator to fill and drain the Quench Tank to reduce Quench Tank temperature.

The Quench Tank will be drained to the ___(1)___ and it will be filled from the ___(2)___ system.

- | | | |
|----|--|--|
| A. | <u> (1) </u>
Containment Sump | <u> (2) </u>
Condensate Make Up |
| B. | Reactor Drain Tank | Primary Make Up |
| C. | Containment Sump | Primary Make Up |
| D. | Reactor Drain Tank | Condensate Make Up |

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Question 35

Given:

- The plant is at 100% power
- Emergency Diesel Generator A is running paralleled to the 3A bus in TEST Mode
- The Unit Auxiliary Transformer A 4.16 KV feeder breaker to the 2A bus trips on overcurrent

Component Cooling Water Pump A will start on the (1) Second load block of the Sequencer and will be powered from (2).

	<u>(1)</u>	<u>(2)</u>
A.	7	Emergency Diesel Generator A
B.	168	Emergency Diesel Generator A
C.	7	Startup Transformer A
D.	168	Startup Transformer A

Question 36

Given

- The plant is at 100% steady state
- Pressurizer Pressure Controller, RC-IPIC-0100, output fails to 100%

If no operator actions are taken which of the following describes the plant response:

- A. Pressurizer pressure would rise and be controlled by the spray valves at 2275 PSIA.
- B. Pressurizer pressure will rise until all back up and proportional heaters secure at 2270 PSIA.
- C. Pressurizer pressure would lower until the reactor trips on low Reactor Coolant System pressure.
- D. Pressurizer pressure would lower until all Pressurizer heaters are energized which will maintain RCS pressure at 2225 PSIA.

Question 37

Given

- The Reactor Coolant System (RCS) pressure is 350 PSIA
- The plant is raising pressure to 2250 PSIA

As RCS pressure rises above 500 PSIA the Pressurizer Pressure Operating Bypass (1) from service. The set point tracks (2) below actual Reactor coolant System pressure during the pressure rise.

- | | <u>(1)</u> | <u>(2)</u> |
|----|--------------------------|------------|
| A. | must be manually removed | 400 PSIA |
| B. | is automatically removed | 400 PSIA |
| C. | must be manually removed | 184 PSIA |
| D. | is automatically removed | 184 PSIA |

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Question 38

Given

- A Safety Injection Actuation Signal (SIAS) was inadvertently actuated
- The CRS directs the BOP operator to reset the SIAS

The SIAS initiation relays are reset at (1) and the actuation relays are reset at (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | CP-10 | CP-33 |
| B. | CP-10 | CP-10 |
| C. | CP-33 | CP-33 |
| D. | CP-33 | CP-10 |

Question 39

Given:

- The plant is at 100% Power
- Emergency Diesel Generator A is Out of Service for Maintenance
- A Loss Of Off Site Power Occurs

Which of the following is available to Emergency Borate the RCS?

- A. Charging Pump B and Boric Acid Makeup pump B
- B. Charging Pump A and Boric Acid Make up pump A
- C. Charging Pump B and Gravity Feed Valve BAM-113A
- D. Charging Pump A and Gravity Feed Valve BAM-113B

Question 40

Plant Conditions are as follows:

- Power is 100%, 300 EFPD
- Reactor Power Cutback is in service with subgroups 5 and 11 selected
- A Shutdown Bank CEA drops into the core
- The crew entered OP-901-102, CEA or CEDMCS Malfunction

Subsequently conditions are as follows:

- Power is 80%
- Main Feedwater pump A trips on overspeed

Based on this event, the crew should

- A. Remain in OP-901-102 and perform OP-901-101, Reactor Power Cutback concurrently.
- B. Trip the reactor, exit OP-901-102, and enter OP-902-000, Standard Post Trip Actions.
- C. Remain in OP-901-102 and adjust turbine load to maintain Tavg -Tref matched.
- D. Exit OP-901-102 and enter OP-901-101, Reactor Power Cutback.

Question 41

Given:

- Reactor Coolant System pressure is 1600 PSIA
- Containment pressure is 17.5 PSIA and rising
- The crew has diagnosed into OP-902-002, Loss of Coolant Accident Recovery
- Component Cooling Water (CCW) Pumps A and B are running

The BOP operator reports that Containment Fan Cooler A has tripped. Which action is required?

- A. Place CCW AB Assignment Switch in the "A" position and manually start CCW Pump AB.
- B. Override and close the Containment Fan Cooler A Component Cooling Water isolation valves.
- C. Verify Containment Cooling Safety Damper, CCS-102A, closed when CFC A tripped.
- D. Verify Containment Spray flow is greater than 1750 GPM for both trains of Containment Spray.

Question 42

Given the following:

- A Loss of Coolant Accident has occurred
- Reactor Coolant System pressure is 700 PSIA
- Containment pressure is 18 PSIA
- Refueling Water Storage Pool level is 9% and lowering
- No operator actions have been taken
- Low Pressure Safety Injection pumps A and B are running
- High Pressure Safety Injection pumps A and B are running

Based on the given conditions the Balance of Plant operator should:

- A. Close SI-602A and B, ESF Pump Suction Valves from the SI Sump.
- B. Open SI-120A and B, SI Pumps Recirculation Isolation Valves.
- C. Secure High Pressure Safety Injection Pumps A and B.
- D. Secure Low Pressure Safety Injection Pumps A and B.

Question 43

Given:

- Reactor Coolant System Tcold is 500°F and lowering
- 15 minutes ago the Reactor Coolant System Tc was 515°F when a controlled cool down was established
- The cool down is being controlled using MS-319A, Main Steam Bypass 1A, at 15% open

IF MS-319A failed open, the maximum allowed cool down rate of (1) which protects the (2), would be exceeded.

- | | | |
|----|-----------------------|--|
| A. | <u>(1)</u>
60°F/Hr | <u>(2)</u>
The most limiting component in Reactor Coolant System under all conditions |
| B. | 60°F/Hr | SG tube sheet from cyclic stress which is the most limiting component under all conditions |
| C. | 100°F/Hr | SG tube sheet from cyclic stress which is the most limiting component under all conditions |
| D. | 100°F/Hr | The most limiting component in Reactor Coolant System under all conditions |

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Question 44

Given

- The plant is performing an up power
- Dilution to the Volume Control Tank is in progress for power ascension
- Reactor Power is 70%
- Turbine is in GO with a rate of 2MW/MIN
- Tave is 565°F
- Tref is 561°F

To match Tave and Tref, The BOP operator should _____ (1) _____ the rate the Main Turbine governor valves open. To accomplish this task, the BOP operator is required to _____ (2) _____.

- | | | |
|----|-------------|--|
| | (1) | (2) |
| A. | raise _____ | depress LOAD RATE pushbutton, entering new value, and press ENTER |
| B. | raise | place the Main Turbine in HOLD, depress LOAD RATE pushbutton, enter new value, and push GO |
| C. | lower | depress LOAD RATE pushbutton, entering new value, and press ENTER |
| D. | lower | place the Main Turbine in HOLD, depress LOAD RATE pushbutton, enter new value, and push GO |

Question 45

Plant Conditions are as Follows:

- Power is 100%
- SG-ILR-1111, Steam Generator 1 Narrow Range level indicator is reading 0% on the CP-1 recorder
- SG-ILR-1105, Steam Generator 1 Narrow Range level indicator is reading 68% on the CP-1 recorder
- All Narrow Range Steam Generator levels on CP-7 are indicating 68%
- A reactor trip occurs
- All systems performed as designed before and after the trip

The expected post trip responses to these conditions are that FW IHIC 1107 Main Feedwater Pump A speed controller (1) and FW IHIC1111, Main Feedwater Regulating Valve A and FW IHIC1105 Startup Feedwater Regulating Valve A Controller (2).

- | | | |
|----|---------------------|--|
| | <u>(1)</u> | <u>(2)</u> |
| A. | lowers to 3900 RPM | remain at their pre trip positions |
| B. | lowers to 3900 RPM | reposition to their Reactor Trip Positions |
| C. | remains at 4500 RPM | remain at their pre trip positions |
| D. | remains at 4500 RPM | reposition to their Reactor Trip Positions |

Question 46

The EFW system is designed to prevent _____ (1) _____ by providing lines with an orifice from the Main Feedwater discharge headers to the EFW _____ (2) _____ piping.

- | _____ (1) _____ | _____ (2) _____ |
|-----------------------------|-----------------|
| A. feed ring thermal stress | suction |
| B. feed ring thermal stress | discharge |
| C. EFW piping damage | suction |
| D. EFW piping damage | discharge |

Question 47

Static Uninterruptable Power Supply SMA requires maintenance to the inverter section requiring the Inverter to be secured.

Other SUPS SMA components are not affected by maintenance.

Will the AC loads remain powered up with the Inverter de energized?

- A. Yes, loads will be powered from the Normal AC supply through the rectifier.
- B. Yes, loads will be powered from the DC supply through the rectifier.
- C. Yes, loads will be powered from the Bypass AC supply.
- D. No, PDP SMA must be de energized to support this maintenance.

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Question 48

Given:

- The plant is at 100% power
- The RAB watch reports that the AB battery bus indicates a positive 125 volt DC ground.

An additional ____ (1) ____ ground of the same magnitude on the AB battery bus, would require implementing OP-901-313, Loss of a 125 Volt DC Bus. This will ____ (2) ____.

	<u>(1)</u>	<u>(2)</u>
A.	negative	make Emergency Feedwater Pump AB unavailable and TS 3.7.1.2 must be addressed
B.	negative	require the crew to manually trip the reactor if bus AB-DC can not be restored
C.	positive	make Emergency Feedwater Pump AB unavailable and TS 3.7.1.2 must be addressed
D.	positive	require the crew to manually trip the reactor if bus AB-DC can not be restored

Question 49

Given:

- Reactor Coolant System Pressure is 1600 PSIA and lowering slowly
- Containment pressure is 19 PSIA and rising
- A Loss Of Offsite Power has occurred
- Five minutes into this event Emergency Diesel Generator A tripped on Overspeed

What of the following describes the MINIMUM actions required to maintain containment integrity?

- A. CS-125A, Containment Spray Header Isolation, must be closed by taking the CP-8 control switch to CLOSE only.
- B. CS-125A, Containment Spray Header Isolation, must be closed by taking the CP-8 control switch to OPEN and then to CLOSE only.
- C. CS-125A, Containment Spray Header Isolation, must be closed by taking the override switch in the +35 Relay Room to OVERRIDE only.
- D. CS-125A, Containment Spray Header Isolation, must be closed by taking the override switch in the +35 relay room to OVERRIDE, followed by taking the CP-8 control switch to OPEN and then to CLOSE.

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Question 50

Given:

- An earthquake has occurred at Waterford 3
- A loss of offsite power has occurred .
- Emergency Diesel Generator A and B have started to supply in house loads
- A support beam in the A Emergency Diesel Generator room has fallen on and damaged both Air compressors A1 and A2
- Both air receiver pressures are 0 PSIG.
- Emergency Diesel Generator A develops an oil leak requiring it to be shutdown.

What action is required to shutdown Emergency Diesel Generator A?

- A. Depress the Emergency Shutdown push buttons on CP-1.
- B. Select STOP on the local Emergency Diesel Generator control panel.
- C. Pull the Overspeed Trip Plunger located on the Overspeed Governor.
- D. Pull and hold the manual Fuel Rack Override lever to the no fuel position.

