U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information	
Name:	
Date: 06/25/14	Facility/Unit: North Anna Power Station
Region: I ☐ II ☑ III ☐ IV ☐	Reactor Type: W ☑ CE ☐ BW ☐ GE ☐
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. 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 2 was operating at 100% power for 220 days

   • A reactor trip without SI occurred 6 hours ago

   • The unit is stable in MODE 3 at NO LOAD Tave

   • No dilutions or borations have occurred

   Which ONE of the choices below completes the following statement regarding Shutdown Margin (SDM) after the reactor trip occurred?

   SDM is ___(1)___ than at the time of the reactor trip, and SDM is currently ___(2)___ .

   A. (1) higher
      (2) lowering

   B. (1) higher
      (2) rising

   C. (1) lower
      (2) lowering

   D. (1) lower
      (2) rising

2. Given the following:

   - Unit 1 was stable at 100% power when a LOCA occurred
   - Current Conditions:
     - Reactor Coolant System (RCS) pressure is 1260 psig and slowly lowering
     - The crew is currently in 1-E-1, Loss of Reactor or Secondary Coolant, and are at step 12 to "CHECK IF LOW-HEAD SI PUMPS SHOULD BE STOPPED"

   Which ONE of the choices below completes the following statement?

   The CAUTION statement before step 12 states that the Low-Head SI Pumps should be manually restarted to supply water to the RCS **IF** ...

   A. RCS pressure decreases in an uncontrolled manner to less than 225 psig.

   B. RWST level decreases to less than 23%.

   C. High-Head Cold Leg SI flow is NOT indicated.

   D. RCS subcooling based on Core Exit TCs is less than 25°F.

3. Given the following:

   - Unit 1 was operating at full power
   - 'B' Train ICCM had failed and was removed from service for repairs
   - A Reactor Trip and Safety Injection occurs
   - Subcooling indication on 'A' train ICCM is suspected to be inaccurate

   Current Conditions:
   - Average 5 highest CETCs: 253°F
   - Wide Range RCS Pressure: 26 psig
   - RCS Cold Leg Temperature: 221°F
   - RCS Hot Leg Temperature: 247° F
   - Containment Pressure: 24 psia

   The crew is directed to manually calculate Subcooling.

   Based on the information above, which ONE of the following is the correct value that the 'A' train ICCM should be displaying? (Reference Provided)

   A. -15°F

   B. -11°F

   C. 15°F

   D. 21°F

4. Given the following:

   - Unit 1 is stable at 7% power preparing to roll the main turbine
   - A loss of the Unit 1 'J' Emergency bus occurs
   - The 1J EDG did not automatically start

   Which ONE of the choices below is correct concerning Reactor Coolant Pump operation?

   A. Component Cooling water flow has been lost to the RCP motors **ONLY**.

   B. Component Cooling water flow has been lost to the RCP motors **AND** thermal barriers.

   C. Component Cooling water flow has been lost to the RCP thermal barriers **ONLY**.

   D. Component Cooling water flow has **NOT** been lost to the RCP motors **OR** thermal barriers.

5. Given the following:

   • Unit 1 is at 100% power and stable

   Current Conditions:

   • 1-AR-C-C5, CH PP To Regen HX Hi-Lo Flow, is LIT

   • 1-AR-C-B3, Regen Hx Letdwn Line Hi Temp, is LIT

   • VCT level is 49% and rising

   • Pressurizer level is 59% and lowering

   • Letdown flow is fluctuating

   • Letdown pressure is fluctuating

   Which ONE of the choices below identifies the failure that has resulted in the above indications?

   A. 1-CH-FT-1122, Charging Flow transmitter, has failed high

   B. 1-CH-PCV-1145, Letdown Pressure control valve, has failed closed

   C. 1-CH-TV-1204A, Letdown Isolation valve, has failed closed

   D. 1-CH-FCV-1122, Charging Flow control valve, instrument air has been lost

6. Given the following:

   - Unit 1 is in MODE 5
   - The RCS is solid
   - All letdown orifice isolations are closed
   - 1-CH-HCV-1142, RHR to Letdown, is full open
   - 1-CH-PCV-1145, Letdown Pressure Control Valve, is in auto
   - RCS Temperature is 185°F
   - RCS Pressure is 330 psig
   - 1-RH-P-1A ('A' RHR Pump) is in service

   Which ONE of the choices below will **INITIALLY** occur if 1-RH-P-1A trips on overcurrent? (Assume no operator actions)

   A. RCS Pressure would rise

   B. 1-CH-PCV-1145 would throttle open

   C. Charging flow would rise

   D. VCT level would rise

7. Given the following:

   - Unit 1 is at 100% power
   - All control systems are in their normal alignment, with the exception of the Pressurizer Master Pressure Controller, 1-RC-PCV-1444J, which is in MANUAL
   - The Pressurizer Master Pressure Controller **output** fails LOW

   Assuming no action has been taken by the crew, which ONE of the choices below describes the effect on the Pressurizer heaters and the resulting effect on Pressurizer PORVs and Spray valves?

   A. Pressurizer heaters energize;
      Pressure rise is controlled by 1-RC-PCV-1455C, Pressurizer PORV operation

   B. Pressurizer heaters energize;
      Pressure rise is controlled by 1-RC-PCV-1456, Pressurizer PORV operation

   C. Pressurizer heaters de-energize;
      Pressurizer spray valves AND 1-RC-PCV-1456, Pressurizer PORV opens.

   D. Pressurizer heaters de-energize;
      Pressurizer spray valves AND 1-RC-PCV-1455C, Pressurizer PORV opens.

8. Given the following:

   - Unit 1 was at 100% power when a turbine trip occurred
   - The reactor failed to trip automatically
   - Operator actions to manually trip the reactor failed
   - 1-FR-S.1, Response to Nuclear Power Generation/ATWS, has been entered
   - The crew had attempted to initiate emergency boration of the RCS
   - Emergency boration flow indicates 0 gpm

   In accordance with 1-FR-S.1, which ONE of the following actions is directed and why?

   A. Open normal charging line isolation valves;
      Maximize core cooling flow

   B. Close normal charging line isolation valves;
      Verify all dilution flow paths are isolated

   C. Close normal charging line isolation valves;
      Maximize negative reactivity addition through the BIT

   D. Open normal charging line isolation valves;
      Allow operators to continue attempts to emergency borate

9. Given the following:

- Unit 1 operators are responding to a tube rupture in the 'B' steam generator in accordance with 1-E-3, Steam Generator Tube Rupture
- 'B' steam generator has been isolated in accordance with 1-E-3
- The cooldown to the desired core exit temperature has **NOT** been initiated.
- Current Conditions
  - RCS subcooling is 20°F
  - Pressurizer level is off scale low
  - 'B' SG pressure is 300 psig and slowly lowering
  - **NO** Charging Pumps are running

Which ONE of the choices below completes the following statements?

In accordance with 1-E-3 continuous action page, based on the above information, the crew __(1)__ trip all RCPs, because __(2)__.

A. (1) will not
   (2) no charging pumps are running

B. (1) will
   (2) RCP seal injection flow has been lost

C. (1) will
   (2) RCS subcooling is below minimum value

D. (1) will not
   (2) operators will restore RCS subcooling during the cooldown

10. Given the following:

    • Unit 2 has tripped from 100% power

    • 10 minutes after the unit trip, a large fault occurs on the ‘B’ main steam line upstream of the steam flow venturi

    Which ONE of the signals below will cause the main steam trip valves to close during this event?

