

U.S. Nuclear Regulatory Commission Site-Specific RO Written Examination	
Applicant Information	
Name:	
Date: 3/18/2020	Facility/Unit SQN
Region: I <input type="checkbox"/> II <input checked="" type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/>	Reactor Type: W <input checked="" type="checkbox"/> CE <input type="checkbox"/> BW <input type="checkbox"/> GE <input type="checkbox"/>
Start Time:	Finish Time:
Instructions	
Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80 percent. Examination papers will be collected 6 hours after the examination begins	
Applicant Certification	
All work done on this examination is my own. I have neither given nor received aid.	

Applicant's Signature	
Results	
Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

1. Given the following:

- Unit 1 is at 70% power

Subsequently,

- Main Condenser pressure increased to 7 psia
- Reactor was manually tripped per AOP-S.02, "Loss of Condenser Vacuum"
- Tave is stable at 545F

Which one of the following completes the statements below?

MFPs (1) automatically trip.

RCS cooldown will be using (2) .

- A. (1) (2)
will S/G ARVs
- B. will Steam Dumps
- C. will NOT S/G ARVs
- D. will NOT Steam Dumps

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2. Given the following:

- "A" train Safety Injection pump is tagged out

Subsequently

- Safety Injection occurs
- RCS pressure is 1220 psig and lowering
- Pressurizer level is rising
- "B" train SI pump trips immediately after starting
- The crew entered E-1, "Loss of Reactor or Secondary Coolant" and is performing Step 7, CHECK SI Termination Criteria."

Which one of the following completes the statements below?

The RCS leak location is (1) .

Safety Injection termination criteria (2) met.

- | | |
|-----------------------------|---------------|
| (1) | (2) |
| A. Pressurizer safety valve | is |
| B. Pressurizer safety valve | is NOT |
| C. Pressurizer heater well | is |
| D. Pressurizer heater well | is NOT |

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3. Given the following:

- ES-1.3 "Transfer to RHR Containment Sump" is in progress
- Both RHR Pumps are running aligned to the Containment Sump
- The CCP and SI Pump suction from the RWST have been isolated
- RWST level is 20%
- EA-63-2 "Refilling RWST" is in progress

Subsequently,

- RHR Pump 1A-A trips.

Which one of the following completes the statements below?

CCPIT Inlet Flow (1) greater than 0 gpm.

In accordance with ES-1.3 the required action is to (2) .

- A. (1) is
(2) ensure 1B-B CCP and 1B-B SI Pumps are running and then place the 1A-A CCP and 1A-A SI Pumps control switches to the pull-to-lock (P-T-L) position
- B. (1) is
(2) ensure the CCP and SI pump suction are realigned to the RWST
- C. (1) is **NOT**
(2) ensure 1B-B CCP and 1B-B SI Pumps are running and then place the 1A-A CCP and 1A-A SI Pumps control switches to the pull-to-lock (P-T-L) position
- D. (1) is **NOT**
(2) ensure the CCP and SI pump suction are realigned to the RWST

4. Given the following:

- Unit 1 is at 15% power
- AOP-R.04 "Reactor Coolant Pump Malfunctions" was entered due to RCP #1 Seal Temperature

Which one of the following completes the statements below?

The P-8 LOW POWER LOW FLOW TRIP BLOCKED annunciator (Bypass and Permissive 1-XA-55-4A) (1) LIT for current plant conditions.

In accordance with AOP-R.04 the reactor (2) required to be tripped before the #1 RCP.

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

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5. Given the following:

- Unit 2 is at 100% power
- The crew entered AOP-M.09, "Loss of Charging"
- The crew is re-establishing charging flow in accordance with EA-62-5, "Establishing Normal Charging and Letdown" Section 4.2 Establishing Charging flow
- RCP seal injection flows are as follows:

<u>#1</u>	<u>#2</u>	<u>#3</u>	<u>#4</u>
9.2 gpm	10.5 gpm	11.9 gpm	13.4 gpm

Which one of the following identifies the adjustment needed to 2-FCV-62-89, "Seal Water FCV" and the effect it will have on charging flow through the Regen Heat Exchanger?

	<u>2-FCV-62-89 needs to be throttled</u>	<u>Charging Flow to the Regen Heat Exchanger WILL</u>
A.	OPEN	Increase
B.	OPEN	Decrease
C.	CLOSED	Increase
D.	CLOSED	Decrease

6. Given the following:

- Both Units are at 100% power

Which one of the following identifies...

(1) a condition that will cause CCS Train B flow/pressure to lower on BOTH units

and

(2) whether a Unit 2 manual reactor trip is required in accordance with AOP-M.03 "Loss of Component Cooling Water" if the Train B flow/pressure cannot be restored

- A. (1) Loss of 480v Shutdown Board 1A2-A
(2) Reactor Trip is required
- B. (1) Loss of 480v Shutdown Board 1A2-A
(2) Reactor Trip is **NOT** required
- C. (1) Loss of 480v Shutdown Board 2B2-B
(2) Reactor Trip is required
- D. (1) Loss of 480v Shutdown Board 2B2-B
(2) Reactor Trip is **NOT** required

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8. Given the following:

- Unit 1 operating at 100% power
- A steam line break downstream of the #3 S/G MSIV occurred
- All MSIVs failed to close and ECA-2.1, "Uncontrolled Depressurization of All Steam Generators" was entered
- EA-1-1, "Closing MSIVs Locally" is complete and 125v control power fuses have been removed
- Safety Injection termination is **NOT** in progress

Which one of the following completes the statement below?

MSIV Valve position (1) available on 6K/6L Panels at 1-M-6

and

ECA-2.1 Foldout Page transition to E-2, Faulted Steam Generator Isolation is based on (2) .

- | | | |
|----|------------------------|---------------------|
| A. | (1)
remains | (2)
S/G Pressure |
| B. | remains | RCS Temperature |
| C. | does NOT remain | S/G Pressure |
| D. | does NOT remain | RCS Temperature |

9. Given the following:

- Unit 1 is at 35% power during a plant startup.
- 1A MFW pump is in service.
- The "MFPT B RESET/TRIP" handswitch on 1-M-3 has the Green light **LIT**.