Question 51

Given:

- A Main Steam Line break has occurred inside containment
- Safety Injection Actuation Signal, Containment Isolation Actuation Signal, Main Steam Isolation Signal and, Containment Spray Actuation are all actuated
- The crew has entered OP-902-004, Excess Steam Demand Recovery
- Containment Temperature is 204°F
- ARM-IRE 5400A and ARM-IRE-5400B, Containment High Range Radiation Monitors alarmed 15 minutes into the event and radiations levels are trending down
- No other Containment Radiation monitors are in alarm

For the given conditions the crew should:

- A. Remain in OP-902-004 and monitor the Containment radiation monitors for thermally induced current effects.
- B. Enter OP-901-403, High Airborne Activity inside Containment, and perform concurrently with OP-902-004.
- C. Take no action since these area monitors are isolated on a CIAS and are unreliable.
- D. Enter OP-902-008, Functional Recovery, due to high activity in Containment.

Question 52

Given

- A Loss Of Coolant Accident is in Progress
- Loss Of Off Site Power has occurred
- Emergency Diesel Generator A has tripped on overspeed
- Component Cooling Water temperature is 98 °F and rising
- B Train Dry Cooling Tower Fans 1-4 are operating in Fast Speed
- B Train Dry Cooling Tower Fans 5-15 are operating in Slow Speed

As Component Cooling Water System temperature continues to rise, Dry Cooling Tower B fans 5-15 will start simultaneously in FAST speed when temperature rises above (1) . The fans will start cycling to SLOW when system temperature drops below (2) .

- | | <u> (1) </u> | <u> (2) </u> |
|----|------------------------|------------------------|
| A. | 100 °F | 92 °F |
| B. | 115 °F | 92 °F |
| C. | 100 °F | 88 °F |
| D. | 115 °F | 88 °F |

Question 53

Given

- Dry Cooling Tower fans 7B and 2B are out of service.
- Outside air temperature is 92 °F.
- Wet Bulb temperature is 73 °F.

What is the most limiting time to restore Dry Cooling Tower fans to comply with Tech Spec 3.7.4?

- A. 1 Hour
- B. 2 Hour
- C. 72 Hour
- D. 7 Days

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Question 54

Given the following conditions:

- Instrument Air Header pressure has lowered to 100 psig due to a leak
- SA-125, Station Air Backup is at its normal setpoint

SA-125 is _____ and SA-123, Air Dryer Bypass is _____.

- A. OPEN, OPEN
- B. CLOSED, OPEN
- C. OPEN, CLOSED
- D. CLOSED, CLOSED

Question 55

Given:

- The plant is in Mode 6
- Core alterations are in progress
- The Reactor Auxiliary Building watch reports that train A Main Steam Line Bellows has been removed from the containment penetration for replacement
- Control room staff verified that the Bellows work is not being tracked by a containment impairment

Containment integrity is (1) . The crew should (2) .

- | | <u> (1) </u> | <u> (2) </u> |
|----|----------------|---|
| A. | met | immediately suspend core alterations |
| B. | met | isolate the affected penetration within 0.5 hours or suspend core alterations |
| C. | not met | isolate the affected penetration within 0.5 hours or suspend core alterations |
| D. | not met | immediately suspend core alterations |

Question 56

To cool the magnetic jack coils of the CEDM System, Control Element Drive Cooling System air flows _____ (1) _____ rejecting the CEDM Cooling System heat to the _____ (2) _____ System.

- | | (1) | (2) |
|----|--|-------------------------|
| A. | across the CEDM coils and then through the CEDM coolers, | Component Cooling Water |
| B. | through the CEDM coolers then across the CEDM coils, | Component Cooling Water |
| C. | across the CEDM coils and then through the CEDM coolers, | Reactor Cavity Cooling |
| D. | through the CEDM coolers then across the CEDM coils, | Reactor Cavity Cooling |

Question 57

Given

- A small break loss of coolant accident is in progress
- A Safety Injection Actuation Signal (SIAS) has occurred
- Voids in the Reactor Coolant System (RCS) are indicated
- The CRS directs the NPO to vent non-condensable gases from the Reactor Vessel Head

The Reactor Vessel Head Vent valves _____ (1) _____. The Reactor Vessel Head is vented to the _____ (2) _____.

- | | (1) | (2) |
|----|---|--------------------|
| A. | can not be opened until SIAS is reset | Quench Tank |
| B. | must be energized from CP-8 and the valves can then be opened | Quench Tank |
| C. | can not be opened until SIAS is reset | Reactor Drain Tank |
| D. | must be energized from CP-8 and the valves can then be opened | Reactor Drain Tank |

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Question 58

Given

- Plant is at 100% power steady state conditions
- Static Uninterruptable Power Supply SMA fails

Core Protection Calculator A and ____ (1) ____ deenergize. TCB 1, 2, 5, and 6 Open and the reactor ____ (2) ____.

- | | (1) | (2) |
|----|--------------------|---------------|
| A. | Linear Channel A | trips |
| B. | Control Channel #1 | does not trip |
| C. | Linear Channel A | does not trip |
| D. | Control Channel #1 | trips |

Question 59

Given the following conditions

- A Loss Of Coolant Accident has occurred

Which of the following describes the temperature when Zr-Water reaction becomes self sustaining?

- A. 1800°F
- B. 2200°F
- C. 3350°F
- D. 5080°F

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Question 60

The containment atmosphere Hydrogen Analyzer takes a suction from ____ (1) ____ and provides indication of Hydrogen concentration on CP- ____ (2) ____

- | | <u>(1)</u> | <u>(2)</u> |
|----|--------------------------|------------|
| A. | Below the Missile Shield | 33 |
| B. | Lower Reactor Cavity | 8 |
| C. | Below the Missile Shield | 8 |
| D. | Lower Reactor Cavity | 33 |

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Question 61

Given

- CCW Surge Tank Level Switch CC-ILS-7013A failed low.
- CC-200A/727, CCW Hdr A TO AB Supply and Return Isolations, failed closed.
- CC-134 A, CCW A Dry Cooling Tower Bypass failed open.
- CC-135 A, CCW A Dry Cooling Tower Isolation, failed closed.
- Both Train A and Train B CC-620, Fuel Pool Heat Exchanger Temperature Control Valve, control switches are in the CONTROL position at CP-18.

Based on this level switch failure,

- A. Spent Fuel Pool temperature will rise since CC-620 failed closed.
- B. Spent Fuel Pool temperature will lower since CC-134 A, CCW A Dry Cooling Tower Bypass failed open.
- C. Spent Fuel Pool temperature will rise since CC-135 A, CCW A Dry Cooling Tower Isolation, failed closed.
- D. Spent Fuel Pool temperature is controlled in automatic since the Train B CC-620 control switch is in CONTROL.

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Question 62

Given

- The Reactor tripped from 100% power
- OP-902-000, Standard Post Trip Actions, has been entered and is being performed
- Reactor Coolant System (RCS) pressure is 2115 PSIA and rising
- One Control Element Assembly is stuck out
- Reactor power is 10⁻⁴% and lowering
- Steam Generator 1 level is 25% NR and lowering
- Steam Generator 2 level is 29% NR and lowering
- Pressurizer level is 28% and rising
- 3 Charging pumps are operating
- Steam Generator 1 and 2 pressures are 950 PSIA
- All ESFAS systems are in standby

Based on the given conditions the Reactor Operator should _____.

- A. commence emergency boration
- B. secure Charging pump AB
- C. take manual control of RCS pressure and control between 2125 to 2275 PSIA
- D. manually initiate Emergency Feedwater Actuation Signal for Steam Generator 1

Question 63

The following plant conditions exist:

- 300 EFPD
- The plant is at 15% power following a mid cycle outage startup
- The Main Turbine in on line with the Speed Loop in service
- Spurious operation of the Steam Bypass Control System resulted in MS-319 A, Main Steam Bypass 1A and MS-320 A, Main Steam Bypass 2A opening

Which of the following parameters will be lower after the event than before the event?

- A. Steam Generator pressure
- B. Reactor power
- C. RCS T_{HOT} temperature.
- D. Main Steam flow

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Question 64

Given

- Plant is 100% Power
- A Waste Condensate Tank is being discharged
- A power supply on PRM-IRE-0647 Liquid Waste Management Radiation Monitor fails

As a result of this failure (1) and (2) .

- | | <u>(1)</u> | <u>(2)</u> |
|----|--|--|
| A. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, closes | LWM-442, Liquid Waste to Circulating Water Control Valve, remains open |
| B. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, closes | LWM-442, Liquid Waste to Circulating Water Control Valve, closes |
| C. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, remains open | LWM-442, Liquid Waste to Circulating Water Control Valve, remains open |
| D. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, remains open | LWM-442, Liquid Waste to Circulating Water Control Valve, closes |

Question 65

Given

- Fire alarms are received for the +35 Cable Vault area.
- The Fire Brigade leader has reported that the automatic deluge actuation has failed and the fire is not under control.
- The Control Room Supervisor has entered OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown.
- The Control Room Supervisor has directed the immediate actions be completed and the Control Room evacuated.

Based on the given conditions the AT-THE-CONTROLS Operator will _____ (1)
and _____ (2) .

- | _____ (1) | _____ (2) |
|--|------------------------------------|
| A. trip <u>2</u> Reactor Coolant Pumps | secure Charging and Letdown |
| B. trip <u>2</u> Reactor Coolant Pumps | start all available Charging Pumps |
| C. trip <u>all 4</u> Reactor Coolant Pumps | secure Charging and Letdown |
| D. trip <u>all 4</u> Reactor Coolant Pumps | start all available Charging Pumps |

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Question 66

Per OI-024-000, Maintaining Active SRO/RO Status, to maintain your Reactor Operator license in an ACTIVE status, you must stand a minimum of _____ (1) _____ 12 hour shifts in a calendar quarter. To upgrade from INACTIVE status to ACTIVE status, a license holder must stand _____ (2) _____ hours of under instruction watches.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | five | 40 |
| B. | seven | 40 |
| C. | five | 60 |
| D. | seven | 60 |

Question 67

In accordance with EN-OP-102, Protection and Caution Tagging, _____ should have double valve isolation and tagging applied during removal and replacement of the component.

- A. Instrument Air Compressor A Unloader Valve
- B. Turbine Cooling Water pump A
- C. Containment Fan Cooler C Cooling Coils
- D. Hydrogen Excess Flow Control Valve

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Question 68

Given:

- The plant is in MODE 6
- The Upper Guide Structure is removed
- Core offload is suspended
- Reactor Cavity Level is 44 ft MSL
- The plant has been shutdown for 200 Hours

_____ (1) _____ train(s) of Shutdown Cooling must be OPERABLE and Shutdown Cooling flow must be at least _____ (2) _____ GPM.

- | | (1) | (2) |
|----|-----|------|
| A. | One | 2000 |
| B. | Two | 2000 |
| C. | One | 3000 |
| D. | Two | 3000 |

Question 69

Given

- The plant is at 100% Power
- At 0100, the BOP operator bypasses the Channel C High LPD and Low DNBR trip bistables for a scheduled 2 hour I&C surveillance on Channel C Core Protection Calculator.
- The I&C technician informs the CRS that the CPC has failed the surveillance and will require a card replacement.