    A. High steam flow coincident with lo-lo Tavg

    B. High steam flow coincident with low steam line pressure

    C. High steam line differential pressure

    D. Intermediate hi-hi containment pressure

11. Given the following:

- A tornado resulted in a complete loss of all offsite power
- The 1H Emergency Diesel Generator (EDG) had been previously tagged out for maintenance
- The 1J EDG automatically started, then immediately tripped on engine overspeed
- The 1J EDG Overspeed Reset Lever has been locally reset

The crew is performing 1-ECA-0.0, Loss of All AC Power, Attachment 5 in an attempt to restore power to the 1J Emergency Bus using the 1J EDG.

The 1J EDG Mode Selector switch is in MANUAL-LOCAL. The RO depresses then releases the Alarm & Shutdown Reset pushbutton.

Which ONE of the choices below completes the following statement?

In accordance with 1-ECA-0.0, the 1J EDG __(1)__ require a 60 second time delay prior to starting and the Mode Selector switch must be in the __(2)__ position to allow for an automatic start.

A. (1) will
   (2) MANUAL-REMOTE

B. (1) will
   (2) MANUAL-LOCAL

C. (1) will not
   (2) MANUAL-REMOTE

D. (1) will not
   (2) MANUAL-LOCAL

12. Given the following:

- Unit 1 is at 75% Power
- Channel III is selected as the controlling channel for Steam Flow, Feed Flow and 1st Stage Turbine Impulse Pressure
- Vital AC Bus 1-III is lost due to a bus fault

With no operator action, which ONE of the choices below describes the plant response to the loss of Vital AC Bus 1-III?

The Main FW Regulating Valves will **INITIALLY** modulate in the __(1)___ direction.
If the plant were to trip with the conditions above, then decay heat removal would be from the __(2)___.

A. (1) open
   (2) steam dumps

B. (1) open
   (2) steam generator PORVs

C. (1) close
   (2) steam dumps

D. (1) close
   (2) steam generator PORVs

13. Given the following:

- Unit 1 is in MODE 1
- 1-PT-86B, Quarterly DC Distribution System Test for Battery 1-II, has just been completed with the following results:
  - Station Battery 1-II battery terminal voltage is 118 VDC

Which ONE of the choices below completes the following statement?

In accordance with Technical Specification LCO 3.8.4, DC Sources - Operating, Station Battery 1-II ___(1)____ within limits for required battery terminal voltage.

and

The required battery limits ensure the battery has adequate storage capacity to carry the required load continuously for at least ___(2)____ .

A. (1) is
   (2) 2 hours

B. (1) is
   (2) 4 hours

C. (1) is not
   (2) 2 hours

D. (1) is not
   (2) 4 hours

14. Given the following:

- Unit 1 is at 75% power
- Both Unit 1 Service Water Pumps are running
- Unit 1 'A' Control Room Chiller is running
- The 1H Emergency Bus is lost due to a fault

In accordance with 0-AP-12, Loss of Service Water, and 0-AP-55, Loss of Control Room/Emergency Switchgear Room Air Conditioning, which ONE of the choices below identifies the Service Water Pump and Control Room Chiller that are required to be started?

A. Unit 2 'A' Service Water Pump
Unit 1 'B' Control Room Chiller

B. Unit 2 'A' Service Water Pump
Unit 1 'C' Control Room Chiller

C. Unit 2 'B' Service Water Pump
Unit 1 'B' Control Room Chiller

D. Unit 2 'B' Service Water Pump
Unit 1 'C' Control Room Chiller

15. Given the following:

- Unit 1 is in MODE 1
- 1-IA-C-1 is in automatic and not running
- Operators note IA and SA headers pressures at the following times:

	1310	1315	1320
IA Header Pressure	89 psig	75 psig	69 psig
SA Header Pressure	88 psig	77 psig	71 psig

Which ONE of the choices below completes the following statement?

In accordance with 1-AP-28, Loss of Instrument Air, actions are required to start 1-IA-C-1, Instrument Air compressor because of the failure to automatically start at the setpoint of __(1)__ psig.

and

In accordance with 1-AP-28, the earliest time a Reactor trip is required due to the conditions above is __(2)__ .

A. (1) 98
   (2) 1320

B. (1) 98
   (2) 1315

C. (1) 90
   (2) 1320

D. (1) 90
   (2) 1315

16. Given the following:

- Unit 1 Generator Hydrogen Bleed and Feed is in progress
- Generator Gas pressure is 60 psig
- Generator Megawatts: 1000 MWe
- A problem occurred with the Voltage Regulator in Auto

In accordance with the Generator Capability Curve, 1-SC-4.3, which ONE of the choices below is the **MAXIMUM** value for MVARs **OUT** that remains within the acceptable region for current Generator Gas pressure? (Reference Provided)

A. 330 MVARs

B. 390 MVARs

C. 475 MVARs

D. 560 MVARs

17. Given the following:

- Unit 1 was in MODE 1
- A Reactor Trip and Safety Injection occurred
- 1-ECA-1.2, LOCA Outside Containment, was entered following verification of outside containment inventory loss

In accordance with 1-ECA-1.2, which ONE of the choices below states:

(1) Which component is first directed to be isolated

and

(2) Which parameter will be used to evaluate if the break has been isolated?

A. (1) Low Head Safety Injection Pump
   (2) RVLIS Level

B. (1) Low Head Safety Injection Pump
   (2) RCS Pressure

C. (1) High Head Safety Injection Pump
   (2) RVLIS Level

D. (1) High Head Safety Injection Pump
   (2) RCS Pressure

18. Given the following:

- 1-ECA-1.1, Loss of Emergency Coolant Recirculation, is in progress
- RWST Level is 19% and lowering

In accordance with 1-ECA-1.1, which ONE of the choices below completes the following?

The HHSI pumps are required to be stopped when RWST level reaches __(1)__ .

and

The Quench Spray Pumps are required to be stopped when RWST level reaches __(2)__ .

A. (1) 8%
   (2) 3%

B. (1) 8%
   (2) 8%

C. (1) 3%
   (2) 3%

D. (1) 3%
   (2) 8%

19. Given the following:

- Reactor Power is stable at 60% power EOL
- Control Rods are in AUTO
- The Unit 1 RO reports the following parameter trends:
  - Reactor Power - Rising
  - RCS Tave - Rising
  - Pressurizer Level - Rising
  - Pressurizer Pressure - Rising
  - Axial Flux - Rising

Which ONE of the choices below answers the following?

Power Range Channel N-44 has failed __(1)__ .

and

In accordance with 1-AP-4.3, Malfunction of Nuclear Instrumentation, manual control of __(2)__ is required.

A. (1) High
   (2) Pressurizer Level

B. (1) High
   (2) Main Feed Reg Bypass Valves

C. (1) Low
   (2) Pressurizer Level

D. (1) Low
   (2) Main Feed Reg Bypass Valves

20. Given the following:

- Unit 2 is stable at 50% power
- Tave and Tref are matched
- Pressurizer Level is stable at program level
- All control systems are in their normal configuration
- The Pressurizer Level **Controller** 2-RC-LC-2459G fails to maximum output

Assuming no operator action, which ONE of the choices below describes the expected plant response.