Subsequently, the 1A MFW pump trips.

Which one of the following identifies:

- (1) the earliest time that the TDAFW Pump will auto-start
 - and
 - (2) the normal source of the cooling water to the TDAFW pump bearing oil cooler?
- A. (1) at the time the 1A MFP tripped
(2) a stage on the TDAFW pump
 - B. (1) at the time the 1A MFP tripped
(2) the ERCW system
 - C. (1) at the time when SG level lowered to the auto-start setpoint
(2) a stage on the TDAFW pump
 - D. (1) at the time when SG level lowered to the auto-start setpoint
(2) the ERCW system

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10. Given the following:

- A Loss of Offsite Power and Reactor Trip occurred on Unit 1.
- Natural Circulation conditions are being verified in accordance with EA-68-6, "Monitoring Natural Circulation Conditions."

Which one of the following identifies conditions where natural circulation exists?

- A. Core exit T/Cs equal to Tcold. Core exit T/Cs at saturation temperature for the S/G pressure.
- B. Core exit T/Cs equal to Tcold. Tcold at saturation temperature for the S/G pressure.
- C. Core exit T/Cs stable. Core exit T/Cs at saturation temperature for the S/G pressure.
- D. Core exit T/Cs stable. Tcold at saturation temperature for the S/G pressure.

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11. Given the following:

- Station Blackout has occurred
- Both Units have entered ECA-0.0 "Loss of All AC Power"
- Offsite Power is being restored using AOP-P.01 Attachment 1

Which one of the following completes the statement below?

In accordance with AOP-P.01 "Loss of Offsite Power" the designated source for restoring off-site power is the (1) line

and

this line is (2).

- | | | |
|----|---------------|-------|
| | (1) | (2) |
| A. | Hiwassee 1 | 161Kv |
| B. | Hiwassee 1 | 500Kv |
| C. | Chickamauga 1 | 161Kv |
| D. | Chickamauga 1 | 500Kv |

12. Given the following:

- Both Units are at 100% power
- 125V DC Vital Battery Board IV is inadvertently deenergized

Which one of the following completes the statements below?

(1) Diesel Generator(s) will auto-start.

In accordance with AOP-P.02 "Loss of 125V DC Vital Battery Board" the 2B-B EDG (2) be shutdown using the EMERGENCY STOP pushbutton on 0-M-26.

- | | | |
|----|-----------------|----------------|
| A. | (1)
Only one | (2)
can |
| B. | Only one | can NOT |
| C. | All four | can |
| D. | All four | can NOT |

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13. In accordance with AOP-M.01 "Loss of Essential Raw Cooling Water, Section 2.5 ERCW Supply Header 2A Rupture in Aux Building", which one of the following completes the statements below?

Unit 2 Train A CCP and SI Pump may experience bearing failure (1) after a loss of ERCW cooling.

The REACTOR COOLANT PUMPS MOTOR THRUST BEARING TEMP HIGH annunciator is required to be monitored on (2) .

- | | | |
|----|------------|--------------------|
| | (1) | (2) |
| A. | 10 minutes | both Units |
| B. | 10 minutes | Unit 2 ONLY |
| C. | 15 minutes | both Units |
| D. | 15 minutes | Unit 2 ONLY |

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14. Which one of the following completes the statements below?

In accordance with AOP M.02 "Loss of Control Air" 0-FCV-32-82 "Train A Control Air Supply" and 0-FCV-32-85 "Train B Control Air Supply" will close first as pressure reaches a setpoint of (1) and lowering in the Station Control & Service Air System.

The reason for this isolation is to (2).

- | | |
|------------|--|
| (1) | (2) |
| A. 50 psig | ensure control air is provided to the essential components for safe shutdown |
| B. 50 psig | prevent exceeding containment design pressure in the event of a design bases accident with an air leak is inside containment |
| C. 69 psig | ensure control air is provided to the essential components for safe shutdown |
| D. 69 psig | prevent exceeding containment design pressure in the event of a design bases accident with an air leak is inside containment |

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16. Given the following:

- Unit 1 was at 100% power
- A reactor trip and SI occurred due to a LOCA outside containment
- The crew has entered ECA-1.2 "LOCA Outside Containment"

Which one of the following completes the statements below?

FCV-62-69 Letdown Isol Loop 3, (1) auto close from the SI signal.

In accordance with ECA-1.2 "LOCA Outside Containment" step 2 "ATTEMPT to isolate break from RCS" the operator is required to close the RHR (2) leg injection valve.

- | | | |
|----|-----------------|------------|
| A. | (1)
will | (2)
hot |
| B. | will | cold |
| C. | will NOT | hot |
| D. | will NOT | cold |

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17. Given the following:

- The Crew has entered FR-H.1, "Loss of Secondary Heat Sink," due to a loss of inventory in the S/Gs and failure of the AFW pumps to start.
- A low pressure feed source from ERCW or HPFP has NOT been established.

	Time:	0800	0810	0820	0830
S/G #1 WR (%)		41	33	28	23
S/G #2 WR (%)		39	32	20	19
S/G #3 WR (%)		46	42	31	19
S/G #4 WR (%)		37	28	19	16
Core Exit T/Cs (°F)		548	549	550	551
Cont. Press. (psid)		1.70	2.40	2.70	2.50

Which one of the following is the earliest time that the initiation of RCS Feed and Bleed is required?

- A. 0800
- B. 0810
- C. 0820
- D. 0830

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18. Given the following:

- Unit 2 was operating at 100% power when a LOCA occurred.
- ES-1.3 "Transfer to RHR Containment Sump" has been completed
- ECA-1.3 "Containment Sump Blockage" was just entered
- 'B' Train pumps are in PULL TO LOCK
- 'A' train CCP, SI, RHR, and Containment Spray pumps are running and have all have indications of cavitation

In accordance with ECA-1.3 which one of the following is an allowable sequence to secure 'A' Train pumps?