Operability will be tracked by ____ (1) ____ when the work begins. The Shift Manager will authorize operability following retest on ____ (2) ____.

(1)

(2)

- | | |
|---|---|
| A. the work package | OP-100-010, Att. 7.1, TS/TRM Entry Guidelines |
| B. OP-100-010, Att. 7.1, TS/TRM Entry Guidelines, | OP-100-010, Att. 7.2, EOS Checklist |
| C. the work package | OP-100-010, Att. 7.2, EOS Checklist |
| D. OP-100-010, Att. 7.1, TS/TRM Entry Guidelines, | OP-100-010, Att. 7.1, TS/TRM Entry Guidelines |

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Question 70

The Peak Centerline Temperature safety limit for new fuel with no burnable poison is ____ (1) ____ °F. Per TS 2.2.1, Reactor Trip Setpoints, a steady state peak linear heat rate of ____ (2) ____ has been selected as the Limited Safety System Setting to prevent fuel centerline melt.

	<u>(1)</u>	<u>(2)</u>
A.	5080	12.9 KW/Ft
B.	5080	21.0 KW/Ft
C.	5022	12.9 KW/Ft
D.	5022	21.0 KW/Ft

Question 71

Given the following:

- The plant is at 10% Power
- A containment entry is desired

Which of the following areas inside containment are forbidden from being entered?

- A. Pressurizer Cubicle below +21' elevation
- B. +46' elevation at the Quench Tank
- C. Main Steam Line Crossovers on the +46' elevation
- D. 1A Cold Leg penetration through the 'D' Ring Wall

Question 72

A high activity detected by the Industrial Waste Sump Radiation Monitor results in the discharge path of Industrial Waste Sump 2 pumps swapping from _____ (1) _____ to _____ (2) _____.

- A. (1) Industrial Waste Sump 1
(2) Waste Tanks
- B. (1) Industrial Waste Sump 1
(2) RAB Oil Sump 3
- C. (1) Oil Separator Sump
(2) Waste Tanks
- D. (1) Oil Separator Sump
(2) RAB Oil Sump 3

Question 73

To verify Core Heat Removal during Standard Post Trip Actions, the ATC should check RCS Loop Delta T for _____ (1) _____ and check T_h Subcooling only when on _____ (2) _____ circulation.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | loops with an operating RCP | forced |
| B. | all loops | forced |
| C. | loops with an operating RCP | natural |
| D. | all loops | natural |

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Question 74

When an Emergency Plan classification is upgraded from an Unusual Event to an Alert and no site evacuation is required, _____ (1) _____ must be notified within _____ (2) _____ minutes of the upgrade.

_____ (1) _____	_____ (2) _____
A. US Coast Guard	15
B. Waterford 1 & 2	15
C. US Coast Guard	60
D. Waterford 1 & 2	60

Question 75

Given:

- A Control Room Evacuation is in progress due to a fire in CP-2.
- Immediate Actions of OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown, have been completed
- The BOP is currently performing Attachment 4, BOP Time Critical Actions

After completion of the attachment, only the ____ (1) ____ 4.16 KV Safety bus will be energized and the bus will be loaded through the ____ (2) ____ sequencer.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | A3 | mini |
| B. | A3 | normal |
| C. | B3 | mini |
| D. | B3 | normal |

END OF EXAM

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Question 1

Given:

- Feedwater Control System (FWCS) 1 was in AUTO with a setpoint of 68% when FWCS 1 Master Controller output failed to 0%
- The operator depresses the MANUAL pushbutton on the FWCS 1 Master Controller and manually raises the output of FWCS 1 Master Controller
- Prior to matching steam flow and feed flow, the reactor trips on S/G 1 Low Level
- Final FWCS 1 Master Controller flow demand is 50% in MANUAL
- Reactor Trip Override (RTO) actions are verified
- S/G 1 level is currently rising

When S/G 1 level exceeds the automatic setpoint of 68% NR, RTO will _____ (1) _____ in FWCS 1 and S/G 1 level will _____ (2) _____.

_____ (1) _____

_____ (2) _____

- | | |
|------------------|-----------------------|
| A. reset | stabilize at setpoint |
| B. remain active | stabilize at setpoint |
| C. reset | continue to rise |
| D. remain active | continue to rise |

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Question 2

Given:

- The plant is at 10% power following refueling
- A Pressurizer Relief Valve spuriously opens
- Reactor Coolant System pressure drops from 2250 PSIA to 1900 PSIA and then slowly recovers
- Quench Tank temperature rises to 135°F and stabilizes

The Pressurizer Relief Valve is currently ____ (1) _____. During this event, Pressurizer Level will _____ (2) _____.

- | | (1) | (2) |
|----|--------|---|
| A. | closed | lower due to mass loss |
| B. | closed | rise to 100% due to head bubble formation |
| C. | open | lower due to mass loss |
| D. | open | rise to 100% due to head bubble formation |

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Question 3

Given:

- A Small Break Loss of Coolant Accident with a concurrent Loss of Offsite Power has occurred
- OP-902-002, Loss of Coolant Accident Recovery, is being implemented
- Containment pressure is 17.3 PSIA
- Reactor Coolant System pressure is 1380 PSIA
- Reactor Coolant System T_{cold} temperatures are 550°F in loops 1 and 2
- A cooldown to Shutdown Cooling entry conditions is commencing

The ATC should reset _____ (1) _____ bistable setpoints during the cooldown to ensure continued _____ (2) _____ availability.

	(1)	(2)
A.	Pressurizer Pressure Low and Steam Generator Pressure Lo	Pressurizer Heater and Emergency Feedwater
B.	Steam Generator Pressure Low only	Pressurizer Heater and Emergency Feedwater
C.	Pressurizer Pressure Low and Steam Generator Pressure Low	Emergency Feedwater
D.	Steam Generator Pressure Low only	Emergency Feedwater

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Question 4

OP-902-002, Loss of Coolant Accident Recovery procedure requires sampling both Steam Generators for activity. The Shift Chemist should be notified that

_____ (1) _____ has occurred to ensure actions are taken to
_____ (2) _____.

- | _____ (1) _____ | _____ (2) _____ |
|---|--|
| A. Safety Injection Actuation Signal/Containment Isolation Actuation Signal | minimize the potential for radioactive release |
| B. Containment Spray Actuation Signal | establish alternate sample cooling |
| C. Safety Injection Actuation Signal/Containment Isolation Actuation Signal | establish alternate sample cooling |
| D. Containment Spray Actuation Signal | minimize the potential for radioactive release |

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Question 5

Given:

- The reactor was operating at 100%
- Reactor Coolant Pump 2B experienced a Locked Rotor event
- All other Reactor Coolant Pumps remain in service

Post trip, Steam Generator (1) level will be lower than the other Steam Generator due to a (2) rate of heat transfer to that Steam Generator.

- | | <u> (1) </u> | <u> (2) </u> |
|----|----------------|----------------|
| A. | 1 | lower |
| B. | 2 | lower |
| C. | 1 | higher |
| D. | 2 | higher |

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Question 6

Given:

- The reactor was operating at 100% steady state
- Pressurizer level starts to lower
- Regen HX Tube Outlet temperature rises from 220°F to 300°F
- Regen HX Shell Outlet temperature rises from 430°F to 460°F
- Letdown Flow is 38 GPM
- Charging Header flow is 44 GPM with one charging pump running

Determine the location of the leak.

- A. Charging header upstream of the Regenerative HX
- B. Charging header downstream of CVC-218A, Charging Line 1A Shutoff Valve
- C. Letdown header upstream of the Regenerative HX
- D. Letdown header downstream of CVC-140, Ion Exchanger Bypass Valve

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Question 7

Given:

- The reactor is at 100% power
- A leak occurs in Component Cooling Water (CCW) that closes the A and B train CCW supply and return valves for the AB Loop

If neither train of Component Cooling Water (CCW) can be restored to the AB Loop within (1) minutes, trip the reactor, secure all Reactor Coolant Pumps (RCPs). Isolation of the Component Cooling Water AB loop also causes loss of cooling to the (2).

	<u>(1)</u>	<u>(2)</u>
A.	3	Containment Fan Coolers
B.	3	Letdown Heat Exchanger
C.	10	Containment Fan Coolers
D.	10	Letdown Heat Exchanger

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Question 8

Given:

- The plant was operating at 2250 PSIA when the selected Pressurizer Pressure Control Channel, RC-IPT-0100X failed high.
- Operator action was taken to stabilize RCS pressure
- The lowest pressure seen was 2235 PSIA
- Backup Heater Bank 3 is in ON
- Backup Heaters Banks 1,2, 4-6 are in AUTO

Pressurizer backup heater capability will be restored when the Pressurizer Pressure Channel selector switch (1) the Lo Level Heater Cutout selector switch is(are) transferred to the non-faulted channel and (2) will energize.

- | | <u> 1 </u> | <u> 2 </u> |
|----|------------------|-------------------------|
| A. | or | Backup Heater Bank 3 |
| B. | and | Backup Heater Bank 3 |
| C. | or | all Backup Heater Banks |
| D. | and | all Backup Heater Banks |

Question 9

Which of the following describes how the Diverse Reactor Trip System (DRTS) interrupts power to the Control Element Drive Mechanism (CEDM) Coils during an Anticipated Transient Without Scram (ATWS) condition?

- A. The shunt trip coils of the Reactor Trip Breakers are energized.
- B. The undervoltage (UV) coils of the Reactor Trip Breakers are de-energized.
- C. The CEDM Motor-Generator Set feeder breakers on busses 32A and 32B open.
- D. The CEDM Motor-Generator Set output load contactors open.

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Question 11

OP-902-004, Excess Steam Demand Recovery Procedure, requires verifying no more than two Reactor Coolant Pumps running if Tcold is less than ____ (1) ____ °F to _____ (2) _____.

- | | (1) | (2) |
|----|----------|--|
| A. | 382[384] | prevent generating excessive core uplift forces |
| B. | 382[384] | aid in stabilizing Reactor Coolant System temperature after Steam Generator dryout |
| C. | 500[502] | prevent generating excessive core uplift forces |
| D. | 500[502] | aid in stabilizing Reactor Coolant System temperature after Steam Generator dryout |

Question 12

- 1) What is the operational concern with feeding a dry Steam Generator?
- AND**
- 2) Describe the appropriate method for restoring feedwater if both Steam Generators are dry.
 - A.
 - 1) Steam Generator internal component damage
 - 2) Slowly restore feed to only ONE Steam Generator.
 - B.
 - 1) Steam Generator internal component damage
 - 2) Slowly restore feed to BOTH Steam Generators.
 - C.
 - 1) Rapid cooldown of the RCS
 - 2) Slowly restore feed to only ONE Steam Generator.
 - D.
 - 1) Rapid cooldown of the RCS
 - 2) Slowly restore feed to BOTH Steam Generators.

Question 13

Given:

- A Station Blackout occurred
- Offsite power is now available
- A Probable Maximum Precipitation (PMP) event just commenced

Power must be restored to the non-safety section of Motor Control Center _____(1)_____ and at least one Dry Cooling Tower Motor Driven Sump Pump aligned for operation within _____(2)_____ of the PMP event.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | 312A or B | 30 minutes |
| B. | 314A or B | 30 minutes |
| C. | 312A or B | 3 hours |
| D. | 314A or B | 3 hours |

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Question 14

The Undervoltage Override feature of the Load Sequencer provides protection against degraded voltage resulting from _____ (1) _____.