A. Pressurizer level will lower and result in a letdown isolation

B. Pressurizer level will lower and then stabilize at minimum program level

C. Pressurizer level will rise and then stabilize at maximum program level

D. Pressurizer level will rise and result in an automatic reactor trip

21. Given the following:

- Unit 1 is at 100% power steady state
- N-16 Radiation Monitor readings are as follows:

	0000	0100	0200
A	2 GPD	2 GPD	3 GPD
B	60 GPD	75 GPD	115 GPD
C	3 GPD	3 GPD	4 GPD
Header	75 GPD	97 GPD	160 GPD

Assuming the N-16 Radiation Monitor readings stabilize at these current values (no additional increase)

Which ONE of the choices below completes the following?

In accordance with 1-AP-24, Steam Generator Tube Leak, __(1)__ is the earliest procedurally required time that Steam Generator Tube Leakage exceeded the limit which requires the Unit to be placed in MODE 3.

and

The requirement to shutdown is due to leakage from __(2)__ .

A. (1) 02:00
   (2) Steam Generator B only

B. (1) 02:00
   (2) all Steam Generators

C. (1) 01:00
   (2) Steam Generator B only

D. (1) 01:00
   (2) all Steam Generators

22. Given the following:

Current Conditions

- Unit 1 is at 20% power
- The balance of plant operator identifies condenser pressure is 4” Hg absolute and degrading

Based on current conditions, which ONE of the choices below completes the following statements?

An automatic turbine trip __(1)___ have occurred.

and

In accordance with 1-AP-14, Low Condenser Vacuum, a manual Reactor Trip __(2)___ required.

A. (1) should
   (2) is not

B. (1) should not
   (2) is not

C. (1) should
   (2) is

D. (1) should not
   (2) is

23. Given the following:

- Both Units are at 100%
- The 'A' Waste Gas Decay Tank (WGDT) is currently being released in accordance with 0-OP-23.2, WASTE GAS DECAY TANKS AND WASTE GAS DIAPHRAGM COMPRESSORS
- 1-GW-FCV-101, WGDT to Process Vents, is controlling in automatic
- The following annunciators are received on Unit 2:
  - 2B-A5 - PROCESS VENT VNT STACK A&B LOW RAD MON ALERT/RAD
  - 2B-B5 - PROCESS VENT VNT STACK A&B HI HI RADIATION
- The operator notes on the MGPI radiation monitor recorder that the process vent radiation release rate had risen rapidly and has subsequently lowered back to previous levels.

Which ONE of the choices below completes the following statements?

Based on these indications, the release was terminated when __(1)__ radiation monitor exceeded alarm limits and 1-GW-FCV-101 __(2)__ be opened without resetting the radiation monitors.

A. (1) 1-GW-RM-178-1, Process Vent RM Noble Gas Normal
   (2) can

B. (1) 1-GW-RM-178-1, Process Vent RM Noble Gas Normal
   (2) cannot

C. (1) 1-GW-RM-178-2, Process Vent RM Noble Gas Accident
   (2) can

D. (1) 1-GW-RM-178-2, Process Vent RM Noble Gas Accident
   (2) cannot

24. Given the following:

- Unit 1 has experienced a Steam Generator tube leak with high RCS activity from a fuel failure
- The Aux Building has rising radiation indications
- HP reports NO high airborne activity in the Aux Bldg and Turbine Bldg
- The Control Room Radiation Monitor, 1-RMS-RM-157, alarm was received
- 0-AP-5.1, Common Unit Radiation Monitoring System, is entered
- The Control Room is determined to be habitable
- The crew has reached the step to perform Main Control Room and Relay Room Emergency Ventilation Operation

Which ONE of the choices below completes the following statement?

In accordance with 0-AP-5.1, the crew is required to place the Control Room Emergency Ventilation System fans in service in the __(1)__ because __(2)___

A. (1) Recirculation Mode

(2) this isolates the Charcoal filter bypass and aligns all airflow through the Charcoal filter to reduce radioactivity in the control room.

B. (1) Recirculation Mode

(2) this provides filtered air to the Control Room envelope to maintain an acceptable environment for operating personnel.

C. (1) Pressurization Mode (Turbine Building Supply)

(2) this isolates the Charcoal filter bypass and aligns all airflow through the Charcoal filter to reduce radioactivity in the control room.

D. (1) Pressurization Mode (Turbine Building Supply)

(2) this provides filtered air to the Control Room envelope to maintain an acceptable environment for operating personnel.

25. Given the following:

- Unit 1 is at 100% power
- Annunciator D-C8, SMOKE DET SYS SMOKE INDICATION TROUBLE, alarms
- The Fire Protection Panel (1-EI-CB-97) has a red FIRE light lit for the control room

Which ONE of the choices below completes the following statements?

The detectors for the control room halon system are located in the control room __(1)___ area

and

Valid indications of a Control Room fire __(2)__ actuation of the control room halon system.

A. (1) overhead
   (2) require manual

B. (1) overhead
   (2) result in automatic

C. (1) under floor
   (2) require manual

D. (1) under floor
   (2) result in automatic

26. Given the following:

- Unit 1 is in MODE 1
- 1-AR-K-D2, Rad Monitor System Hi Rad Level, is in alarm
- Reactor Coolant Letdown Radiation, 1-CH-RI-128 is in high alarm

Which ONE of the choices below completes the following statement?

The main purpose of the Reactor Coolant Letdown Radiation Monitor, 1-CH-RI-128, is to detect __(1)__ .

and

Auto actuations __(2)__ occur if 1-CH-RI-128 reaches the HI-HI setpoint.

A. (1) fuel failure
   (2) will not

B. (1) fuel failure
   (2) will

C. (1) a crud burst
   (2) will not

D. (1) a crud burst
   (2) will

27. Given the following:

- Unit 1 experienced a reactor trip and loss of offsite power
- 1-ES-0.4, Natural Circulation Cooldown with Steam Void in Vessel (WITHOUT RVLIS), is in progress.
- Charging and Seal injection flow are equal to Letdown and Seal Leakoff flow
- During RCS depressurization to 800 psig, 1-AR-B-F6, PRZ HI LEVEL CH I-II-III annunciates
- Pressurizer level is 93%

Which ONE of the choices below states the required action per 1-ES-0.4 in response to these conditions and what is the basis for that action?

A. Energize pressurizer heaters;
   To prevent water relief out of the safety valves

B. Open Reactor Vessel Head Vents;
   To prevent water relief out of the safety valves

C. Energize pressurizer heaters;
   To promote reactor head cooling and collapse any existing void

D. Open Reactor Vessel Head Vents;
   To promote reactor head cooling and collapse any existing void

28. Given the following:

- Unit 1 is at 100% power
- Annunciator 1C-F2, RCP 1B OIL RES HI-LO LEVEL, alarms and is in progress.

In accordance with 1-OP-5.2, Reactor Coolant Pump Startup and Shutdown, which ONE of the choices below completes the following statements?

The trip criteria for 'B' RCP is met when RCP motor bearing temperature exceeds __(1)__ °F or **PROXIMITY** vibrations exceed __(2)__ mils.