- A. Containment Spray, RHR, SI, CCP
- B. RHR, SI, Containment Spray, CCP
- C. CCP, Containment Spray, RHR, SI
- D. SI, CCP, Containment Spray, RHR

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19. Given the following:

- The unit is at 85% power
- Rod Control is in MAN
- A continuous uncontrolled Control Bank D rod withdrawal occurs

Which one of the following completes the statements below?

In accordance with AOP-C.01 " Rod Control Malfunctions" the OATC (1) required to place Rod Control in AUTO and CHECK rod motion stopped.

If Rod motion stopped with reactor power at 98%, with no operator action, reactor power will stabilize at (2) .

- | | | |
|----|---------------|-------------|
| A. | (1)
is | (2)
~85% |
| B. | is | ~98% |
| C. | is NOT | ~85% |
| D. | is NOT | ~98% |

20. Given the following:

- Unit 2 was tripped from 100% power.
- The crew is performing ES-0.2 "Natural Circulation Cooldown."
- All steps have been completed up to Step 13, MAINTAIN the following RCS conditions.
- At time 18:00 the following plant conditions existed:
 - Core exit T/Cs = 520°F
 - RCS pressure = 1600 psig

Subsequently, a PZR PORV failed OPEN.

- At time 18:15 the following plant conditions are observed :
 - Core exit T/Cs remain at 520°F.
 - RCS pressure is 800 psig and stable.
 - PZR level is 70% and rising rapidly.

Which one of the following completes the statements below at time 18:15?

In accordance with ES-0.2 Foldout page a transition to E-0, Reactor Trip or Safety Injection (1) required.

PZR level is rapidly rising is due to (2) .

- A. (1) is
(2) an automatic Safety Injection actuation
- B. (1) is
(2) drawing a bubble in the reactor vessel head
- C. (1) is **NOT**
(2) an automatic Safety Injection actuation
- D. (1) is **NOT**
(2) drawing a bubble in the reactor vessel head

21. Given the following:

- Unit 1 is at 40% power
- Two Condenser Vacuum Pumps are running

Subsequently,

- Condenser pressure is 2.5 psia
- AOP-S.02, "Loss of Condenser Vacuum" was entered

Which one of the following completes the statements below?

The third Condenser Vacuum Pump (1) be running.

In accordance with AOP-S.06, "Turbine Trip Below P-9 (50% Power)" if a turbine trip subsequently occurs, and C-9 Condenser Interlock is LIT, control rods are required be positioned to (2).

- A. (1) will
(2) stabilize power with Tave = 547°F
- B. (1) will
(2) stabilize power at approximately 13 -15%
- C. (1) will **NOT**
(2) stabilize power with Tave = 547°F
- D. (1) will **NOT**
(2) stabilize power at approximately 13 -15%

22. Given the following:

- Both Units are at 100% power
- The following alarm is received:

- 1-RA-90-1A AUX BLDG AREA RAD MON HIGH RAD (0-M-12-A, A-7)

Subsequently, the following alarm is received:

- 0-RA-90-101A AUX BLDG VENT MONITOR HI RAD (0-M-12-B, B-1)

- No other rad monitors are in alarm.

Which one of the following completes the statements below?

The cause of the alarms is (1) .

0-AR-M12-B, B-1 Annunciator Response Procedure, (2) contain steps to check that automatic actions have occurred.

- | | | |
|----|---|-----------------|
| | (1) | (2) |
| A. | Gas Decay Tank relief valve fails open | does |
| B. | Gas Decay Tank relief valve fails open | does NOT |
| C. | Gas Decay Tank pressure indicator sensing line breaks | does |
| D. | Gas Decay Tank pressure indicator sensing line breaks | does NOT |

23. Given the following:

- Both Units are at 100%
- A fire in the Control Building requires evacuating the Main Control Room

In accordance with AOP-C.04 "Shutdown from Auxiliary Control Room" which one of the following completes the statements below?

PRIOR to the reactor being tripped...

the OATC (1) dispatched outside the MCR

and

following the reactor trip the next action in the MCR is to (2) .

- A. is ENSURE MSIV and MSIV bypass valve handswitches to CLOSE
- B. is RCP handswitches in STOP/PULL TO LOCK
- C. is **NOT** ENSURE MSIV and MSIV bypass valve handswitches to CLOSE
- D. is **NOT** RCP handswitches in STOP/PULL TO LOCK

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24. Given the following:

- Unit 2 is at 100% power
- AOP-R.06 "High RCS Activity" is in progress

Which of the following completes the sentences below?

AOP-R.06 "High RCS Activity" directs monitoring (1) .

LCO 3.4.16 "RCS Specific Activity" is applicable in Modes (2) .

- A. (1) 2-RR-90-1A AUX BLDG AREA RAD MON
(2) 1-4
- B. (1) 2-RR-90-1A AUX BLDG AREA RAD MON
(2) 1-5
- C. (1) 0-RE-90-101B AUX BLDG VENT RADMON-TOTAL GAS
(2) 1-4
- D. (1) 0-RE-90-101B AUX BLDG VENT RADMON-TOTAL GAS
(2) 1-5

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25. Following a large steam line rupture, monitoring of Critical Safety Function Status Trees indicates a RED path for Pressurized Thermal Shock.

In accordance with EPM-3-FR-P.1 "Basis Document for FR-P.1 "Pressurized Thermal Shock" which one of the statements below identifies the limiting component and reason for the concern?

<u>Limiting Component</u>	<u>Reason for Concern</u>
A. Pressurizer	Increased stresses resulting from a rapid depressurization condition at high temperature.
B. Pressurizer	Increased stresses resulting from a cooldown of unexpected severity or an overpressure condition at low temperature.
C. Reactor Vessel	Increased stresses resulting from a rapid depressurization condition at high temperature.
D. Reactor Vessel	Increased stresses resulting from a cooldown of unexpected severity or an overpressure condition at low temperature.

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26. Which one of the following completes the statements below in accordance with ES-0.3 "Natural Circulation Cooldown with Steam Void in Vessel (With RVLIS)"

Operators are (1) to attempt to start a RCP

and

RCS cooldown rate is limited to a maximum of (2).

