U. S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information	
Name:	
Date: 01/22/2018	Facility / Unit: Brunswick Unit 1/2
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

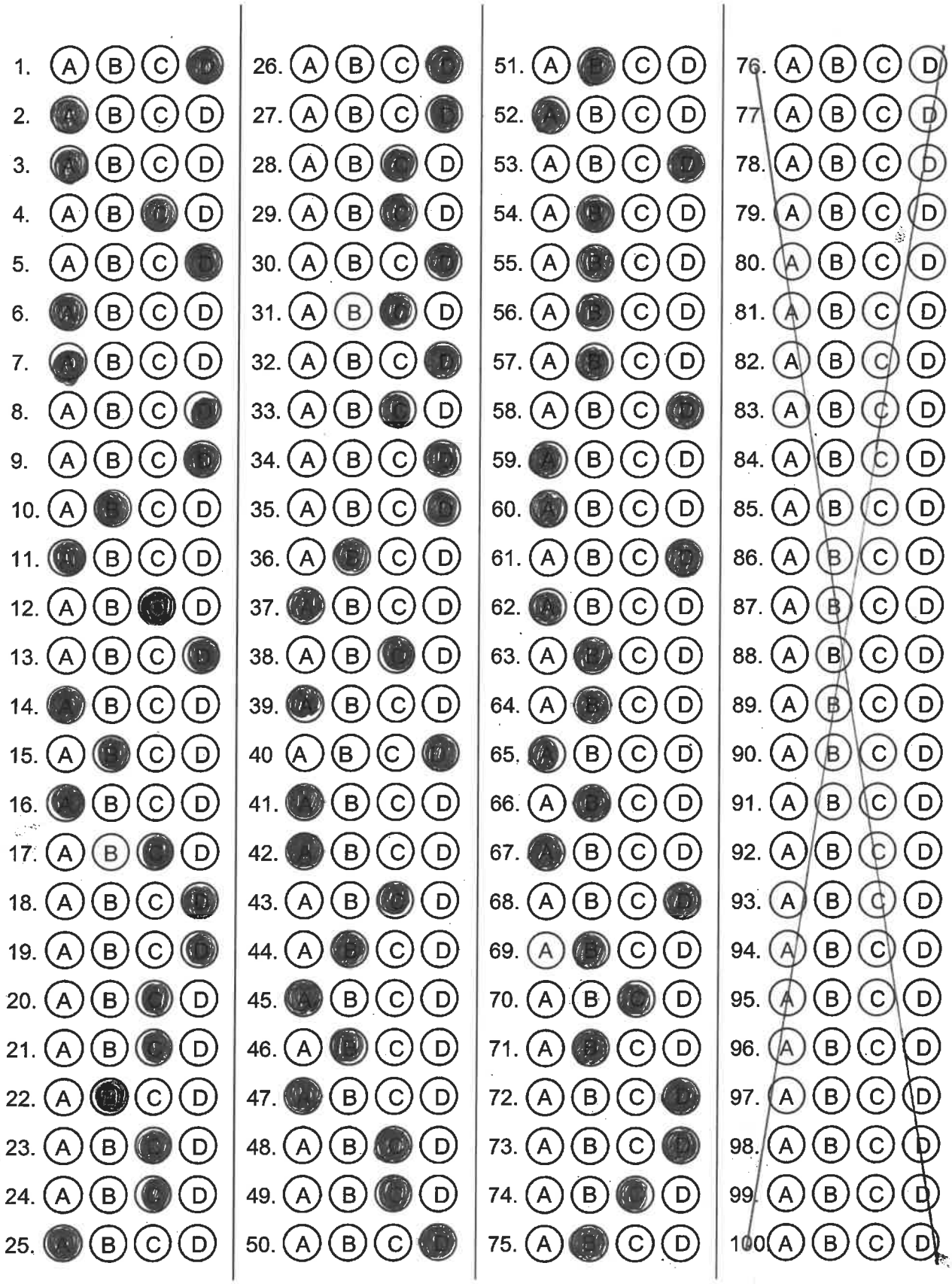
Applicant Certification

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

January 2019 NRC RO Written Exam Answer Key



RO Written Exam Reference Index

1. 0EOP-01-UG, User's Guide, Attachments:

   5 (Drywell Spray Initiation Limit)
   8 (Core Spray NPSH Limit)
   13 (Core Spray Vortex Limit)
   25 (Unit 1 RPV Level at LL4)
   27 (Unit 1 RPV Level at LL5)

2. 0EOP-03-SCCP, Table SC-3, Area Radiation Limits

3. LL-30024 SH0006, 125/250 Volt DC System Control Building Distribution Panel 3A

1. Unit Two is performing a shutdown IAW 0GP-05, Unit Shutdown.

   Which one of the following completes both statements below?