A. (1) 225
   (2) 20

B. (1) 225
   (2) 5

C. (1) 195
   (2) 20

D. (1) 195
   (2) 5

29. Given the following:

- Unit 1 is in MODE 4, cooling down for a refueling outage
- RCS Temperature is 315°F
- RCS Pressure is 390 psig
- All RCPs are running
- The Crew is performing 1-OP-5.2, Reactor Coolant Pump Startup and Shutdown, to shutdown the 'B' RCP.
- Immediately following the shutdown of the 'B' RCP, the following indications are present
  - Seal Water Outlet Temperature - 157°F and stable
  - Pump Radial Bearing Temp - 124°F and stable
  - Thermal Barrier Outlet Temperature - 84°F and stable
  - C-G2, RCP 1B Standpipe Hi Level, is LIT
  - C-G8, RCP 1A-B-C Seal Leakoff Lo Flow, is LIT
  - 'B' RCP Seal Leakoff rate is 0.4 gpm

In accordance with 1-AP-33.1, Reactor Coolant Pump Seal Failure, which ONE of the choices below completes the following?

A __(1)__has occurred on the 'B' RCP

and

The 'B' RCP Standpipe Hi Level alarm __(2)__ be cleared by opening a drain valve in the control room.

A. (1) No. 1 Seal Failure
   (2) can

B. (1) No. 1 Seal Failure
   (2) can not

C. (1) No. 2 Seal Failure
   (2) can

D. (1) No. 2 Seal Failure
   (2) can not

30. Given the following:

- Unit 1 is operating at full power
- Letdown is in service
- 1-CH-HCV-1200B, 'B' Letdown Orifice valve is open with normal indicated flow
- 1C-C6, Demin Inlet Divert Hi Temp, is in alarm

With no operator action, which ONE of the choices below completes the following?

Based on the indications above, 1-CH-TE-1144, non-regenerative heat exhanger outlet temperature, has failed __(1)__

and

1-CH-TCV-1143, Low Pressure Letdown Line Divert Valve, is expected to bypass the ion exchange demineralizers when 1-CH-TE-1143 reaches __(2)__.

A. low
137°F

B. low
115°F

C. high
137°F

D. high
115°F

31. Given the following:

Initial Conditions

- RHR is in service
- RHR total flow is 3,300 gpm
- 1-RH-HCV-1758, RHR H/X Outlet, is approximately 50% open and flowing 1,500 gpm
- 1-RH-FCV-1605, RHR H/X Bypass, is in AUTOMATIC

Current Conditions

- RHR flow transmitter 1-RH-FT-1605 fails LOW.

Which ONE of the choices below completes the following statements?

As a result of this failure, total RHR flow will __(1)__ and flow through the RHR H/X will __(2)__.

A. (1) Lower
   (2) Rise

B. (1) Lower
   (2) Lower

C. (1) Rise
   (2) Rise

D. (1) Rise
   (2) Lower

32. Given the following:

Initial Indications

- Unit 2 is in MODE 5
- RCS temperature is 120°F and stable
- Pressurizer level is stable at 30% on VCT float
- 2-RH-P-1B is running with both RHR heat exchangers in service
- 2-RH-FCV-2605, RHR Heat Exchanger Bypass Valve, is controlling RHR flow at 3500 GPM in automatic
- 2-RH-HCV-2758, RHR Heat Exchanger Outlet, controller is set to 20%
- CC Flow to the RHR Heat Exchanger is 1200 gpm

Current Indications

- A total loss of instrument air pressure occurs **outside** and **inside** containment

Which ONE of the choices below completes the following statements?

RCS temperature will ultimately ___(1)___

and

Flow from the RHR system to letdown will ___(2)____.

A. (1) Lower
   (2) Rise

B. (1) Lower
   (2) Lower

C. (1) Rise
   (2) Rise

D. (1) Rise
   (2) Lower

33. Given the following:

- A Large Break LOCA has occurred on Unit 1
- Safety Injection has actuated
- The motor for 1-CH-MOV-1115D, High Head Safety Injection (HHSI) suction from the RWST, has torqued out and the valve has remained fully closed

Which ONE of the choices below completes the following statements?

HHSI pump suction will be from ___(1)____

and

HHSI pump suction ___(2)_____

A. (1) both the VCT and the RWST
(2) will be affected when the VCT empties.

B. (1) the RWST only
(2) will not be affected.

C. (1) the VCT only
(2) will be affected when the VCT empties.

D. (1) both the VCT and the RWST
(2) will not be affected.

34. Given the following:

- Unit 1 is at 100% power
- The Unit 1 RO notes the following Pressurizer Relief Tank (PRT) indication
  - PRT pressure: 10.5 psig and rising
  - PRT level: 70.5% and rising
  - PRT temp: 90°F and rising

Which ONE of the choices below completes the following?

__(1)__ is a possible cause for the indications above

and

following a high temperature condition, the PRT is drained to the __(2)__.

A. (1) Packing leakage from 1-RC-PCV-1455C, Przr PORV
   (2) PDTT

B. (1) Spurious Phase 'A' containment isolation
   (2) PDTT

C. (1) Packing leakage from 1-RC-PCV-1455C, Przr PORV
   (2) Gas Stripper

D. (1) Spurious Phase 'A' containment isolation
   (2) Gas Stripper

35. Given the following:

Initial Conditions:

- Unit 1 is in MODE 1
- 1-CC-P-1B is in operation
- 1-CC-P-1A is in standby

- Unit 2 is in MODE 5
- 2-CC-P-1B is tagged out for maintenance
- 2-CC-P-1A is in operation

Current Conditions:

- 2-CC-P-1A trips

Which ONE of the choices below completes the following statement?

Entry into an action statement for T.S. LCO 3.7.19, Component Cooling Water System, __(1)__ required for Unit 1

and

Considering **ONLY** T.S. LCO 3.7.19, entry into an action statement __(2)__ required for Unit 2.

A. (1) is
   (2) is not

B. (1) is
   (2) is

C. (1) is not
   (2) is not

D. (1) is not
   (2) is

36. Given the following:

- Unit 1 is in MODE 1
- 1-CC-P-1A, Component Cooling Pump A is running
- 1-CC-P-1B, Component Cooling Pump B is in standby
- An undervoltage occurs on 1H 4160 V Emergency Bus

Which ONE of the choices below answers the following question?

With NO operator action, 1 minute after the undervoltage occurred on the 1H 4160 V Emergency Bus, which Unit 1 CC Pumps will have received an auto start signal?

A. Both

B. 'A' only

C. 'B' only

D. Neither

37. Given the following:

- Unit 1 is at 100% Power
- The Master Pressurizer Pressure Controller is in automatic
- Pressurizer Pressure Control Transmitter 1-RC-PT-1444 has failed due to a leak in the bellows

Which ONE of the choices below completes the following statements?

Assuming no operator action is taken, **ACTUAL** Pressurizer Pressure will **INITIALLY** ___(1)____ and a Reactor Trip ___(2)____ occur.

A. (1) rise
(2) will

B. (1) rise
(2) will not

C. (1) lower
(2) will

D. (1) lower
(2) will not

38. Given the following:

- Unit 1 is in MODE 1
- Reactor power is 40%
- 1-RC-PCV-1456, Pressurizer Power Operated Relief Valve fails open
- Operator action to close or isolate the Pressurizer PORV flowpath has been unsuccessful

With no further operator action, which ONE of the choices below states which Reactor Protection System Trip Setpoint will be exceeded **FIRST** and the basis for the setpoint?