- | | | |
|----|--------------------|------------|
| | (1) | (2) |
| A. | required | 50°F/hour |
| B. | NOT allowed | 50°F/hour |
| C. | required | 100°F/hour |
| D. | NOT allowed | 100°F/hour |

27. Given the following:

- Large Break LOCA is in progress on Unit 2
- Containment pressure is 1.9 psig and stable
- The STA reports an ORANGE condition on the CONTAINMENT (FR-Z) Safety Function Status Tree due to high level in the containment sump

Which one of the following...

(1) describes the action(s) that will be directed by FR-Z.2, "Containment Flooding,"

and

(2) In accordance with EPM-3-FR-Z.2 "Basis Document for FR-Z.2 Containment Flooding" what is the concern if the action(s) are **NOT** successful?

- A. (1) Transfer water from containment sump to the RWST.
(2) Components necessary for plant recovery could be damaged and rendered inoperable.
- B. (1) Transfer water from containment sump to the RWST.
(2) Water reaching the bottom of the reactor vessel could result in thermal shock and vessel failure.
- C. (1) Identify and isolate the source of excess water.
(2) Components necessary for plant recovery could be damaged and rendered inoperable.
- D. (1) Identify and isolate the source of excess water.
(2) Water reaching the bottom of the reactor vessel could result in thermal shock and vessel failure.

28. Given the following:

- Unit 1 is at 9% power
- All control systems are in AUTO

Subsequently,

- Loop 1 Reactor Coolant Pump tripped
- No operator actions have been taken

Which one of the following is the plant response?

- A. #2, #3, and #4 S/G steam flows rise.
- B. #2, #3, and #4 S/G steam flows lower.
- C. #2, #3, and #4 S/G steam flows do **NOT** change.
- D. The reactor automatically trips on HIGH #1 steam generator level.

29. Given the following:

- Unit 1 is at 100%
- Annunciator TS-62-75 LOW PRESSURE LETDOWN RELIEF TEMP HIGH (1-M-6 Window C-4) is in alarm.
- RCS leakrate is calculated at 3 gpm

To maintain PZR level stable, operator action (1) required.

The letdown relief flow (2) go to the PRT.

- | | | |
|----|---------------|-----------------|
| A. | (1)
is | (2)
does |
| B. | is | does NOT |
| C. | is NOT | does |
| D. | is NOT | does NOT |

30. Given the following:

- Unit 1 is at 100% power
- Letdown in service at 75 gpm

Which one of the following conditions will result in **lowering** the available NPSH to the CCPs?

- A. Loss of air to 1-FCV-62-77, Letdown Flow Isolation
- B. Loss of air to 1-FCV-62-118, Letdown Divert to HUT LCV
- C. Loss of air to 1-FCV-62-79, Mixed Bed High Temp Bypass
- D. Loss of air to 1-TCV-70-192, Letdown HX Outlet Temperature Control

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31. Which one of the following is powered from C&A Vent Board 1B1-B?
- A. 1-FCV-74-1, RHR Suction From Loop 4 HL
 - B. 1-FCV-74-21, RHR Pump 1B Suction Isolation
 - C. 1-FCV-63-1, RHR Pump Suction from the RWST
 - D. 1-FCV-63-93, RHR CL Inj To Loops 2 & 3

32. Given the following:

- Unit 1 was operating at 100% power.
- A loss of Vital Instrument Power Board 1-II occurred.
- The OATC observes the following:
 - RWST to CCP suction valves 1-FCV-62-135, -136 automatically OPEN
 - VCT to CCP suction valves 1-FCV-62-132, -133 automatically CLOSE

Which one of the following completes the statement below?

The CCP suction source swapped to the RWST due to a loss of power to (1)

and

In accordance with AOP-P.03, "Loss of Unit 1 Vital Instrument Power Board", operators will (2).

- | | | |
|----|--------------------------|---|
| A. | (1)
Separation Relays | (2)
trip the Reactor |
| B. | Separation Relays | manually transfer CCP suction source to VCT |
| C. | VCT level Instruments | trip the Reactor |
| D. | VCT level Instruments | manually transfer CCP suction source to VCT |

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33. Which one of the following is an AUTOMATIC action during automatic switchover to sump recirculation after a large-break LOCA?
- A. RWST to CCP suction valves (FCV-62-135, -136) CLOSE.
 - B. RWST to RHR pump suction valves (FCV-74-3, -21) CLOSE.
 - C. RHR Discharge to CCP and SI Pump suction (FCV-63-7, -6) OPEN.
 - D. RHR heat exchanger discharge crosstie valves (FCV-74-33, -35) CLOSE.

34. Given the following:

- Unit 2 is at 90% power.
- Due to a leaking PORV, 2-FCV-68-332 PORV block valve was closed.
- PRT level is 89%
- PRT pressure is 7 psig
- PRT Temperature is 145°F

Which one of the following completes the statements below?

In accordance with 2-SO-68-5, "Pressurizer Relief Tank," PRT temperature and (1) are outside the recommended band.

Primary Water flow for PRT cooling enters the tank via (2) .

- | | | |
|----|----------|--------------------------------------|
| | (1) | (2) |
| A. | level | a sparger at the bottom of the tank |
| B. | level | spray nozzles at the top of the tank |
| C. | pressure | a sparger at the bottom of the tank |
| D. | pressure | spray nozzles at the top of the tank |

35. Given the following:

- Unit 1 is being cooled down and has been placed on shutdown cooling with 'A' Train RHR in service.
- Temperature on 1-TI-70-157, "RHR Heat Exchanger 1A Outlet Temperature" reads 112°F and rising.

Which one of the following completes the statements below?

In accordance with "RHR HX A OUTLET TEMPERATURE HIGH" (M27-B-A, E-6), Annunciator response, RHR HX outlet temperature shall NOT exceed (1) for given conditions .

In order to reduce the RHR heat exchanger CCS outlet temperature, (2) .