The Undervoltage Override feature is active between the _____ (2) _____ second load blocks.

	(1)	(2)
A. the start of large transformer (inductive) loads		0.5 to 17
B. failure of the Emergency Diesel Generator excitation system		0.5 to 17
C. the start of large transformer (inductive) loads		17 to 200
D. failure of the Emergency Diesel Generator excitation system		17 to 200

Question 15

Given:

- Reactor Coolant System Cooldown is in progress using the Atmospheric Dump Valves (ADV's)
- The Main Condenser is unavailable
- Static Uninterruptible Power Supply (SUPS) SMC inverter fails

Due to the failure of SUPS SMC, Atmospheric Dump Valve 1 must be operated manually using the _____ (1) _____, because Atmospheric Dump Valve 1 failed ____ (2) ____.

- | | (1) | (2) |
|----|--------------------------------|--------|
| A. | handwheel only | closed |
| B. | handwheel only | open |
| C. | local air station or handwheel | closed |
| D. | local air station or handwheel | open |

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Question 16

Comparing a loss of the Train B DC Safety Busses to a loss of the Train AB DC Safety Busses, select the problem that occurs ONLY for a loss of Train B.

- A. Emergency power to a Static Uninterruptible Power Supply is lost.
- B. A reactor trip occurs due to loss of power to Reactor Trip Breaker UV coils.
- C. Overcurrent protection is lost for associated 4.16 KV bus loads.
- D. Control Power is lost to the associated 480V switchgear loads.

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Question 17

In accordance with OP-002-001, Auxiliary Component Cooling Water (ACCW) A header flow should be at least _____ (1) _____ GPM flow to minimize _____ (2) _____.

	<u>(1)</u>	<u>(2)</u>
A.	100	ACC-126A, ACC Header A CCW HX Outlet Temp Control Valve seat and disc erosion
B.	100	ACC Pump A vibration
C.	1000	ACC-126A, ACC Header A CCW HX Outlet Temp Control Valve seat and disc erosion
D.	1000	ACC Pump A vibration

Question 18

Given:

- The plant is at 100% Power
- Instrument Air pressure is 63 PSIG and lowering rapidly

The crew should:

- A. Direct the turbine building watch to suspend all operations involving the condensate polisher operations.
- B. Commence a rapid down power IAW OP-901-212, Rapid Plant Power Reduction.
- C. Commence a normal plant shutdown when MSR temperature control valves fail closed to maintain Rx Power less than 100% Power.
- D. Trip the reactor and enter OP-902-000, Standard Post Trip Actions.

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Question 19

Given:

- The reactor was operating at 80%
- Control Element Assembly (CEA) 20 drops to 0.0"

Within 15 minutes, turbine load will be reduced at a rate of approximately _____ (1) _____ MW/MINUTE. 45 minutes from the time the CEA dropped, reactor power must be reduced to _____ (2) _____ %.

	<u> (1) </u>	<u> (2) </u>
A.	30	60
B.	30	70
C.	60	60
D.	60	70

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Question 20

Given:

- The plant is at 55% performing a power ascension
- Group P is at 140 INCHES for ASI control
- At 0335 Group P Control Element Assembly (CEA) 35 slips to 125"
- Power is stabilized at 55%
- The crew implements OP-901-102, CEA or CEDMCS Malfunction
- Attempts to move the CEA are unsuccessful, CEA 35 is declared INOPERABLE
- At 0420
 - Malfunctioning Automatic Control Timing Module (ACTM) card is replaced and
 - CEA 35 was realigned to 140" and CEA 35 is declared OPERABLE

The earliest that the crew can re-commence the power ascension is _____ (1) _____
to _____ (2) _____.

_____ (1) _____ (2) _____

- A. 0535 minimize the effects of Xenon redistribution
- B. 0535 allow for clad relaxation
- C. 0620 minimize the effects of Xenon redistribution
- D. 0620 allow for clad relaxation

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Question 21

Given:

- The plant is at 50% power
- Tave and Tref are matched and stable
- The Standby Charging Pump Selector Switch is in AB-A
- Due to a PAC card failure the output of the Pressurizer Level Controller auto output failed to the high limit.
- The crew entered OP-901-110, took manual control of the Pressurizer Level Controller and stabilized level at 41% (lowest level attained)
- Charging Pumps B and AB are running

Charging pump A _____(1)_____ be running. The lowest pressurizer level the crew should maintain while operating is _____(2)_____%.

	(1)	(2)
A.	should	25
B.	should NOT	25
C.	should	30
D.	should NOT	30

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Question 22

Given:

- A reactor startup is in progress

Startup Channel 2 high voltage is automatically removed when power exceeds approximately (1) % on ENI Logarithmic Channel A, if the HV Control Switch in Startup Channel 2 is selected to (2) .

	<u> (1) </u>	<u> (2) </u>
A.	1.0×10^{-4}	Primary
B.	1.0×10^{-4}	Alternate
C.	5.3×10^{-6}	Primary
D.	5.3×10^{-6}	Alternate

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Question 23

Given:

- Primary-to-Secondary leakage in Steam Generator 1 has changed over the last hour with a rate and value that requires the plant to be at 50% in one hour and MODE 3 in a total of 3 hours

Waterford 3 is designed for a ramp load change of (1) %/MINUTE between 100% and 15%; however, the target shutdown rate will be approximately (2) MW/MINUTE provided pressurizer level can be maintained.

	<u> (1) </u>	<u> (2) </u>
A.	10	60
B.	5	60
C.	10	30
D.	5	30

Question 24

Concerning Tech Spec Containment Integrity in Mode 1, which of the following conditions would require action within 24 hours?

- A. The Personnel Air Lock outer door is found closed and unlocked.
- B. The Escape Air Lock outer door seal is failed with the operable inner door verified locked closed.
- C. The Personnel Air Lock door interlocks are inoperable, allowing both doors to be open at the same time.
- D. The Escape Air Lock door position indications are inoperable on CP-8 and on the Plant Monitoring Computer.

Question 25

Given:

- The plant was in MODE 3 at Normal Operating Temperature and Pressure
- A steam line break occurs on Main Steam Line 1 outside Containment upstream of the Main Steam Isolation Valve
- After 5 minutes Steam Generator 1 completely blows down
- Representative Core Exit Thermocouple (CET) lower to 460°F
- T_{cold} lowers to 430°F

With Reactor Coolant Pumps in operation _____ (1) _____ should be used to monitor RCS cooldown limits. The Reactor Coolant System cooldown limits _____ (2) _____ been exceeded.

- | _____ (1) _____ | _____ (2) _____ |
|-----------------------|-----------------|
| A. T_{cold} | have |
| B. T_{cold} | have NOT |
| C. Representative CET | have |
| D. Representative CET | have NOT |

Question 26

Given:

- RCS Tavg is 574°F and stable
- Letdown flow is 28 GPM
- All Charging Pumps are OPERABLE
- Annunciator Panel H Window B1, Pressurizer Level HI/LO is actuated
- Pressurizer level is 49% and slowly lowering

Based on these conditions, pressurizer level will _____ (1) _____ and the crew should _____ (2) _____.

- | (1) | (2) |
|----------------------|--------------------------|
| A. continue to lower | perform a rapid shutdown |
| B. continue to lower | trip the reactor |
| C. recover | perform a rapid shutdown |
| D. recover | trip the reactor |

Question 27

Given:

- The reactor tripped due to a loss of offsite power
- On the trip, a Main Steam Safety Valve on Main Steam Line 1 opened and will not reseal
- Steam Generator 1 pressure is 500 PSIA and lowering
- Main Steam Line 1 and Blowdown Radiation Monitors are in Hi-Hi alarm
- RCS pressure is 1300 PSIA and lowering
- Pressurizer level is 0%
- All engineering safeguards equipment is operable
- OP-902-000, Standard Post Trip Actions is being implemented

After Standard Post Trip Actions are complete, the crew will implement:

- A. OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery
- B. OP-902-004, Loss of Excess Steam Demand Recovery
- C. OP-902-007, Steam Generator Tube Rupture Recovery
- D. OP-902-008, Functional Recovery Procedure

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Question 28

Given:

- The reactor was at 100% power
- RCP 1A trips on overcurrent

(1) RCP 1A Lift Oil Pump(s) started when RCP 1A (2).

- | <u>(1)</u> | <u>(2)</u> |
|------------|--------------------------|
| A. One | load breaker opened |
| B. Both | load breaker opened |
| C. One | speed lowered to 600 RPM |
| D. Both | speed lowered to 600 RPM |

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Question 29

Given:

- The reactor is operating at 100% power
- At 0100 RCP 1A Lower Seal fails and Controlled Bleedoff flow rises to 2.5 GPM
- OP-901-130, Reactor Coolant Pump Malfunction is implemented and the plant remains at 100% power
- At 0530 RCP 1A Middle Seal fails
- RCP 1A Controlled Bleedoff flow went out of range high and then went to 0 GPM

RCP 1A Controlled Bleedoff flow went low due to closure of _____ (1) _____.
The crew should _____ (2) _____ and secure RCP 1A.

- | _____ (1) _____ | _____ (2) _____ |
|--|--|
| A. a RCP Controlled Bleedoff Containment Isolation Valve | perform a shutdown to MODE 3 per OP-010-005, Plant Shutdown |
| B. a RCP Controlled Bleedoff Containment Isolation Valve | manually trip the reactor and perform Standard Post Trip Actions |
| C. the check valve on RCP 1A Controlled Bleedoff line | perform a shutdown to MODE 3 per OP-010-005, Plant Shutdown |
| D. the check valve on RCP 1A Controlled Bleedoff line | manually trip the reactor and perform Standard Post Trip Actions |

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Question 31

Given:

- The plant has tripped from 100% power
- Reactor Coolant System pressure lowered and stabilized at 1500 psia
- Containment Pressure is 17.3 PSIA and rising

Which of the following describes the condition of the Chemical Volume Control system?

- A. CVC-101, Letdown Stop Valve is open.
- B. CVC-103 & CVC-109, Letdown Isolation Valves are open.
- C. CC-636, Component Cooling Water to Letdown Heat Exchanger is closed.
- D. Charging Pumps A, B, and AB are running.

Question 32

Given:

- The plant is in Mode 4
- Shutdown Cooling Train B is being placed in service

What would be an acceptable manipulation to compensate for the increased heat load on the Component Cooling Water system prior to starting LPSI Pump B?

- A. CC-963B, Shutdown HX B CCW Flow Control is placed to OPEN.
- B. CC-963B, Shutdown HX B CCW Flow Control is placed to SETPNT.
- C. Dry Cooling Tower fans are manually started in slow speed.
- D. Dry Cooling Tower fans are manually started in fast speed.

Question 33

Given:

- A Loss Of Cooling Accident is in progress
- Reactor Coolant System (RCS) pressure is 200 PSIA
- High Pressure Safety Injection Pump B trips shortly after starting
- All other equipment functions as designed

The minimum required Safety Injection flow for High Pressure Safety Injection is (1) and (2) is required for Low Pressure Safety Injection.