A. Overtemperature ΔT
Protects against violating the DNBR limit

B. Overtemperature ΔT
Ensures less than 1% clad strain

C. Pressurizer Pressure Low
Protects against violating the DNBR limit

D. Pressurizer Pressure Low
Ensures less than 1% clad strain

39. Given the following:

- Unit 1 is at a hold point following a refueling outage
- 1-OP-2.1, Unit Startup from MODE 2 to MODE 1, is in progress and all steps are completed for current conditions
- Control Rods are in Manual with Tave and Tref matched
- Power Range NIs indicate as follows:

  N-41 32%
  N-42 31%
  N-43 28%
  N-44 31%

- Power Range N-44 then fails low.

Which ONE of the choices below completes the following statements?

The current status of Reactor Trip System Interlock P-8 Permissive, PR<30% 1 Loop Fail Trips Blkd, Annunciator P-F1 is __(1)__ .

and

The Reactor Protection System function currently protecting the core against a positive reactivity excursion is __(2)__ .

A. (1) NOT LIT
   (2) Intermediate Range Neutron Flux

B. (1) NOT LIT
   (2) Power Range Neutron Flux - High

C. (1) LIT
   (2) Intermediate Range Neutron Flux

D. (1) LIT
   (2) Power Range Neutron Flux - High

40. Given the following:

Initial Conditions

- Unit 2 is at 100% power
- Containment Pressure Protection Instrument channel 2-LM-PT-200B (Ch. II) failed and was declared inoperable
- The crew entered 2-AP-3, Loss of Vital Instrumentation
- Bistables for 2-LM-PT-200B have been placed in their required position IAW 2-MOP-55.75
    - The Safety Injection bistable has been placed in TRIP
    - The Containment Depressurization bistable has been placed in BYPASS

Current Conditions

- Vital bus I has just lost power.

Which ONE of the choices below describes the current status of Safety Injection and Containment Depressurization?

Automatic Safety Injection actuation __(1)__ occurred

and

Automatic Containment Depressurization actuation __(2)__ occurred.

A. (1) has
   (2) has

B. (1) has
   (2) has not

C. (1) has not
   (2) has

D. (1) has not
   (2) has not

41. Given the following:

•Unit 1 is in MODE 3

•A loss of the 1H emergency bus occurs

Which ONE of the choices below describes starting the Containment Air Recirculation Fans (CARF) after the 1H emergency bus is restored?

A. The 'A' and 'C' CARFs can be started immediately.

B. The 'A' CARF cannot be started until after 30 seconds.
The 'C' CARF can be started immediately.

C. The 'A' CARF can be started immediately.
The 'C' CARF cannot be started until after 30 seconds.

D. The 'A' and 'C' CARFs cannot be started until after 30 seconds.

42. Given the following:

- Unit 1 was at 75% power when a large break LOCA occurred
- 1-QS-LT-100A (RWST level ch. III) and 1-QS-LT-100C (RWST level ch. I) are not responding to RWST level change due to being frozen during extreme cold weather

Which ONE of the choices below completes the following statements?

Due to this failure, Recirc Spray pumps __(1)___ auto start

and

The automatic swapover to containment suction __(2)___ occur when the appropriate RWST level setpoint is reached.

A. (1) will
(2) will

B. (1) will
(2) will not

C. (1) will not
(2) will

D. (1) will not
(2) will not

43. Given the following:

- Unit 1 was at 100% power when a Reactor Trip/Turbine Trip occurred
- 1-AR-B-A8, Loop 1A-B-C Tavg Deviation, is LIT
- Current RCS Loop Tavg indications:

Loop A	Loop B	Loop C
563°F	552°F	561°F

Which ONE of the choices below describes the expected indicated position of the condenser steam dump valves?

A. Banks 1, 2, 3, and 4 valves indicate full open

B. Banks 1, 2, and 3 valves indicate full open; bank 4 valves indicate midposition

C. Banks 1 and 2 valves indicate full open; banks 3 and 4 valves are closed

D. Bank 1 valves indicate full open; bank 2 valves indicate midposition; banks 3 and 4 valves are closed

44. Given the following

Initial Conditions:
- Unit 1 is operating at 20% power
- Feedwater Pump A is in service

Current Conditions:
- 50 seconds ago, A high-high level occurred in the 5A Feedwater Heater due to a tube rupture
- A Turbine Trip and Reactor Trip occurred
- RCS Tave is 551° F and lowering

Which ONE of the choices below completes the following statement?

Assuming no operator action, in response to the above conditions, Main Feedwater Pump A is __(1)___

and

the Feed Reg **Bypass** Valves ___(2)____ receive an automatic closure signal.

A. (1) running
   (2) will

B. (1) running
   (2) will not

C. (1) tripped
   (2) will

D. (1) tripped
   (2) will not

45. Given the following:

- Unit 2 is at 100% power
- A loss of offsite power occurs
- No Safety Injection signal is present

Which ONE of the choices below completes the following statement?

The motor-driven Auxiliary Feed Water (AFW) pumps will automatically start _____ seconds after the associated emergency bus voltage is restored?

A. 0

B. 15

C. 20

D. 25

46. Given the following:

- Battery Charger 1-I has failed due to an overcurrent fault
- 1-AR-H-B1, Battery Chgr 1-I Trouble is LIT
- 1-AR-H-A1, Vital Bus 1-I Invert Trouble, is NOT LIT
- In accordance with the Annuciator Response Procedure an operator has been dispatched
    - At 1-VB-INV-01, Vital Bus Distribution Panel 1-I Inverter, "Low AC Output Voltage" is NOT LIT

Which ONE of the choices below completes the following statement?

Vital AC Bus 1-I is currently being supplied from___(1)____ and the vital bus indications will be verified normal by checking__(2)___.

A. (1) Voltage Regulating Transformer 1-I
   (2) Amps in the Main Control Room

B. (1) Voltage Regulating Transformer 1-I
   (2) Amps at the Inverter Panel, 1-VB-INV-01

C. (1) Station Battery 1-I
   (2) Amps at the Inverter Panel, 1-VB-INV-01

D. (1) Station Battery 1-I
   (2) Amps in the Main Control Room

47. Given the following:

- Unit 1 is in MODE 4 following a refueling outage
- Circulating Water Pumps 1-CW-P-1A and 1-CW-P-1B are in service
- 1-CW-P-1C was just started in accordance with 1-OP-48.2, Operation of Circulating Water System
- The associated 'C' CW pump discharge MOV failed to open fully and pump amps are indicating high
- The local operator has been directed to trip the 'C' CW pump at the breaker in accordance with 1-OP-48.2 attachment 2, Manual Operation of Circulating Water Pump Breakers
- The Control Switch for 1-CW-P-1C has been placed in the Pull-To-Lock position in the control room

Which ONE of the choices below completes the following statement?

The pump cannot be stopped from the control room due to a __(1)__ minute time delay interlock after closing the breaker

and

The operator in the control room __(2)__ be able to monitor the breaker operation using the green (open) breaker position light.