- A. (1) 115°F;
(2) either the CCS flow or the RHR flow through the heat exchanger is allowed to be adjusted
- B. (1) 115°F;
(2) only the CCS flow through the heat exchanger is allowed to be adjusted
- C. (1) 145°F;
(2) either the CCS flow or the RHR flow through the heat exchanger is allowed to be adjusted
- D. (1) 145°F;
(2) only the CCS flow through the heat exchanger is allowed to be adjusted

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36. Which one of the following is the power supply to the valve position indication for PZR PORV 68-340A on Unit 1?
- A. 125V Battery Board I
 - B. 125V Battery Board IV
 - C. 120V Vital Instrument Power Board 1-I
 - D. 120V Vital Instrument Power Board 1-IV

37. Given the following:

- Unit 1 is at 100%
- Rod control has been placed in MANUAL with T_{avg} at 578.0°F

Which one of the following identifies how the actual RPS trip setpoint value will change if T_{avg} decreases by 1°F? Assume AFD remains constant.

- A. Both $OT_{\Delta T}$ and $OP_{\Delta T}$ trip setpoint values will decrease.
- B. $OT_{\Delta T}$ trip setpoint value will increase and $OP_{\Delta T}$ trip setpoint value will decrease.
- C. $OT_{\Delta T}$ trip setpoint value will increase and $OP_{\Delta T}$ trip setpoint value will remain the same.
- D. $OT_{\Delta T}$ trip setpoint value will remain the same and $OP_{\Delta T}$ trip setpoint value will decrease.

38. Given the following:

- Unit 1 is in Mode 3 preparing for a reactor startup

Which of the following completes the sentences below?

Technical Specification 3.5.2 ECCS - Operating (1) applicable for this plant condition.

LCO 3.5.2 helps ensure highest fuel cladding temperature following a LOCA will not exceed (2) .

- | | (1) | (2) |
|----|---------------|--------|
| A. | is | 2200°F |
| B. | is | 1200°F |
| C. | is NOT | 2200°F |
| D. | is NOT | 1200°F |

39. Given the following:

- Both Units are at 100%
- Upper Compartment Cooling Units A-A and B-B are in service on both units

Compare the effects of the inadvertent closing of the **Lower** Compartment Cooling Unit (LCCU) valves listed:

- Unit 1, LCCU 1A-A ERCW Inlet FCV (Outboard), 1-FCV-67-107
- Unit 2, LCCU 2A-A ERCW Inlet FCV (Outboard), 2-FCV-67-107

Which one of the following identifies the effect on the Upper Containment humidity on the respective unit(s) and the mitigation strategy, if any?

- A. Upper containment humidity would RISE on Units 1 and 2.
No additional cooling unit would be available to be placed in service for either Unit.
- B. Upper containment humidity would RISE on Units 1 and 2.
0-SO-30-4, Upper Compartment Cooling Units, would be used to place additional coolers in service on both Units.
- C. Upper containment humidity would RISE on Unit 1 only.
No additional cooling unit would be available to be placed in service for this Unit.
- D. Upper containment humidity would RISE on Unit 1 only.
0-SO-30-4, Upper Compartment Cooling Units, would be used to place additional coolers in service for this Unit.

40. Given the following:

- A LOCA occurred on Unit 1
- Phase B automatically actuated

Subsequently

- ECA-1.1 "Loss of ECCS Sump Recirculation", was entered
- Annunciator status
 - LS-63-50A RWST LVL LO, 1-M6-E window E-3 is in Alarm
 - LS-63-50B RWST LVL LO-LO, 1-M6-E window E-4 is Dark
 - STM GEN LEVEL ADVERSE SETPOINT, 1-M3-C window E-2 is Dark
- Both Containment Spray pumps are running
- The crew is implementing Step 9:

9. **DETERMINE** containment spray requirements:

Which one of the following completes the statement below?

(1) Containment Spray Pump(s) are required to be secured (2).

[REFERENCE PROVIDED]

- | | | |
|----|------------|--------------------------------------|
| A. | (1)
One | (2)
now |
| B. | One | when LS-63-50B RWST LVL LO-LO alarms |
| C. | Both | now |
| D. | Both | when LS-63-50B RWST LVL LO-LO alarms |

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41. The reason the Ice Condenser Lower Inlet doors are required to be closed during normal operations is to prevent which of the following?
- A. Loss of Divider Barrier Integrity.
 - B. Excessive sublimation of the ice.
 - C. Frost buildup blocking flow channels.
 - D. Violating minimum containment air temperature.

42. Given the following:

- Unit 1 is at 100% power

Subsequently,

- A LOCA occurred
- ES-1.3, "Transfer to RHR Containment Sump" is in progress
- Containment pressure peaked at 3.0 psig
- Current containment pressure is 1.8 psig and stable

In accordance with ES-1.3 which one of the following identifies the **MINIMUM** action(s) necessary to allow 1B-B Containment Spray Pump to be stopped and placed in A-AUTO?

- A. Reset the Train B Phase B signal and then the Train B Containment Spray signal
- B. Reset the Train B Containment Spray signal **ONLY**
- C. Simultaneously Reset BOTH Trains of Phase B
- D. Reset the Train B Phase B **ONLY**

43. Given the following:

A plant cooldown is in progress on Unit 2 in accordance with 0-GO-7, "Unit Shutdown From Hot Standby To Cold Shutdown."

at 08:00, conditions were achieved in accordance with 0-GO-7:

- RCS pressure is 1850 psig
- RCS temperature is 455°F

Subsequently,

at 08:15, an event occurred and the following conditions currently exist

- RCS pressure is 1700 psig and lowering at 10 psi per second
- S/G pressures are 700 psig and lowering at 25 psi per second
- Containment pressure is 1.2 psig and rising

Which one of the following completes the statement below?

At 08:15,

an automatic Safety Injection (1) occurred

and

a Main Steam Line Isolation (2) occurred.

- | | | |
|----|----------------|----------------|
| | (1) | (2) |
| A. | has | has |
| B. | has | has NOT |
| C. | has NOT | has |
| D. | has NOT | has NOT |

44. Given the following:

- Unit 1 is at 25% power
- The #3 S/G MFW Reg valve is in Manual and throttled open
- The #3 S/G MFW Bypass valve is in Manual and closed

Which one of the following completes the statement below for how controllers are required to be transferred from MANUAL to AUTO in accordance with 1-SO-98-1 "Distributed Control System (DCS)"?