	<u>(1)</u>	<u>(2)</u>
A.	>185 GPM total flow to the cold legs	no flow
B.	>185 GPM total flow to the cold legs	>185 GPM flow to loop 2 cold legs
C.	>185 GPM to each cold leg	no flow
D.	>185 GPM to each cold leg	>185 GPM flow to loop 2 cold legs

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Question 34

Given

- Reactor Coolant System Code safety valve has been weeping for the past week
- Quench tank level is 81%
- Quench tank temperature is 147°F

Control Room Supervisor orders the ATC operator to fill and drain the Quench Tank to reduce Quench Tank temperature.

The Quench Tank will be drained to the ___(1)___ and it will be filled from the ___(2)___ system.

- | | | |
|----|--|--|
| A. | <u> (1) </u>
Containment Sump | <u> (2) </u>
Condensate Make Up |
| B. | Reactor Drain Tank | Primary Make Up |
| C. | Containment Sump | Primary Make Up |
| D. | Reactor Drain Tank | Condensate Make Up |

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Question 35

Given:

- The plant is at 100% power
- Emergency Diesel Generator A is running paralleled to the 3A bus in TEST Mode
- The Unit Auxiliary Transformer A 4.16 KV feeder breaker to the 2A bus trips on overcurrent

Component Cooling Water Pump A will start on the (1) Second load block of the Sequencer and will be powered from (2).

	<u>(1)</u>	<u>(2)</u>
A.	7	Emergency Diesel Generator A
B.	168	Emergency Diesel Generator A
C.	7	Startup Transformer A
D.	168	Startup Transformer A

Question 36

Given

- The plant is at 100% steady state
- Pressurizer Pressure Controller, RC-IPIC-0100, output fails to 100%

If no operator actions are taken which of the following describes the plant response:

- A. Pressurizer pressure would rise and be controlled by the spray valves at 2275 PSIA.
- B. Pressurizer pressure will rise until all back up and proportional heaters secure at 2270 PSIA.
- C. Pressurizer pressure would lower until the reactor trips on low Reactor Coolant System pressure.
- D. Pressurizer pressure would lower until all Pressurizer heaters are energized which will maintain RCS pressure at 2225 PSIA.

Question 37

Given

- The Reactor Coolant System (RCS) pressure is 350 PSIA
- The plant is raising pressure to 2250 PSIA

As RCS pressure rises above 500 PSIA the Pressurizer Pressure Operating Bypass (1) from service. The set point tracks (2) below actual Reactor coolant System pressure during the pressure rise.

- | | <u>(1)</u> | <u>(2)</u> |
|----|--------------------------|------------|
| A. | must be manually removed | 400 PSIA |
| B. | is automatically removed | 400 PSIA |
| C. | must be manually removed | 184 PSIA |
| D. | is automatically removed | 184 PSIA |

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Question 38

Given

- A Safety Injection Actuation Signal (SIAS) was inadvertently actuated
- The CRS directs the BOP operator to reset the SIAS

The SIAS initiation relays are reset at (1) and the actuation relays are reset at (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | CP-10 | CP-33 |
| B. | CP-10 | CP-10 |
| C. | CP-33 | CP-33 |
| D. | CP-33 | CP-10 |

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Question 39

Given:

- The plant is at 100% Power
- Emergency Diesel Generator A is Out of Service for Maintenance
- A Loss Of Off Site Power Occurs

Which of the following is available to Emergency Borate the RCS?

- A. Charging Pump B and Boric Acid Makeup pump B
- B. Charging Pump A and Boric Acid Make up pump A
- C. Charging Pump B and Gravity Feed Valve BAM-113A
- D. Charging Pump A and Gravity Feed Valve BAM-113B

Question 40

Plant Conditions are as follows:

- Power is 100%, 300 EFPD
- Reactor Power Cutback is in service with subgroups 5 and 11 selected
- A Shutdown Bank CEA drops into the core
- The crew entered OP-901-102, CEA or CEDMCS Malfunction

Subsequently conditions are as follows:

- Power is 80%
- Main Feedwater pump A trips on overspeed

Based on this event, the crew should

- A. Remain in OP-901-102 and perform OP-901-101, Reactor Power Cutback concurrently.
- B. Trip the reactor, exit OP-901-102, and enter OP-902-000, Standard Post Trip Actions.
- C. Remain in OP-901-102 and adjust turbine load to maintain $T_{avg} - T_{ref}$ matched.
- D. Exit OP-901-102 and enter OP-901-101, Reactor Power Cutback.

Question 41

Given:

- Reactor Coolant System pressure is 1600 PSIA
- Containment pressure is 17.5 PSIA and rising
- The crew has diagnosed into OP-902-002, Loss of Coolant Accident Recovery
- Component Cooling Water (CCW) Pumps A and B are running

The BOP operator reports that Containment Fan Cooler A has tripped. Which action is required?

- A. Place CCW AB Assignment Switch in the "A" position and manually start CCW Pump AB.
- B. Override and close the Containment Fan Cooler A Component Cooling Water isolation valves.
- C. Verify Containment Cooling Safety Damper, CCS-102A, closed when CFC A tripped.
- D. Verify Containment Spray flow is greater than 1750 GPM for both trains of Containment Spray.

Question 42

Given the following:

- A Loss of Coolant Accident has occurred
- Reactor Coolant System pressure is 700 PSIA
- Containment pressure is 18 PSIA
- Refueling Water Storage Pool level is 9% and lowering
- No operator actions have been taken
- Low Pressure Safety Injection pumps A and B are running
- High Pressure Safety Injection pumps A and B are running

Based on the given conditions the Balance of Plant operator should:

- A. Close SI-602A and B, ESF Pump Suction Valves from the SI Sump.
- B. Open SI-120A and B, SI Pumps Recirculation Isolation Valves.
- C. Secure High Pressure Safety Injection Pumps A and B.
- D. Secure Low Pressure Safety Injection Pumps A and B.

Question 43

Given:

- Reactor Coolant System Tcold is 500°F and lowering
- 15 minutes ago the Reactor Coolant System Tc was 515°F when a controlled cool down was established
- The cool down is being controlled using MS-319A, Main Steam Bypass 1A, at 15% open

IF MS-319A failed open, the maximum allowed cool down rate of (1) which protects the (2), would be exceeded.

- | | | |
|----|-----------------------|--|
| A. | <u>(1)</u>
60°F/Hr | <u>(2)</u>
The most limiting component in Reactor Coolant System under all conditions |
| B. | 60°F/Hr | SG tube sheet from cyclic stress which is the most limiting component under all conditions |
| C. | 100°F/Hr | SG tube sheet from cyclic stress which is the most limiting component under all conditions |
| D. | 100°F/Hr | The most limiting component in Reactor Coolant System under all conditions |

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Question 44

Given

- The plant is performing an up power
- Dilution to the Volume Control Tank is in progress for power ascension
- Reactor Power is 70%
- Turbine is in GO with a rate of 2MW/MIN
- Tave is 565°F
- Tref is 561°F

To match Tave and Tref, The BOP operator should _____(1)_____ the rate the Main Turbine governor valves open. To accomplish this task, the BOP operator is required to _____(2)_____.

- | | | |
|----|-------|--|
| | (1) | (2) |
| A. | raise | depress LOAD RATE pushbutton, entering new value, and press ENTER |
| B. | raise | place the Main Turbine in HOLD, depress LOAD RATE pushbutton, enter new value, and push GO |
| C. | lower | depress LOAD RATE pushbutton, entering new value, and press ENTER |
| D. | lower | place the Main Turbine in HOLD, depress LOAD RATE pushbutton, enter new value, and push GO |

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Question 45

Plant Conditions are as Follows:

- Power is 100%
- SG-ILR-1111, Steam Generator 1 Narrow Range level indicator is reading 0% on the CP-1 recorder
- SG-ILR-1105, Steam Generator 1 Narrow Range level indicator is reading 68% on the CP-1 recorder
- All Narrow Range Steam Generator levels on CP-7 are indicating 68%
- A reactor trip occurs
- All systems performed as designed before and after the trip

The expected post trip responses to these conditions are that FW IHIC 1107 Main Feedwater Pump A speed controller (1) and FW IHIC1111, Main Feedwater Regulating Valve A and FW IHIC1105 Startup Feedwater Regulating Valve A Controller (2).

- | | | |
|----|---------------------|--|
| | <u>(1)</u> | <u>(2)</u> |
| A. | lowers to 3900 RPM | remain at their pre trip positions |
| B. | lowers to 3900 RPM | reposition to their Reactor Trip Positions |
| C. | remains at 4500 RPM | remain at their pre trip positions |
| D. | remains at 4500 RPM | reposition to their Reactor Trip Positions |

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Question 46

The EFW system is designed to prevent _____ (1) _____ by providing lines with an orifice from the Main Feedwater discharge headers to the EFW _____ (2) _____ piping.

- | _____ (1) _____ | _____ (2) _____ |
|-----------------------------|-----------------|
| A. feed ring thermal stress | suction |
| B. feed ring thermal stress | discharge |
| C. EFW piping damage | suction |
| D. EFW piping damage | discharge |

Question 47

Static Uninterruptable Power Supply SMA requires maintenance to the inverter section requiring the Inverter to be secured.

Other SUPS SMA components are not affected by maintenance.

Will the AC loads remain powered up with the Inverter de energized?

- A. Yes, loads will be powered from the Normal AC supply through the rectifier.
- B. Yes, loads will be powered from the DC supply through the rectifier.
- C. Yes, loads will be powered from the Bypass AC supply.
- D. No, PDP SMA must be de energized to support this maintenance.

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Question 48

Given:

- The plant is at 100% power
- The RAB watch reports that the AB battery bus indicates a positive 125 volt DC ground.

An additional ____ (1) ____ ground of the same magnitude on the AB battery bus, would require implementing OP-901-313, Loss of a 125 Volt DC Bus. This will ____ (2) ____.

	<u>(1)</u>	<u>(2)</u>
A.	negative	make Emergency Feedwater Pump AB unavailable and TS 3.7.1.2 must be addressed
B.	negative	require the crew to manually trip the reactor if bus AB-DC can not be restored
C.	positive	make Emergency Feedwater Pump AB unavailable and TS 3.7.1.2 must be addressed
D.	positive	require the crew to manually trip the reactor if bus AB-DC can not be restored

Question 49

Given:

- Reactor Coolant System Pressure is 1600 PSIA and lowering slowly
- Containment pressure is 19 PSIA and rising
- A Loss Of Offsite Power has occurred
- Five minutes into this event Emergency Diesel Generator A tripped on Overspeed

What of the following describes the MINIMUM actions required to maintain containment integrity?

- A. CS-125A, Containment Spray Header Isolation, must be closed by taking the CP-8 control switch to CLOSE only.
- B. CS-125A, Containment Spray Header Isolation, must be closed by taking the CP-8 control switch to OPEN and then to CLOSE only.
- C. CS-125A, Containment Spray Header Isolation, must be closed by taking the override switch in the +35 Relay Room to OVERRIDE only.
- D. CS-125A, Containment Spray Header Isolation, must be closed by taking the override switch in the +35 relay room to OVERRIDE, followed by taking the CP-8 control switch to OPEN and then to CLOSE.

Question 50

Given:

- An earthquake has occurred at Waterford 3
- A loss of offsite power has occurred .
- Emergency Diesel Generator A and B have started to supply in house loads
- A support beam in the A Emergency Diesel Generator room has fallen on and damaged both Air compressors A1 and A2
- Both air receiver pressures are 0 PSIG.
- Emergency Diesel Generator A develops an oil leak requiring it to be shutdown.