A. (1) 4
   (2) will

B. (1) 4
   (2) will not

C. (1) 5
   (2) will

D. (1) 5
   (2) will not

48. Given the following:

- Unit 1 is at 100% power steady state
- Alarm 1-AR-H-B1, Battery Chgr 1-I Trouble, annunciates
- An operator is dispatched to battery charger 1-I
- The operator discovers the negative ground light is NOT LIT on the 1-I DC Bus Panel.

Which ONE of the choices below completes the following statement?

A blown ground indicating bulb on the DC Bus panel __(1)__ cause the Battery Charger 1-I trouble alarm.

If a ground exists, the cause can be determined by swapping loads to DC Bus __(2)__ one at a time until the grounded load is identified.

A. (1) can not
   (2) 1-II

B. (1) can
   (2) 1-II

C. (1) can not
   (2) 1-III

D. (1) can
   (2) 1-III

49. Given the following:

- The Shift Manager has directed entry into 1-AP-20, Operation from the Auxiliary Shutdown Panel
- Step 5 of 1-AP-20 is in progress with both Emergency Busses energized by offsite power
- Step 5 continues:
  " Place CRE switch for any Emergency Bus energized by offsite power to EMERGENCY while continuing with this procedure"

Which ONE of the choices below completes the following statement?

The Contol Room Emergency (CRE) switch is located __(1)___ .

and

Regarding manual operation, with the CRE switch in EMERGENCY, the associated EDG can ___(2)___ .

A. (1) at the Auxiliary Shutdown Panel
   (2) be started from the Main Control Room and the EDG Room

B. (1) at the Auxiliary Shutdown Panel
   (2) only be started in the EDG Room

C. (1) in the EDG Room
   (2) only be started in the EDG Room

D. (1) in the EDG Room
   (2) be started from the Main Control Room and the EDG Room

50. Given the following:

- Unit 1 is in MODE 1 at 100% power
- 1H EDG is in auto
- 1H-EG-A1, "Starting Air Pressure Low" local alarm is lit
- 1-EG-TK-1HA, Air Receiver Air pressure is 175 psig
- 1-EG-C-1HA, 1H EDG Air Compressor AC motor failed to start

Which ONE of the choices below states the expected diesel air system response?

The 1H EDG Air System Lister Diesel will ___(1)___ .

and

When the Lister Diesel air compressor discharge pressure rises to 250 psig __(2)___.

A. (1) start automatically due to low air receiver pressure
   (2) the associated pressure switch opens signaling the compressor to stop

B. (1) start automatically due to low air receiver pressure
   (2) the unloader valves open causing the compressor to discharge to atmosphere

C. (1) not start automatically and requires manual alignment
   (2) the associated pressure switch opens signaling the compressor to stop

D. (1) not start automatically and requires manual alignment
   (2) the unloader valves open causing the compressor to discharge to atmosphere

51. Given the following:

- 1-AR-K-D2, Rad Monitor System Hi Rad Level is in alarm
- 1-AR-K-D4, Rad Monitor Syst Hi-Hi Rad Level is in alarm
- 1-AP-5, Unit 1 Radiation Monitoring System, is initiated for process radiation monitor 1-SS-RM-124, 'C' SG Blowdown Rad Monitor

Which ONE of the choices below states what caused this condition and in accordance with 1-AP-5, what actions are taken to reset the radiation monitor?

A. Radiation Monitor Loss of Power
   Notify the Instrument Dept to reset the trip relays

B. Radiation Monitor Loss of Power
   Remove then reinstall the Radiation Monitor fuses

C. Radiation Detector Failure
   Notify the Instrument Dept to reset the trip relays

D. Radiation Detector Failure
   Remove then reinstall the Radiation Monitor fuses

52.

Which ONE of the choices below states what Service Water (SW) equipment actuations occur **DIRECTLY** as a result of a Unit-1 Containment Depressurization Actuation (CDA) signal?

1. Unit-1 SW to Cont. Air Recirc. Coolers Valves close
2. Unit-2 SW Spray Array Bypass MOVs close
3. 'A' SW Header supply MOVs to the CCHXs close
4. 'B' SW Header supply MOVs to the CCHXs close
5. Unit-1 SW to Recirc. Spray HXs MOVs open
6. Unit-1 SW Spray Array MOVs open

A. 1; 3; 5

B. 2; 3; 6

C. 1; 4; 5

D. 2; 4; 6

53. Given the following:

- Instrument Air compressors are being swapped in accordance with 1(2)-OP-46.1, Operation of 1(2)-IA-C-1, Instrument Air Compressor
- 1-IA-C-1 Instrument Air Compressor is running in HAND
- Instrument Air header pressure is 110 psig
- 2-IA-C-1 Instrument Air Compressor was just transferred from HAND to AUTO control

Which ONE of the choices below describes the Instrument Air system 12 minutes later?

Instrument air pressure will _____ .

A. be higher and both compressors will be running

B. be higher and only one compressor will be running

C. remain unchanged and both compressors will be running

D. remain unchanged and only one compressor will be running

54. Given the following:

- A loss of Main Feedwater occurred
- Unit 1 is in MODE 3 and cooling down using Aux. Feedwater
- RCS Tavg is 495°F
- AFW flow is throttled to 100 gpm to each SG
- An instrument air line break occurs in the motor driven AFW pump house

Which ONE of the choices below completes the following statement?

When all IA in the AFW pump house is depressurized, including the seismic air flasks,
AFW flow to the 'B' SG will __(1)___
and
AFW flow to the 'C' SG will __(2)___.

A. (1) rise
   (2) rise

B. (1) rise
   (2) remain the same

C. (1) remain the same
   (2) rise

D. (1) remain the same
   (2) remain the same

55. Given the following:

- Unit 1 is at 30% power
- Chilled water is supplying cooling to containment
- 2-CD-MR-1, Mechanical Chiller, trips due to a short in the motor
- At time 1600, Containment air temperature is 95°F and rising at 5°F/hour

Which ONE of the choices below completes the following statements?

Due to the loss of containment cooling, **INDICATED** containment partial air pressure will __(1)___.

and

If cooling to containment cannot be restored, the limit of T.S. LCO 3.6.5, Containment Air Temperature, will be reached at time __(2)__. (Assume a constant temperature rise)

A. (1) Rise
(2) 1800

B. (1) Rise
(2) 2000

C. (1) Lower
(2) 1800

D. (1) Lower
(2) 2000

56.

Which ONE of the choices below completes the following statement?

Low Temperature Overpressure protection requires pressure relief and limiting coolant input capability to a maximum of __(1)__ charging pump(s).

and

Over the life of the reactor vessel, the effect of neutron exposure accumulation will result in the reactor vessel Reference Temperature Nil Ductility Temperature (RT_{NDT}) __(2)__ .

A. (1) one
(2) rising

B. (1) one
(2) lowering

C. (1) two
(2) rising

D. (1) two
(2) lowering

57. Given the following:

Initial Conditions

- Unit 1 reactor startup is in progress
- Control bank "B" demand position is 28 steps
- All "B" control bank IRPIs read 28 steps ± 3 steps

Current Conditions

- An IRPI for "B" control bank, rod D6, is noted to be slowly lowering on the control board and PCS

Which ONE of the choices below completes the following statement?