The (1) controller will be transferred first, otherwise SG level will (2) .

- | | | |
|----|----------------------|-------------|
| A. | (1)
MFW Reg valve | (2)
Rise |
| B. | MFW Reg valve | Lower |
| C. | MFW Bypass valve | Rise |
| D. | MFW Bypass valve | Lower |

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45. Given the following:

- Unit 1 is at 100% power.
- MFW header pressure transmitters (1-PT-3-1, 1A, 1B) fail **LOW** due to an instrument line leak.
- DCS does **NOT** transfer any MFW controllers to manual.

Which one of the following completes the statements below?

The failure will initially cause Steam Generator levels to (1).

In accordance with AOP-S.01, "Main Feedwater Malfunctions," the operator is required to take manual control of (2) to stabilize the plant.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|----------------------------------|
| A. | rise | main feed pump speed control |
| B. | rise | main feedwater regulating valves |
| C. | lower | main feed pump speed control |
| D. | lower | main feedwater regulating valves |

46. Given the following:

- Unit 2 is at 50% power

Subsequently, a reactor trip occurs

- The crew entered ES-0.1, "Reactor Trip Response" and is performing Step 1
- The following parameters are observed:
 - PZR level is 25% and slowly lowering
 - All S/G levels are between 12% and 18% NR and slowly rising
 - S/G pressures are 990 psig and slowly lowering
 - All RCPs are running
 - Tavg is 545°F and slowly lowering
 - RCS pressure is 2020 psig and slowly lowering
- NO operator actions have been taken

In accordance with ES-0.1, which one of following is required to be performed FIRST?

- A. Emergency borate
- B. Throttle Auxiliary Feedwater flow
- C. Close MSIVs and bypass valves
- D. Initiate Safety Injection

47. Given the following:

- Unit 2 is in Mode 1
- The TDAFW Pump is tagged out of service
- A Loss of Feedwater causes a reactor trip
- Concurrent with the trip, 2B-B 6.9kV SDBD de-energizes on Differential fault

Assuming **NO** operator actions have been taken, which one of the following describes the Auxiliary Feedwater alignment and design flowrate for these conditions?

- A. 1 and 2 S/Gs being fed at 220 GPM each
- B. 1 and 2 S/Gs being fed at 440 GPM each
- C. ALL S/Gs being fed at 110 GPM each
- D. ALL S/Gs being fed at 220 GPM each

48. Given the following:

- 0-SO-82-2 "Diesel Generator 1B-B", Section 8.3 Control Room Start is in progress for a Post maintenance test run
- Shutdown Boards are aligned to the Normal Supply Unit boards

Which of the following completes the statement below?

The 1B-B Diesel Generator will be operating in parallel with the supply from the (1) 6.9 kV Unit Board.

and

If the DG output breaker Overcurrent (50) Relay actuates during the maintenance run, while operating in parallel, it (2) cause the DG Output breaker to open.

- | | | |
|----|-----|-----------------|
| | (1) | (2) |
| A. | 1D | will |
| B. | 1D | will NOT |
| C. | 1C | will |
| D. | 1C | will NOT |

49. Given the following:

- Both Units are at 100% power
- All Offsite power is lost to both Units
- 1A-A and 2B-B diesel generators start and load
- 1B-B and 2A-A diesel generators do **NOT** start
- **NO** operator action has yet been taken

Which one of the following describes status of the 125V Vital Boards?

- A. Vital boards I and II are energized by their battery.
- B. Vital boards I and IV are energized by their battery.
- C. Vital boards II and III are energized by their battery.
- D. All Vital 125V DC boards are energized by their battery charger.

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50. Which one of the following will cause the Emergency Diesel Generator (EDG) to receive a trip signal following an **Emergency Start** condition?
- A. Engine Overspeed
 - B. Low lube oil pressure
 - C. High Jacket Water temperature
 - D. Loss of Field (40) Relay actuation

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51. Given the following:

- Unit 1 is at 100% power with Steam Generator Blowdown (SGBD) in service to the Cooling Tower Blowdown.
- The following alarm is received:
 - "1-RA-120/121B STM GEN BLDN LIQ SAMP MON INSTR MALFUNC" (0-AR-M12A, B6), due to low sample flow.
 - FCV-15-44, S/G Blowdown to CTBD, is open

Which one of the following completes the sentences below?

Normally (1) of the rad monitors that provide input to this alarm is(are) in service.

In accordance with the ARP, the operator is required to (2) .

- | | | |
|----|------|---|
| | (1) | (2) |
| A. | one | ensure FCV-15-44 is closed |
| B. | one | dispatch operator to adjust sample flow |
| C. | both | ensure FCV-15-44 is closed |
| D. | both | dispatch operator to adjust sample flow |

52. Given the following:

- Both units were operating at 100%

Subsequently,

- A loss of all off site power to both units occurs
- The 2A-A DG did not start.

Which ERCW pumps will have power available?

- A. J-A and K-A
- B. J-A and Q-A
- C. K-A and R-A
- D. Q-A and R-A

53. Given the following:

- A Safety Injection has occurred on Unit 1
- ERCW pump L-B is not selected and not running
- ERCW pump M-B pump failed to automatically start

Which one of the following describes the impact of this ERCW condition (if any) on the 1B-B D/G?

- A. 1B-B D/G will **NOT** auto-start
- B. 1B-B D/G is required to be immediately stopped
- C. 1B-B D/G will be unaffected since the ERCW system is crosstied between the 1A and 1B trains
- D. 1B-B D/G will be unaffected since the 1B ERCW header is crosstied with the 2B ERCW header

54. Given the following:

- Unit 1 is at 100% power
- Annunciator "LS-32-63 AUX AIR COMPRP A LOW OIL LVL HI AIR TEMP" 1-AR-M15-B(C-6) is in alarm
- Auxiliary Building AUO reports a red indicating light for high discharge air temperature is LIT

Which one of the following completes the statements below?

This condition (1) cause an automatic trip of the Auxiliary air compressor.

Cooling water to the Auxiliary Air Compressor (2) supplied from the Raw Cooling Water system.