What action is required to shutdown Emergency Diesel Generator A?

- A. Depress the Emergency Shutdown push buttons on CP-1.
- B. Select STOP on the local Emergency Diesel Generator control panel.
- C. Pull the Overspeed Trip Plunger located on the Overspeed Governor.
- D. Pull and hold the manual Fuel Rack Override lever to the no fuel position.

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Question 51

Given:

- A Main Steam Line break has occurred inside containment
- Safety Injection Actuation Signal, Containment Isolation Actuation Signal, Main Steam Isolation Signal and, Containment Spray Actuation are all actuated
- The crew has entered OP-902-004, Excess Steam Demand Recovery
- Containment Temperature is 204°F
- ARM-IRE 5400A and ARM-IRE-5400B, Containment High Range Radiation Monitors alarmed 15 minutes into the event and radiations levels are trending down
- No other Containment Radiation monitors are in alarm

For the given conditions the crew should:

- A. Remain in OP-902-004 and monitor the Containment radiation monitors for thermally induced current effects.
- B. Enter OP-901-403, High Airborne Activity inside Containment, and perform concurrently with OP-902-004.
- C. Take no action since these area monitors are isolated on a CIAS and are unreliable.
- D. Enter OP-902-008, Functional Recovery, due to high activity in Containment.

Question 52

Given

- A Loss Of Coolant Accident is in Progress
- Loss Of Off Site Power has occurred
- Emergency Diesel Generator A has tripped on overspeed
- Component Cooling Water temperature is 98 °F and rising
- B Train Dry Cooling Tower Fans 1-4 are operating in Fast Speed
- B Train Dry Cooling Tower Fans 5-15 are operating in Slow Speed

As Component Cooling Water System temperature continues to rise, Dry Cooling Tower B fans 5-15 will start simultaneously in FAST speed when temperature rises above (1) . The fans will start cycling to SLOW when system temperature drops below (2) .

- | | <u> (1) </u> | <u> (2) </u> |
|----|------------------------|------------------------|
| A. | 100 °F | 92 °F |
| B. | 115 °F | 92 °F |
| C. | 100 °F | 88 °F |
| D. | 115 °F | 88 °F |

Question 53

Given

- Dry Cooling Tower fans 7B and 2B are out of service.
- Outside air temperature is 92 °F.
- Wet Bulb temperature is 73 °F.

What is the most limiting time to restore Dry Cooling Tower fans to comply with Tech Spec 3.7.4?

- A. 1 Hour
- B. 2 Hour
- C. 72 Hour
- D. 7 Days

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Question 54

Given the following conditions:

- Instrument Air Header pressure has lowered to 100 psig due to a leak
- SA-125, Station Air Backup is at its normal setpoint

SA-125 is _____ and SA-123, Air Dryer Bypass is _____.

- A. OPEN, OPEN
- B. CLOSED, OPEN
- C. OPEN, CLOSED
- D. CLOSED, CLOSED

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Question 55

Given:

- The plant is in Mode 6
- Core alterations are in progress
- The Reactor Auxiliary Building watch reports that train A Main Steam Line Bellows has been removed from the containment penetration for replacement
- Control room staff verified that the Bellows work is not being tracked by a containment impairment

Containment integrity is (1) . The crew should (2) .

- | | <u> (1) </u> | <u> (2) </u> |
|----|----------------|---|
| A. | met | immediately suspend core alterations |
| B. | met | isolate the affected penetration within 0.5 hours or suspend core alterations |
| C. | not met | isolate the affected penetration within 0.5 hours or suspend core alterations |
| D. | not met | immediately suspend core alterations |

Question 56

To cool the magnetic jack coils of the CEDM System, Control Element Drive Cooling System air flows _____ (1) _____ rejecting the CEDM Cooling System heat to the _____ (2) _____ System.

- | | (1) | (2) |
|----|--|-------------------------|
| A. | across the CEDM coils and then through the CEDM coolers, | Component Cooling Water |
| B. | through the CEDM coolers then across the CEDM coils, | Component Cooling Water |
| C. | across the CEDM coils and then through the CEDM coolers, | Reactor Cavity Cooling |
| D. | through the CEDM coolers then across the CEDM coils, | Reactor Cavity Cooling |

Question 57

Given

- A small break loss of coolant accident is in progress
- A Safety Injection Actuation Signal (SIAS) has occurred
- Voids in the Reactor Coolant System (RCS) are indicated
- The CRS directs the NPO to vent non-condensable gases from the Reactor Vessel Head

The Reactor Vessel Head Vent valves _____ (1) _____. The Reactor Vessel Head is vented to the _____ (2) _____.

- | | (1) | (2) |
|----|---|--------------------|
| A. | can not be opened until SIAS is reset | Quench Tank |
| B. | must be energized from CP-8 and the valves can then be opened | Quench Tank |
| C. | can not be opened until SIAS is reset | Reactor Drain Tank |
| D. | must be energized from CP-8 and the valves can then be opened | Reactor Drain Tank |

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Question 58

Given

- Plant is at 100% power steady state conditions
- Static Uninterruptable Power Supply SMA fails

Core Protection Calculator A and ____ (1) ____ deenergize. TCB 1, 2, 5, and 6 Open and the reactor ____ (2) ____.

- | | (1) | (2) |
|----|--------------------|---------------|
| A. | Linear Channel A | trips |
| B. | Control Channel #1 | does not trip |
| C. | Linear Channel A | does not trip |
| D. | Control Channel #1 | trips |

Question 59

Given the following conditions

- A Loss Of Coolant Accident has occurred

Which of the following describes the temperature when Zr-Water reaction becomes self sustaining?

- A. 1800°F
- B. 2200°F
- C. 3350°F
- D. 5080°F

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Question 60

The containment atmosphere Hydrogen Analyzer takes a suction from ____ (1) ____ and provides indication of Hydrogen concentration on CP- ____ (2) ____

- | | <u>(1)</u> | <u>(2)</u> |
|----|--------------------------|------------|
| A. | Below the Missile Shield | 33 |
| B. | Lower Reactor Cavity | 8 |
| C. | Below the Missile Shield | 8 |
| D. | Lower Reactor Cavity | 33 |

Question 61

Given

- CCW Surge Tank Level Switch CC-ILS-7013A failed low.
- CC-200A/727, CCW Hdr A TO AB Supply and Return Isolations, failed closed.
- CC-134 A, CCW A Dry Cooling Tower Bypass failed open.
- CC-135 A, CCW A Dry Cooling Tower Isolation, failed closed.
- Both Train A and Train B CC-620, Fuel Pool Heat Exchanger Temperature Control Valve, control switches are in the CONTROL position at CP-18.

Based on this level switch failure,

- A. Spent Fuel Pool temperature will rise since CC-620 failed closed.
- B. Spent Fuel Pool temperature will lower since CC-134 A, CCW A Dry Cooling Tower Bypass failed open.
- C. Spent Fuel Pool temperature will rise since CC-135 A, CCW A Dry Cooling Tower Isolation, failed closed.
- D. Spent Fuel Pool temperature is controlled in automatic since the Train B CC-620 control switch is in CONTROL.

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Question 62

Given

- The Reactor tripped from 100% power
- OP-902-000, Standard Post Trip Actions, has been entered and is being performed
- Reactor Coolant System (RCS) pressure is 2115 PSIA and rising
- One Control Element Assembly is stuck out
- Reactor power is 10⁻⁴% and lowering
- Steam Generator 1 level is 25% NR and lowering
- Steam Generator 2 level is 29% NR and lowering
- Pressurizer level is 28% and rising
- 3 Charging pumps are operating
- Steam Generator 1 and 2 pressures are 950 PSIA
- All ESFAS systems are in standby

Based on the given conditions the Reactor Operator should _____.

- A. commence emergency boration
- B. secure Charging pump AB
- C. take manual control of RCS pressure and control between 2125 to 2275 PSIA
- D. manually initiate Emergency Feedwater Actuation Signal for Steam Generator 1

Question 63

The following plant conditions exist:

- 300 EFPD
- The plant is at 15% power following a mid cycle outage startup
- The Main Turbine in on line with the Speed Loop in service
- Spurious operation of the Steam Bypass Control System resulted in MS-319 A, Main Steam Bypass 1A and MS-320 A, Main Steam Bypass 2A opening

Which of the following parameters will be lower after the event than before the event?

- A. Steam Generator pressure
- B. Reactor power
- C. RCS T_{HOT} temperature.
- D. Main Steam flow

Question 64

Given

- Plant is 100% Power
- A Waste Condensate Tank is being discharged
- A power supply on PRM-IRE-0647 Liquid Waste Management Radiation Monitor fails

As a result of this failure (1) and (2) .

- | | <u>(1)</u> | <u>(2)</u> |
|----|--|--|
| A. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, closes | LWM-442, Liquid Waste to Circulating Water Control Valve, remains open |
| B. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, closes | LWM-442, Liquid Waste to Circulating Water Control Valve, closes |
| C. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, remains open | LWM-442, Liquid Waste to Circulating Water Control Valve, remains open |
| D. | LWM-441, Liquid Waste to Circulating Water Shutoff Valve, remains open | LWM-442, Liquid Waste to Circulating Water Control Valve, closes |

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Question 65

Given

- Fire alarms are received for the +35 Cable Vault area.
- The Fire Brigade leader has reported that the automatic deluge actuation has failed and the fire is not under control.
- The Control Room Supervisor has entered OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown.
- The Control Room Supervisor has directed the immediate actions be completed and the Control Room evacuated.

Based on the given conditions the AT-THE-CONTROLS Operator will _____ (1)
and _____ (2) .

- | _____ (1) | _____ (2) |
|--|------------------------------------|
| A. trip <u>2</u> Reactor Coolant Pumps | secure Charging and Letdown |
| B. trip <u>2</u> Reactor Coolant Pumps | start all available Charging Pumps |
| C. trip <u>all 4</u> Reactor Coolant Pumps | secure Charging and Letdown |
| D. trip <u>all 4</u> Reactor Coolant Pumps | start all available Charging Pumps |

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Question 66

Per OI-024-000, Maintaining Active SRO/RO Status, to maintain your Reactor Operator license in an ACTIVE status, you must stand a minimum of _____ (1) _____ 12 hour shifts in a calendar quarter. To upgrade from INACTIVE status to ACTIVE status, a license holder must stand _____ (2) _____ hours of under instruction watches.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | five | 40 |
| B. | seven | 40 |
| C. | five | 60 |
| D. | seven | 60 |

Question 67

In accordance with EN-OP-102, Protection and Caution Tagging, _____ should have double valve isolation and tagging applied during removal and replacement of the component.

- A. Instrument Air Compressor A Unloader Valve
- B. Turbine Cooling Water pump A
- C. Containment Fan Cooler C Cooling Coils
- D. Hydrogen Excess Flow Control Valve

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Question 68

Given:

- The plant is in MODE 6
- The Upper Guide Structure is removed
- Core offload is suspended
- Reactor Cavity Level is 44 ft MSL
- The plant has been shutdown for 200 Hours

_____ (1) _____ train(s) of Shutdown Cooling must be OPERABLE and Shutdown Cooling flow must be at least _____ (2) _____ GPM.