Alarm A-F1, CMPTR ALARM ROD DEV/SEQ, will **FIRST** alarm when the IRPI indication for control rod D6 reaches __(1)__ steps

and

Alarm A-G2, RPI ROD BOT ROD DROP, __(2)__ alarm when the IRPI indication for rod D6 lowers below 20 steps.

A. (1) 17
   (2) will not

B. (1) 17
   (2) will

C. (1) 3
   (2) will not

D. (1) 3
   (2) will

58. Given the following:

- Unit 1 is operating at 100% power steady state
- A Core Exit Thermocouple in Quadrant 1, B05, is currently failed and reading 1300°F

Which ONE of the choices below completes the following statement?

The minimum required number of operable CETCs is __(1)__ per quadrant.

and

If an accident occurs, entry into 1-FR-C.1, Response to Inadequate Core Cooling, is based on __(2)__ reading greater than 1200°F.

A. (1) 4
   (2) any valid CETC

B. (1) 4
   (2) the average of the 5 highest CETCs

C. (1) 5
   (2) any valid CETC

D. (1) 5
   (2) the average of the 5 highest CETCs

59.

Which ONE of the choices below describes (1) how NAOH solution is added to the Containment Building during a design bases accident and (2) why?

A. (1) Gravity-fed to the suction of the Outside Recirculation Spray pumps.
   (2) To aid in the prevention of hydrogen formation.

B. (1) Gravity-fed to the suction of the Outside Recirculation Spray pumps.
   (2) To aid in the removal of radioactive iodine.

C. (1) Gravity-fed to the suction of the Quench Spray pumps.
   (2) To aid in the prevention of hydrogen formation.

D. (1) Gravity-fed to the suction of the Quench Spray pumps.
   (2) To aid in the removal of radioactive iodine.

60. Given the following:

- Unit 1 is in MODE 5 for a mid cycle outage to repair the 'C' RCP seal
- Unit 2 is in a refueling outage with fuel offload operations in progress
- Containment purge supply and exhaust are in service on <u>both</u> units

Which ONE of the choices below states the effects of a Unit 2 manipulator crane radiation monitor Hi-Hi alarm on containment purge supply and exhaust?

A. All purge supply and exhaust fans shut down.

   The Unit 2 purge supply and exhaust isolation valves shut. The purge supply and exhaust fans will NOT re-start until the radiation monitor alarm is reset.

B. All purge supply and exhaust fans shut down.

   The Unit 2 purge supply and exhaust isolation valves shut. The purge supply and exhaust fans will re-start.

C. All purge supply and exhaust fans shut down.

   Unit 1 and Unit 2 purge supply and exhaust isolation valves shut.

D. The purge supply and exhaust fans remain running.

   Unit 2 purge supply and exhaust isolation valves shut.

61. Given the following:

Initial Conditions

- Both Units are operating at 100% power
- Fuel Building Radiation Automatic Interlock Key switch is in ENABLE

Current Conditions:

- A rupture occurs on the Spent Fuel Pool Heat Exchanger
- Fuel Pool Bridge Radiation Monitor, 1-RM-RMS-153, indication is rising
- Spent Fuel Pool level is lowering slowly
- All fuel movement in the Spent Fuel Pool has been stopped

Which ONE of the choices below completes the following statement?

1-RM-RMS-153 radiation increase to the HI-HI setpoint will cause automatic actuations to occur __(1)__ .

and

The Spent Fuel Pool Cooling System is designed to prevent Spent Fuel Pool level from lowering below a minimum of __(2)___ feet above the fuel.

A. (1) immediately
   (2) 10

B. (1) immediately
   (2) 23

C. (1) after a 2 minute time delay
   (2) 10

D. (1) after a 2 minute time delay
   (2) 23

62.

Which ONE of the choices below describes the function and purpose of the pictured Fuel Handling tool? (Reference Provided)

A. This tool is used to transfer new fuel assemblies for inspection or movement between shipping containers, new fuel racks or the new fuel elevator.

B. This tool is used to transfer new or spent fuel assemblies within the spent fuel pool for spent fuel pool shuffling or video inspection.

C. This tool is used to transfer spent fuel between the the transfer system upender, the spent fuel storage racks and the new fuel elevator in the full down position.

D. This tool is used to transfer a Rod Control Cluster from one fuel assembly to another fuel assembly in the spent fuel pool.

63. Given the following:

- Unit 1 is at 20% power
- The Main Feed Reg Valves (MFRVs) are in AUTO
- All 3 SG water levels have lowered
- All 3 MFRV outputs have risen

Which ONE of the choices below identifies the cause of these indications?

A. The 4A feedwater heater high level divert valve failed open

B. The running main condensate pump suction strainer clogged

C. The 3A feedwater heater normal level control valve failed closed

D. The selected Turbine First Stage Pressure transmitter failed low

64. Given the following:

Initial Conditions
- Both Units are in MODE 1
- A low level liquid waste tank is being discharged into the Clarifier

Current Conditions:
- The following alarms are received:
  - K-D4, Rad Monitor Syst Hi-Hi Rad Level
  - K-D2, Rad Monitor System Hi Rad Level
  - X-G4, Holdup Tank Influent Valve Closed, alarms at the Liquid Waste Panel

Which ONE of the choices below identifies:

(1) the radiation monitor that caused 1-LW-FCV-100, Clarifier Holdup Tank Influent Valve, to close

and

(2) the expected response from this valve automatically closing?

A. (1) 1-RM-LW-110, Clarifier Inlet Radiation Monitor;
(2) Steam Generator Low Capacity Blowdown Pump will receive a trip signal

B. (1) 1-RM-LW-110, Clarifier Inlet Radiation Monitor;
(2) Clarifier Discharge Pump will receive a trip signal

C. (1) 1-RM-LW-111, Clarifier Outlet Radiation Monitor;
(2) Steam Generator Low Capacity Blowdown Pump will receive a trip signal

D. (1) 1-RM-LW-111, Clarifier Outlet Radiation Monitor;
(2) Clarifier Discharge Pump will receive a trip signal

65. Given the following:

- Unit 1 is at 100% power
- While taking logs, the reactor operator observes the following instrument air (IA) indications:
  - IA pressure outside containment is 106 psig and slowly cycling ± 3 psig
  - IA pressure inside containment is 90 psig and cycling ± 5 psig
- No operator actions have been taken

Which ONE of the choices below completes the following statement?

The failure is __(1)__.

and

If instrument air pressure is lost inside containment it __(2)__ result in a loss of Reactor Coolant Pump Seal Injection.

A. (1) an Instrument Air line leak inside containment
   (2) will not

B. (1) an Instrument Air line leak inside containment
   (2) will

C. (1) 1-IA-TV-102B, containment IA isolation valve, failed closed
   (2) will not

D. (1) 1-IA-TV-102B, containment IA isolation valve, failed closed
   (2) will

66. Given the following:

- It is currently 06:30 on July 10
- A Reactor Operator is the on-coming watchstander and is preparing to assume his duties
- He has been offsite since July 2

Which ONE of the choices below completes the following statement?

In accordance with OP-AA-100, Conduct of Operations, to complete his turnover the on-coming RO is required to review applicable logs and temporary orders since at least _____?

A. July 2

B. July 3

C. July 7

D. July 9

67. Given the following:

- Unit 1 is at 100% power **steady state** conditions

Which ONE of the choices below completes the following statement?