- | | | |
|----|-----------------|---------------|
| A. | (1)
will | (2)
is |
| B. | will | is NOT |
| C. | will NOT | is |
| D. | will NOT | is NOT |

55. Given the following:

- Unit 1 is in Mode 6.
- An inadvertent dilution is in progress.
- Source Range audible count rate is rising.

In accordance with SOURCE RANGE HIGH FLUX LEVEL AT SHUTDOWN (1-AR-M4-B) which ONE of the following completes the statements below?

The EARLIEST time that containment evacuation is required is when SR counts first reach (1) times above background.

An audible alarm inside containment (2) occur when the annunciator alarms.

- | | | |
|----|-----|-----------------|
| | (1) | (2) |
| A. | 3 | will |
| B. | 3 | will NOT |
| C. | 5 | will |
| D. | 5 | will NOT |

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56. Which one of the following completes the statement below?

The Unit 2 Power Range Overpower Rod withdrawal stop setpoint is (1) on (2) Power Range channels.

- | | | |
|----|-------------------|---------------|
| A. | (1)
100% Power | (2)
1 of 4 |
| B. | 100% Power | 2 of 4 |
| C. | 103% Power | 1 of 4 |
| D. | 103% Power | 2 of 4 |

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57. Normal DC Control Power for the 1A-A Centrifugal Charging Pump breaker is powered from which of the following electrical boards?
- A. Vital Battery Board I
 - B. Vital Battery Board II
 - C. Vital Battery Board III
 - D. Vital Battery Board IV

58. Given the following:

- 1-FR-0 "Status Trees" for CORE COOLING is being evaluated
- RVLIS > 42% lower range

b1c/3-18-2020

Which one of the following completes the statement below?

A RED PATH in Core Cooling requires at least (1) thermocouples greater than (2) .

- | | (1) | (2) |
|----|------|--------|
| A. | four | 700°F |
| B. | four | 1200°F |
| C. | five | 700°F |
| D. | five | 1200°F |

59. Given the following:

- The Rx has tripped from 65% power.
- 'A' Rx trip breaker failed to open (remains closed)

Which one of the following completes the statement below?

Control of steam dumps will _____ .

- A. transfer to the Rx Trip Controller and the steam dump valves will open
- B. remain on the Load Reject Controller and the steam dump valves will open
- C. transfer to the Rx trip controller, however, the steam dump valves will NOT open
- D. remain on the Load Reject Controller; however, the steam dump valves will NOT open

60. Given the following:

- Unit 2 is at 100%
- CRO observes the following on EHC Display Panel, 2-XX-47-2000:
 - 'RUNBACK OPER' light LIT
 - 'VALVE POS LIMIT' light DARK

Which one of the following describes the event and turbine control response to the event in progress? (Assume no operator action.)

<u>EVENT</u>	<u>TURBINE CONTROL RESPONSE</u>
A. OTΔT Runback	Reference and setter indicating changing values.
B. OTΔT Runback	Reference and setter indicating the initial value.
C. HDTP Runback	Reference and setter indicating changing values.
D. HDTP Runback	Reference and setter indicating the initial value.

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61. In accordance with AOP-S.02 "Loss of Condenser Vacuum" which one of the following completes the statements below?

When turbine load is less than 30%, the EARLIEST time a manual turbine trip is required is when condenser pressure first rises above (1) .

When turbine load is greater than 30%, the EARLIEST time a manual reactor trip is required is when condenser pressure first rises above (2) .

- | | (1) | (2) |
|----|-----------|----------|
| A. | 1.72 psia | 3.5 psia |
| B. | 1.72 psia | 5.4 psia |
| C. | 2.7 psia | 3.5 psia |
| D. | 2.7 psia | 5.4 psia |

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62. Which one of the following completes the statement below?

The 1A MFW Pump auto-trip setpoint for seal water is low _____ that lasts for 28 seconds.

- A. injection pressure below 220 psig
- B. differential pressure below 10 psid
- C. injection pressure below 265 psig
- D. differential pressure below 20 psid

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63. In accordance with 0-SO-77-1, "Waste Disposal System (Liquid)" which one of the following completes the statements below?

The minimum required dilution flow for radioactive liquid releases is (1) .

IF a total of two CCW Pumps are running at the site, THEN the minimum required dilution flow for radioactive liquid releases (2) met.

- | | |
|--------------|---------------|
| (1) | (2) |
| A. 10,000gpm | is |
| B. 10,000gpm | is NOT |
| C. 17,000gpm | is |
| D. 17,000gpm | is NOT |

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64. Which one of the following completes the statements below?

0-RE-90-125/126 "Main Control Room Intake Monitors", (1) the instruments that cause a Control Room Isolation.

If a Control Room Isolation occurs, 0-FCO-311-20 "MCR AHU A INLET" (2) required to be OPEN.

- A. (1) (2)
A. are is
- B. (1) (2)
B. are is **NOT**
- C. (1) (2)
C. are **NOT** is
- D. (1) (2)
D. are **NOT** is **NOT**

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65. Both units are performing AOP-M.01, Loss of ERCW, for a Loss of all ERCW flow.
- High Pressure Fire Protection (HPFP) temporary cooling has been aligned in accordance with AOP-M.01
 - No actions have been performed under Appendix H, TSC Actions in the event of Loss of ERCW.

Subsequently,
A total loss of the High Pressure Fire Protection system occurs.

Which of the following have lost their source of TEMPORARY cooling?

- A. Glycol Chillers
- B. Centrifugal Charging Pumps
- C. Residual Heat Removal Pumps
- D. Component Cooling System Pumps

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66. Which one of the following identifies when a required periodic verification of a locked valve may be waived in accordance with OPDP-6, Locked Valve/Breaker Program?
- A. Valve located in area where the heat stress stay time <1 hour.
 - B. Valve located in containment raceway during normal power operations.
 - C. Valve inside a Clearance boundary with system's status control not being maintained.
 - D. Valve located within a locked area and access to the area has not occurred since the last verification.

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67. In accordance with Tech Spec 3.4.16, "RCS Specific Activity", which one of the following identifies the specific activity limits for the primary coolant in Mode 1?