- | | (1) | (2) |
|----|-----|------|
| A. | One | 2000 |
| B. | Two | 2000 |
| C. | One | 3000 |
| D. | Two | 3000 |

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Question 69

Given

- The plant is at 100% Power
- At 0100, the BOP operator bypasses the Channel C High LPD and Low DNBR trip bistables for a scheduled 2 hour I&C surveillance on Channel C Core Protection Calculator.
- The I&C technician informs the CRS that the CPC has failed the surveillance and will require a card replacement.

Operability will be tracked by ____ (1) ____ when the work begins. The Shift Manager will authorize operability following retest on ____ (2) ____.

(1)

(2)

- | | |
|---|---|
| A. the work package | OP-100-010, Att. 7.1, TS/TRM Entry Guidelines |
| B. OP-100-010, Att. 7.1, TS/TRM Entry Guidelines, | OP-100-010, Att. 7.2, EOS Checklist |
| C. the work package | OP-100-010, Att. 7.2, EOS Checklist |
| D. OP-100-010, Att. 7.1, TS/TRM Entry Guidelines, | OP-100-010, Att. 7.1, TS/TRM Entry Guidelines |

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Question 70

The Peak Centerline Temperature safety limit for new fuel with no burnable poison is ____ (1) ____ °F. Per TS 2.2.1, Reactor Trip Setpoints, a steady state peak linear heat rate of ____ (2) ____ has been selected as the Limited Safety System Setting to prevent fuel centerline melt.

	<u>(1)</u>	<u>(2)</u>
A.	5080	12.9 KW/Ft
B.	5080	21.0 KW/Ft
C.	5022	12.9 KW/Ft
D.	5022	21.0 KW/Ft

Question 71

Given the following:

- The plant is at 10% Power
- A containment entry is desired

Which of the following areas inside containment are forbidden from being entered?

- A. Pressurizer Cubicle below +21' elevation
- B. +46' elevation at the Quench Tank
- C. Main Steam Line Crossovers on the +46' elevation
- D. 1A Cold Leg penetration through the 'D' Ring Wall

Question 72

A high activity detected by the Industrial Waste Sump Radiation Monitor results in the discharge path of Industrial Waste Sump 2 pumps swapping from _____ (1) _____ to _____ (2) _____.

- A. (1) Industrial Waste Sump 1
(2) Waste Tanks
- B. (1) Industrial Waste Sump 1
(2) RAB Oil Sump 3
- C. (1) Oil Separator Sump
(2) Waste Tanks
- D. (1) Oil Separator Sump
(2) RAB Oil Sump 3

Question 73

To verify Core Heat Removal during Standard Post Trip Actions, the ATC should check RCS Loop Delta T for _____ (1) _____ and check T_h Subcooling only when on _____ (2) _____ circulation.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | loops with an operating RCP | forced |
| B. | all loops | forced |
| C. | loops with an operating RCP | natural |
| D. | all loops | natural |

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Question 74

When an Emergency Plan classification is upgraded from an Unusual Event to an Alert and no site evacuation is required, _____ (1) _____ must be notified within _____ (2) _____ minutes of the upgrade.

_____ (1) _____	_____ (2) _____
A. US Coast Guard	15
B. Waterford 1 & 2	15
C. US Coast Guard	60
D. Waterford 1 & 2	60

Question 75

Given:

- A Control Room Evacuation is in progress due to a fire in CP-2.
- Immediate Actions of OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown, have been completed
- The BOP is currently performing Attachment 4, BOP Time Critical Actions

After completion of the attachment, only the ____ (1) ____ 4.16 KV Safety bus will be energized and the bus will be loaded through the ____ (2) ____ sequencer.

- | | <u> (1) </u> | <u> (2) </u> |
|----|--------------------------------|--------------------------------|
| A. | A3 | mini |
| B. | A3 | normal |
| C. | B3 | mini |
| D. | B3 | normal |

END OF RO SECTION
CONTINUE TO SRO SECTION

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SRO Question 1

Given:

- A planned Reactor Coolant System (RCS) cooldown is in progress
- RCS pressure is 350 psia
- Shutdown Cooling (SDC) Trains A and B are in service
- Component Cooling Water (CCW) Surge Tank A and B levels are rising
- CCW Radiation Monitors AB and B are in Alert Alarm and rising
- CCW Radiation Monitor A is in High Alarm
- Pressurizer level is being maintained at setpoint by Charging and Letdown

Which of the following describes:

- 1) The potential source of the leak?
- 2) The action required per OP-901-411, High Activity in Component Cooling Water System?

(1)	(2)
A. Low Pressure Safety Injection Pump A seal cooler	GO TO OP-901-111, Reactor Coolant System Leak
B. Low Pressure Safety Injection Pump B seal cooler	GO TO OP-901-111, Reactor Coolant System Leak
C. Low Pressure Safety Injection Pump A seal cooler	Refer to Attachment 1, Auxiliary Equipment Supplied by CCW, secure affected Low Pressure Safety Injection Pump, and isolate CCW to seal cooler
D. Low Pressure Safety Injection Pump B seal cooler	Refer to Attachment 1, Auxiliary Equipment Supplied by CCW, secure affected Low Pressure Safety Injection Pump, and isolate CCW to seal cooler

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SRO Question 2

Given:

- The Plant was operating at 100% with all safety related equipment OPERABLE when a reactor trip is initiated due to a Steam Generator Tube Rupture in Steam Generator 1
- OP-902-007, Steam Generator Tube Rupture Recovery was entered
- When the Control Room Supervisor reaches the step to implement the Placekeeper a Loss of Offsite Power occurs
- Emergency Diesel Generator B trips on Overspeed

The rapid cooldown to T_{hot} of 520°F will be performed in accordance with _____ (1) _____, using the Atmospheric Dump Valve(s) on _____ (2) _____ Steam Generator(s).

- | _____ (1) _____ | _____ (2) _____ |
|--|-----------------|
| A. OP-902-007, Steam Generator Tube Rupture Recovery | the unaffected |
| B. OP-902-007, Steam Generator Tube Rupture Recovery | both |
| C. OP-902-008, Functional Recovery | the unaffected |
| D. OP-902-008, Functional Recovery | both |

SRO Question 3

The following plant conditions exist:

- The plant was operating in Mode 3
- A Main Steam line break occurs
- S/G 1 pressure is 650 PSIA and very slowly lowering
- S/G 2 pressure is 300 PSIA and lowering
- The crew is performing OP-902-004, Excess Steam Demand Recovery

Based on these conditions, the CRS should stabilize RCS Temperature by directing the BOP operator to fully open _____ (1) _____ when _____ (2) _____ starts to rise.

_____ (1) _____	_____ (2) _____
A. ADV 1 and feed S/G 1 with EFW in manual	CET temperatures and Pressurizer pressure
B. ADV 1 and feed S/G 1 with EFW in manual	S/G 2 level reaches 10% WR and S/G 1 pressure
C. ADV 2 and feed S/G 2 with EFW in manual	CET temperatures and Pressurizer pressure
D. ADV 2 and feed S/G 2 with EFW in manual	S/G 2 level reaches 10% WR and S/G 1 pressure

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SRO Question 4

Given:

- The plant is at the Point of Adding Heat, preparing to start the first Feedwater Pump
- Feedwater Pump A is being warmed up in accordance with, OP-003-033, Main Feedwater; the Feedwater Pump Casing to Feedwater ΔT is 100°F
- The Auxiliary Feedwater Pump trips on overcurrent and can not be restarted
- The crew manually trips the reactor and Emergency Feedwater Actuation Signal 1 and 2 occur
- Emergency Feedwater Pump AB trips on overspeed and can not be restored

The crew should GO TO _____ (1) _____. To conserve Steam Generator inventory ____ (2) ____ Reactor Coolant Pumps should be secured.

	(1)	(2)
A.	OP-902-000, Standard Post Trip Actions and then transition to OP-902-006, Loss of Main Feedwater Recovery	Two
B.	OP-902-000, Standard Post Trip Actions and then transition to OP-902-006, Loss of Main Feedwater Recovery	All
C.	OP-902-006, Loss of Main Feedwater Recovery directly	Two
D.	OP-902-006, Loss of Main Feedwater Recovery directly	All

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SRO Question 5

Given:

- The plant is in MODE 1
- All SUPS are in a normal alignment
- Battery Charger A1 is Out of Service due to a previous High Voltage Shutdown
- The normal AC input to SUPS MA trips open

These conditions require that _____ (1) _____ be restored within 24 hours to prevent _____ (2) _____.

- | _____ (1) _____ | _____ (2) _____ |
|--|----------------------------------|
| A. BOTH the SUPS A Rectifier and Battery Charger A1 | battery discharge |
| B. BOTH the SUPS A Rectifier and Battery Charger A1 | damage to the rectifier assembly |
| C. EITHER the SUPS A Rectifier OR Battery Charger A1 | battery discharge |
| D. EITHER the SUPS A Rectifier OR Battery Charger A1 | damage to the rectifier assembly |

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SRO Question 6

Given:

- Generator load is currently 1230 MWe and 100 MVARs Out
- Waterford 3 offsite grid parameters are within the prescribed operating ranges
- To maintain the grid stable, the Systems Operation Center (Pine Bluff) issues a formal request to the Shift Manager to adjust Reactive Load within the allowable limits to lower grid voltage as soon as possible, not to exceed 30 minutes

The CRS should implement OP-901-314, Degraded Grid Conditions, Section _____ (1) _____. The administrative limit for Reactive Load that applies when lowering Main Generator voltage is _____ (2) _____.

	(1)	(2)
A.	E1, Response to Degraded Grid	400 MVARs Out
B.	E2, Response to Transmission Loading Relief Request	400 MVARs Out
C.	E1, Response to Degraded Grid	75 MVARs In
D.	E2, Response to Transmission Loading Relief Request	75 MVARs In

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SRO Question 7

Given

- The plant is in MODE 3
- Reactor Power is 5×10^{-7} % power
- The following operating bypasses are enabled on all channels:
 - CPC Trip Bypass
 - Reactor Coolant Flow Low Trip Bypass
 - High SG Level Trip Bypass
- The middle detector for Excore Instrument Channel A has failed low

In addition to bypassing the trip bistables for Hi Log Power, Hi Local Power, and Low DNBR on Channel A, the trip bistable(s) for _____ must also be bypassed due to the loss of the (2)% bistable.

_____ (1) _____	_____ (2) _____
A. SG Lo Flow	10^{-4}
B. Hi SG-1 and 2 Level	10^{-4}
C. SG Lo Flow	65
D. Hi SG-1 and 2 Level	65

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SRO Question 8

Initial conditions:

- Fuel movement was in progress
- Containment Purge was aligned for service under the Continuous Release Permit

Current conditions:

- An irradiated fuel assembly is significantly bent due to a Containment Upender malfunction
- Large bubbles are noted coming to the surface of the Reactor Cavity
- The Refueling Machine Radiation Monitor, ARM-IRE-5013 is in Hi-Hi Alarm
- All other radiation monitors servicing the Containment have risen but have not reached an alarm condition
- No RAB radiation monitors are in an alarm condition

Containment Purge _____ (1) _____. After entering the appropriate offnormal procedure the CRS will initiate action to _____ (2) _____.