In accordance with the Technical Requirements Manual for Reactor Coolant Chemisty, TR 3.4.1, the Dissolved Oxygen limit is less than or equal to __(1)__ and at current conditions __(2)__ is used to maintain dissolved oxygen within limits.

A. (1) 0.10 ppm
   (2) Hydrazine

B. (1) 0.10 ppm
   (2) Hydrogen

C. (1) 1.5 ppm
   (2) Hydrazine

D. (1) 1.5 ppm
   (2) Hydrogen

68. Initial Conditions:

- Unit 1 and Unit 2 are operating at 100% power steady state
- 34.5 kV Bus 4 in the switchyard is out of service

Current Conditions:

- An earthquake occurs
- Both Units trip coincident with a loss of 34.5 kV bus 5

Which ONE of the choices below describes the Unit 1 and Unit 2 Reactor Coolant Pump (RCP) status?

A. All RCPs are running except Unit 2 'A' and 'B'

B. Only Unit 1 'C' and Unit 2 'C' RCPs are running

C. All RCPs are running except Unit 1 'C' and Unit 2 'C'

D. Only Unit 1 'A' and Unit 2 'A' RCPs are running

69. Given the following:

Unit 1 is in MODE 1

'A' SI Accumulator:
- Water Volume 7590 gallons
- Nitrogen Pressure 600 psig
- Boron Concentration 2450 ppm

'B' SI Accumululator:
- Water Volume 7550 gallons
- Nitrogen Pressure 650 psig
- Boron Concentration 2500 ppm

'C' SI Accumulator:
- Water Volume 7750 gallons
- Nitrogen Pressure 550 psig
- Boron Concentration 2775 ppm

In accordance with Technical Specification LCO 3.5.1, Accumulators, which ONE of the choices below states SI accumulator parameters that individually would require entry into a **1 HOUR** Required Action statement for restoration based on the parameters above? (Disregard entry into LCO 3.0.3)

A. 'A' SI Accumulator boron concentration
   'C' SI Accumulator nitrogen pressure

B. 'B' SI Accumulator water volume
   'C' SI Accumulator nitrogen pressure

C. 'B' SI Accumulator water volume
   'C' SI Accumulator boron concentration

D. 'A' SI Accumulator boron concentration
   'C' SI Accumulator boron concentration

70. Given the following:

- Fuel failure has resulted in elevated radiation in the Auxiliary Building
- An Operator has been dispatched to an area where radiation levels are 178 mrem/hr at 30 cm.
- The operator is reviewing the RWP for entry into the area.

Which ONE of the choices below completes the following statement?

The posting for this area will indicate ___(1)___.

and

In accordance with Technical Specification Chapter 5, Administrative Controls, this area requires the entryway__(2)__.

A. (1) Radiation Area
(2) to be barricaded and conspicuously posted

B. (1) High Radiation Area
(2) to be provided with a locked or continuously guarded door or gate

C. (1) High Radiation Area
(2) to be barricaded and conspicuously posted

D. (1) Radiation Area
(2) to be provided with a locked or continuously guarded door or gate

71. Initial Conditions:

- Unit 1 is in a refueling outage
- Fuel off-load is in progress

Current Conditions:

- A report is received that a spent fuel assembly being removed from the core was significantly damaged during transit and has been placed in a safe location in containment
- Large Bubbles were seen escaping from the damaged fuel assembly
- NO radiation alarms have been received from the radiation monitors associated with the manipulator crane or the refueling area

Based on the current conditions, which ONE of the choices below describes the actions required by 0-AP-30, Fuel Failure During Handling?

A. Manual Control Room Bottle Air Dump and Isolation are required; Containment evacuation is required

B. Manual Control Room Bottle Air Dump and Isolation are required. Containment evacuation is NOT required

C. Manual Control Room Bottle Air Dump and Isolation are NOT required. Containment evacuation is required

D. Manual Control Room Bottle Air Dump and Isolation are NOT required. Containment evacuation is NOT required

72. Given the following:

- A radioactive leak has occured in the CVCS system
- Radiation Protection has determined area conditions are 10 mRem/hour
- A North Anna operator is assigned to isolate the leak in the area
- This operator currently has a TEDE of 1.95 Rem for the calender year
- Leak isolation will require 2 hours of time

Which ONE of the choices below completes the following statement?

This operator ___(1)___ exceed the Dominion Administrative Dose Limit.

and

In accordance with EPIP-4.04, Emergency Personnel Radiation Exposure, the dose limit during an emergency for life-saving activities is __(2)__ TEDE.

A. (1) will not
   (2) 25 Rem

B. (1) will not
   (2) 10 Rem

C. (1) will
   (2) 25 Rem

D. (1) will
   (2) 10 Rem

73. Given the following:

- An event has occurred on Unit 2
- RCS Pressure is 400 psig and lowering rapidly
- Pressurizer Level is offscale low
- Containment Pressure is 27 psia and rising
- Containment Radiation is rising rapidly
- Main Steamline Pressure is 605 psig lowering slowly
- 2-E-0, Reactor Trip or Safety Injection, has just been entered
- The STA had previously left the Control Room and is not present

Which ONE of the choices below completes the following statement?

In accordance with OP-AP-104, Emergency and Abnormal Operating Procedures, the U-2 SRO will direct the __(1)___ to monitor the Critical Safety Function Status Trees

and

Monitoring and implementation of CSF Status Trees is required to be initiated __(2)___.

A. (1) Backboards Operator (Step 7 Qualified NLO)
   (2) during the performance of 2-E-0

B. (1) Backboards Operator (Step 7 Qualified NLO)
   (2) upon transition out of 2-E-0

C. (1) U-1 Reactor Operator (RO-B)
   (2) during the performance of 2-E-0

D. (1) U-1 Reactor Operator (RO-B)
   (2) upon transition out of 2-E-0

74. Given the following:

Refueling Water Storage Tank level is currently 80% and a large break loss of coolant accident is in progress. Assume the following pumps are running at the specified flow rates.

- 'A' and 'B' low head safety injection pumps (2500 gpm each)
- 'B' and 'C' high head safety injection pumps (200 gpm each)
- 'A' and 'B' quench spray pumps (1900 gpm each)

Which ONE of the choices below completes the following statement?

Disregarding the volume of the chemical addition tank, automatic swapover to cold leg recirculation will occur in _____ minutes. (Reference Provided)

A. 29

B. 34

C. 38

D. 41

75. Given the following:

- 1-E-3, Steam Generator Tube Rupture is in progress
- 'A' SG has been identified as the ruptured Steam Generator
- The crew is at step 4 to "Monitor Ruptured SG Level"

Which ONE of the choices below completes the following statement?

In accordance with 1-E-3, AFW flow is required until ruptured Steam Generator narrow range level is greater than ___(1)___ because ___(2)___ .

A. (1) 18%
(2) this ensures the steam generator steam bubble is not in contact with the steam generator U-tubes

B. (1) 18%
(2) the narrow range instrumentation is required to be on scale to accurately monitor the primary leak rate

C. (1) 11%
(2) this ensures the steam generator steam bubble is not in contact with the steam generator U-tubes

D. (1) 11%
(2) the narrow range instrumentation is required to be on scale to accurately monitor the primary leak rate