	<u>Dose Equivalent Xe-133</u>	<u>Dose Equivalent I-131</u>
A.	≤ 1612.6 microcuries/gram	≤ 0.10 microcuries/gram
B.	≤ 1612.6 microcuries/gram	≤ 0.35 microcuries/gram
C.	≤ 1200 microcuries/gram	≤ 0.10 microcuries/gram
D.	≤ 1200 microcuries/gram	≤ 0.35 microcuries/gram

68. Which one of the following completes the statements below?

The license thermal power limit is based on a (1) AVERAGE.

In accordance with OPDP-1 "Conduct of Operations", secondary-side control valve oscillations that cause AVERAGE thermal power to exceed the licensed thermal power limit (2) allowable.

- | | |
|-----------|----------------|
| (1) | (2) |
| A. 1 hour | are |
| B. 1 hour | are NOT |
| C. 8 hour | are |
| D. 8 hour | are NOT |

69. Given the following:

- 1C HWP has been secured for three days for maintenance.
- Hold order was removed and the pump was started at **1005**.
- Immediately after the motor came up to speed, the pump was shut down.
- The pump was restarted at **1020**
- The pump continued to run until **1045**, when it was shutdown again.

In accordance with GOI-6, "Apparatus Operations," which one of the following identifies if/when the 1C HWP can be restarted?

- A. Pump can be restarted immediately.
- B. 20 minutes cooldown is required prior to restarting.
- C. 45 minutes cooldown is required prior to restarting.
- D. Starting requirements were violated, do not restart the pump.

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70. Which one of the following completes the statements below?

The Safety Limit (Tech Spec 2.1.2) for RCS pressure states RCS pressure shall be maintained \leq (1) .

Tech Spec 2.1.2 is applicable in modes (2) .

- | | |
|--------------|-----|
| (1) | (2) |
| A. 2485 psig | 1-4 |
| B. 2485 psig | 1-5 |
| C. 2735 psig | 1-4 |
| D. 2735 psig | 1-5 |

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71. In accordance with 0-SO-77-1 "Waste Disposal System" Section 6.2, Monitor Tank Recirculation and Release, what is the minimum required recirculation time?
- A. 5 minutes
 - B. 10 minutes
 - C. 50 minutes
 - D. 60 minutes

72. Given the following:

- A Unit 1 Lower Containment entry in accordance with 0-PI-OPS-000-011.0, "Containment Access Control during Modes 1-4" is scheduled to add oil to #1 RCP
- The Incore Flux Detectors are within 10 feet of the bottom of the core

Which one of the following completes the statements below?

The Incore Flux detectors (1) in an approved storage location to be TAGGED.

and

UNIT 1 UPR/LWR AIR LOCK BREACH (0-M12-C, A-5) (2) expected to alarm.

- | | | |
|----|----------------|---------------|
| A. | (1)
are | (2)
is |
| B. | are | is NOT |
| C. | are NOT | is |
| D. | are NOT | is NOT |

73. In accordance with EPM-4 "User's Guide" which one of the following completes the statements below?

One of the verbs used to visually identify a Continuous Action Step is (1) .

Equipment or control devices (2) be manipulated when performing a step with the word CHECK.

- | | | |
|----|----------------|-------------------|
| A. | (1)
MONITOR | (2)
must |
| B. | MONITOR | should NOT |
| C. | ENSURE | must |
| D. | ENSURE | should NOT |

74. Given the following:

The crew has reached a point in the EOPs where FRPs are being monitored and implemented when required.

In accordance with EPM-4, "User's Guide" which one of the following completes the statements below?

If a RED or ORANGE priority condition comes in and clears prior to FRP entry, the FRP (1) performed.

FR-C.2, "Degraded Core Cooling", includes steps for depressurizing intact S/Gs which may cause a RED path on the FR-P.1, "Pressurized Thermal Shock status tree". In this case (2) has priority.

- | | | |
|----|---------------------|---------------|
| A. | (1)
must be | (2)
FR-C.2 |
| B. | must be | FR-P.1 |
| C. | does not need to be | FR-C.2 |
| D. | does not need to be | FR-P.1 |

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75. Which one of the following procedures contains at least one immediate operator action?
- A. AOP-M.02, Loss of Control Air
 - B. ECA-0.0, Loss of All AC Power
 - C. FR-C.1 Inadequate Core Cooling
 - D. AOP-C.02, Uncontrolled RCS Boron Concentration Changes

Step	Action/Expected Response	Response Not Obtained
------	--------------------------	-----------------------

9. **DETERMINE** containment spray requirements:

a. **CHECK** Cntmt Spray pump suction **ALIGNED** to RWST.

a. **IF** Cntmt Spray pump suction is aligned to sump, **THEN GO TO** Step 11.



b. **DETERMINE** number of spray pumps required from table below:

RWST LEVEL (%)	CNTMT PRESSURE (PSIG)	NUMBER OF CNTMT SPRAY PUMPS REQUIRED
Greater than 8	Greater than 12.0	2
	Between 9.5 and 12.0	1
	Less than 9.5	0
Less than 8	-----	0

(Step continued on next page.)

ANSWER KEY REPORT
for RO Exam Test Form: 0

Answers

#	0
1	A
2	B
3	A
4	A
5	A
6	D
7	B
8	A
9	A
10	D
11	C
12	D
13	A
14	C
15	A
16	D
17	D
18	D
19	C
20	B
21	B
22	C
23	B
24	A
25	D
26	C
27	C
28	A
29	C
30	A
31	B
32	B
33	B
34	B
35	C
36	A
37	C
38	A
39	C
40	C
41	B
42	B
43	C
44	B
45	A
46	B
47	A

ANSWER KEY REPORT
for RO Exam Test Form: 0

Answers

#	0
48	C
49	C
50	A
51	B
52	B
53	D
54	D
55	A
56	C
57	A
58	D
59	A
60	A
61	A
62	A
63	C
64	A
65	B
66	D
67	B
68	D
69	A
70	D
71	D
72	B
73	B
74	C
75	B

SECTION 01 (75 items)