- | _____ (1) _____ | _____ (2) _____ |
|-----------------------|--|
| A. remains in service | isolate the Control Room Envelope |
| B. isolated | isolate the Control Room Envelope |
| C. remains in service | complete OP-901-131, Shutdown Cooling Malfunction, Attachment 1, Containment Closure Checklist |
| D. isolated | complete OP-901-131, Shutdown Cooling Malfunction, Attachment 1, Containment Closure Checklist |

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SRO Question 10

Given:

- The plant is in MODE 4
- A large leak on Train A Component Cooling Water (CCW) Supply Header resulted total isolation of the AB CCW Header
- Prior to isolation, all Component Cooling Water components and support systems were OPERABLE
- The ATC Operator notes that CCW AB Radiation Monitor is flashing light blue on CP-6 Radiation Monitoring CRT after the isolation

CCW AB radiation monitor should be considered _____ (1) _____. The radiation monitor is _____ (2) _____ for the given MODE.

- | _____ (1) _____ | _____ (2) _____ |
|-----------------|------------------------------------|
| A. INOPERABLE | not required to be OPERABLE |
| B. INOPERABLE | required to be OPERABLE |
| C. OPERABLE | not required to be OPERABLE |
| D. OPERABLE | required to be OPERABLE |

SRO Question 11

Given:

- Mode 1 100% Power
- RCP 1B THRUST BRNG TEMPERATURE HI annunciator is in alarm
- RCP 1B Motor Lube Oil Reservoir Cooler CCW return temperature is rising.
- RCP 1B Motor Oil Cooler Differential Temperature is 27°F and rising
- PMC and CP-2 indication for RCP 1B UPR THRST BRG TEMP indicates 228°F and rising
- CCW temperature has been lowered from 90°F to 76°F over the past 90 minutes

The CRS should:

- A. Trip the reactor, secure RCP 1B, and enter OP-902-000, Standard Post Trip Actions.
- B. Make the required notifications only (Duty Plant Manager and Systems Engineering).
- C. Start an ACCW pump only, while continuing to cool down CCW to 70°F in the next 30 minutes.
- D. Start RCP 1B Oil Lift Pump A or B only, while monitoring thrust bearing temperature.

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SRO Question 12

Given:

- Plant is at 100% Power
- Component Cooling Water Pump B trips
- Attempts to start AB Component cooling water pump were unsuccessful

Which of the following will be performed:

- A. Split out Component Cooling Water Headers and isolate the AB header from Train A to protect Train A cooled components.
- B. Split out Component Cooling Water Headers, isolate the AB header from Train B, verify selected Train B components secured.
- C. Trip the reactor, secure Reactor Coolant Pumps, and enter OP-902-000, Standard Post Trip Actions.
- D. Verify Containment Fan Coolers B and D are operating and Containment Average Temperature is maintained within limits.

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SRO Question 13

Given:

- The plant is at 100% power
- RC-IPR-0100, Pressurizer Pressure Channels X and Y, indicate 2225 PSIA and lowering on CP-2
- RC-IPIC-0100, Pressurizer Pressure Controller output is 0%
- Both RC-301A(B), Pressurizer Spray Valves are open

The CRS should order the ATC to take manual control of RC-IHIC-0100, Pressurizer Spray Valve Controller, adjust output to (1) %, and enter OP-901-120, Pressurizer Pressure Control Malfunction, Section (2) .

	<u> (1) </u>	<u> (2) </u>
A.	0	E-3, Pressurizer Spray Valve Malfunction
B.	0	E-1, Pressurizer Pressure Control Channel Instrument Failure
C.	100	E-3, Pressurizer Spray Valve Malfunction
D.	100	E-1, Pressurizer Pressure Control Channel Instrument Failure

SRO Question 14

Given:

- The plant is at normal steady state 100% power
- Annunciator N-2, Cabinet M, SG 1 FW ISOL VLV ACCU PRES LO is received on CP-8
- The white light on the test switch is illuminated
- An NAO is dispatched to the +46 wing area and reports the following:
 - MFIV 1 Accumulator A pressure reads 4700 PSIG
 - MFIV 1 Accumulator B pressure reads 4970 PSIG

What actions are required as a result of these accumulator pressures?

- A. The MFIV is inoperable due to the low accumulator pressure, enter TS 3.7.1.6.
- B. Re-pressurize Accumulator A above the alarm set point within 6 hours and enter TS 3.6.3.
- C. The MFIV is operable. Re-pressurize Accumulator A if desired.
- D. Enter a 72 hour administrative time limit to restore Accumulator A pressure to an acceptable pressure.

SRO Question 15

Given

- Reactor tripped
- CEA 1 stuck out
- Start up rate is negative
- Pressurizer level 28% and rising
- 1A and 1B Buses are de-energized
- 2A and 2B Buses are de-energized
- A Emergency Diesel Generator tripped on over speed
- B Emergency Diesel Generator is supplying the 3B Bus
- A and B 125 VDC buses are energized

Which of the following procedures should be implemented?

- A. OP-902-003, Loss Of Off Site Power/Loss Of Forced Circulation Recovery
- B. OP-902-006, Loss of Main Feedwater Recovery
- C. OP-902-005, Station Blackout Recovery
- D. OP-902-008, Functional Recovery

SRO Question 17

Which of the following equipment has a technical specification related surveillance that is required to be performed as part of the Pre-core Alteration Checklist?

- A. New Fuel Elevator
- B. Fuel Transfer Machine
- C. Fuel Handling Building Crane
- D. Spent Fuel Handling Machine

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SRO Question 18

Given

- The plant was at 100% power
- Reactor Power Cutback was in service
- The Main Turbine tripped on over speed

The CRS should implement (1). CEA Transient Insertion Limits may be exceeded for (2) hours before entry into Technical Specification 3.1.3.6 is required.

<u>(1)</u>	<u>(2)</u>
A OP-901-001, Reactor Power Cutback only	2
B OP-901-001, Reactor Power Cutback and OP-901-210, Turbine Trip concurrently	2
C OP-901-001, Reactor Power Cutback only	4
D OP-901-001, Reactor Power Cutback and OP-901-210, Turbine Trip concurrently	4

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SRO Question 19

Given:

- The plant was performing initial power ascension following a refueling outage
- 12 hrs ago the plant commenced raising power from 50% at a steady rate of 2%/hour
- At 72% power, two Control Element Assemblies in Regulating Group 6 drop and the crew performs a manual reactor trip

If the plant performed a startup and power ascension and reached 70% power five days later, the power ascension limit in effect should be ____ (1) ____ to prevent fuel damage due to ____ (2) ____.

- | | (1) | (2) |
|----|----------|-------------------------|
| A. | 3%/hour | pellet clad interaction |
| B. | 3%/hour | radial power peaking |
| C. | 30%/hour | pellet clad interaction |
| D. | 30%/hour | radial power peaking |

SRO Question 20

Given:

- A full core offload is in progress.
- The Normal Spent Fuel Pool Heat Exchanger is in service.
- The Backup Spent Fuel Pool Heat Exchanger is secured and available.

The RAB Watch has reported a leak on the Normal Spent Fuel Pool Heat Exchanger that requires isolating CCW to the Heat Exchanger.

Based on this report,

- A. The full core off load may continue after placing the Backup SFPHX provided Spent Fuel Pool temperature is maintained < 140 °F.
- B. The full core off load may continue after placing the Backup SFPHX provided Spent Fuel Pool temperature is maintained < 155 °F.
- C. The full core off load must be secured. Both the Normal and Backup Heat Exchangers are required to be available to perform a full core off load.
- D. The full core off load must be secured until a heat load calculation is performed to ensure the heat load does not exceed 15.3×10^6 BTU/HR.

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SRO Question 21

Given:

- The plant is in MODE 1
- On 3/11 at 0500 the Control Room Supervisor determines that the 7 day surveillance for sampling Boric Acid Makeup Tank A was last completed on 3/1 at 0500
- Boric Acid Makeup Pump A is currently Out of Service, but is expected to return to service in 5 days

Per Technical Specification 4.0.3, provided that _____ (1) _____ is approved and risk impact is managed, the surveillance must be completed by 0500 on ____ (2) ____ or Boric Acid Makeup Tank A must be declared inoperable.

_____ (1) _____	_____ (2) _____
A. NRC enforcement discretion	3/12
B. a satisfactory risk evaluation	3/12
C. NRC enforcement discretion	3/18
D. a satisfactory risk evaluation	3/18

SRO Question 22

The following plant conditions exist:

- RAD MONITOR SYS ACTIVITY HI-HI annunciator is in alarm
- Plant Stack PIG A and B show rising activity
- HVAC Duct PIG D shows rising activity
- HVAC Duct PIG A is in alarm
- Chemistry Tech reports HIGH airborne activity in the lab following sampling.

The CRS should carry out the actions in:

- A. OP-901-401, High Airborne Activity in Control Room
- B. OP-901-402, High Airborne Activity in Reactor Auxiliary Building
- C. OP-901-403, High Airborne Activity in Containment
- D. OP-901-404, High Airborne Activity in Fuel Handling Building

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SRO Question 23

Given:

- The plant is shutdown and in MODE 5 for a forced outage
- Waste Condensate Tank A is on recirculation in preparation for discharge
- The Liquid Waste Management discharge flow rate instrumentation is out of service
- Circulating Water Waterboxes A1, B1, and C1 are out of service
- Minimum dilution flow required is 250,000 gpm and discharge flow rate limit is 50 gpm
- Circulating Water Pumps A and B are running

Which of the following must be done to discharge Waste Condensate Tank A?

- A. Start either Circulating Water Pump C or D.
- B. Complete independent valve lineups by two qualified persons.
- C. Restore either Circulating Water Waterbox A1 or B1 to service.
- D. Ensure flow rate is estimated every 4 hours during the release.

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SRO Question 24

Given:

- Emergency Diesel Generator B is OOS for preventive maintenance and is expected to be restored in 2 hours
- The reactor was at 100%
- 20 minutes ago the Main Generator tripped and Offsite power was lost
- Emergency Diesel Generator A started and then tripped immediately on Generator Differential
- The reactor failed to trip automatically
- All CEAs inserted when the RPS manual trip pushbuttons were depressed

As Emergency Coordinator you should implement _____.

- A. EP-001-010, Unusual Event
- B. EP-001-020, Alert
- C. EP-001-030, Site Area Emergency
- D. EP-001-040, General Emergency

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SRO Question 25

Given:

- A General Emergency was declared
- A release of unknown duration is in progress
- The initial Protective Action Guideline issued for a wind direction of 0° were as follows:
 - Evacuate A1, B1, C1, D1, D2
- A wind shift has occurred to 180°
- Dose downwind of 0° is now projected to be < 1000 mrem TEDE and < 5000 mrem CDE THYROID at 2 miles and 5 miles
- Projected Dose in mrem for the new wind direction is:

EAB TEDE	EAB CDE THYROID	2 MILE TEDE	2 MILE CDE THYROID	5 MILE TEDE	5 MILE CDE THYROID
3000	7500	2000	3000	1200	1500

The Protective Action Recommendation update will be to Evacuate Protective Response Areas A1, B1, C1, D1 and:

- A. A2, C2
- B. A2, C2, D2
- C. A2, C2, A3, A4
- D. A2, C2, D2, A3, A4

END OF SRO SECTION
END OF EXAM