   An insert rod block will **first** be enforced when reactor power lowers below __(1)__.

   Use of the Emergency Rod In switch __(2)__ bypass the enforcement of the insert rod block.

   A. (1) 27.8%
      (2) will

   B. (1) 27.8%
      (2) will NOT

   C. (1) 19.1%
      (2) will

   D. (1) 19.1%
      (2) will NOT

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

   To maintain adequate net positive suction head (NPSH), the Unit Two recirc pumps will runback to __(1)__ when __(2)__ flow is <16.4% of rated.

   A. (1) Limiter #1
      (2) total feedwater

   B. (1) Limiter #1
      (2) individual feed pump suction

   C. (1) Limiter #2
      (2) total feedwater

   D. (1) Limiter #2
      (2) individual feed pump suction

3. With Unit One at 100% power, 125 VDC Switchboard 3A Circuit 3 trips open. Subsequently, the following conditions exist:

   Drywell pressure is 2 psig
   Reactor water level is 90 inches and lowering
   Reactor pressure is 400 psig and lowering

   [Reference Provided]

   Which one of the following completes both statements below?

   RHR Loop A pumps __(1)__ running.

   E11-F015A, Inboard Injection Valve, __(2)__ automatically open.

   A. (1) are
      (2) will

   B. (1) are
      (2) will NOT

   C. (1) are NOT
      (2) will

   D. (1) are NOT
      (2) will NOT

4. Unit Two is in MODE 3 following a scram from 100% power.
RWCU is lined up for rejecting to the condenser hotwell.

Which one of the following completes both statements below?

IAW the hardcard, Post Scram Level Control – High RPV Level, maintain pump flow less than or equal to 290 gpm and __(1)__ less than 130°F by throttling G31-F033, RWCU Reject Flow Control Vlv.

If 135°F is exceeded, the G31-F004, RWCU Outboard Isol Vlv, __(2)__ auto close.

A. (1) Regen HX Outlet temperature
(2) will

B. (1) Regen HX Outlet temperature
(2) will NOT

C. (1) Filter Inlet temperature
(2) will

D. (1) Filter Inlet temperature
(2) will NOT

5. RHR Loop B is operating in Shutdown Cooling (SDC) on Unit Two with the following parameters:

Reactor pressure	10 psig
Reactor mode switch	Shutdown
MSIVs	Closed
2B RHRSW Pump	Operating
2B RHR Pump	Operating
2A NSW Pump	Operating
2B NSW Pump	Under clearance

Conventional Service Water Pumps are aligned to CSW Header

Subsequently, A-02 (2-9) *RHR SW Pmp II - Suct Hdr Press Low,* is received due to a trip of the 2A NSW pump.

Which one of the following completes both statements below?

The 2B RHRSW pump will trip __(1)__.

With no operator action, a mode change __(2)__ occur.

A. (1) immediately
   (2) will

B. (1) immediately
   (2) will NOT

C. (1) after 10 seconds
   (2) will

D. (1) after 10 seconds
   (2) will NOT

6. Following a scram on Unit Two, HPCI is operating in pressure control IAW the hardcard, HPCI Pressure Control in EOPs.
0EOP-01-SEP-10, Circuit Alteration Procedure, has NOT been implemented.

Subsequently, A-01 (1-5) *Suppression Chamber Lvl Hi-Hi, (red bar)* alarms.

Which one of the following completes both statements below?

The E41-F041 and E41-F042, Torus Suction Valves, __(1)__ automatically open.

The E41-F008, Bypass to CST Valve, __(2)__ automatically close.

A. (1) will
(2) will

B. (1) will
(2) will NOT

C. (1) will NOT
(2) will

D. (1) will NOT
(2) will NOT

7. Unit One is at 100% power when a LOCA occurs.

   Current indications are as follows:

Reactor pressure	350 psig
Reactor level	110 inches
Drywell pressure	2.2 psig

   Which one of the following completes both statements below?

   E21-F005A, Core Spray A Inboard Injection Valve, __(1)__ open.

   Core Spray Loop A flow, as indicated on the P601 panel indicator E21-FI-R601A, Pump 1A Discharge Flow, is __(2)__.

   A. (1) is
      (2) 0 gpm

   B. (1) is
      (2) 500 gpm

   C. (1) is NOT
      (2) 0 gpm

   D. (1) is NOT
      (2) 500 gpm

8. Unit Two is performing an emergency depressurization during an ATWS.

   IAW ATWS Procedure, which one of the following identifies when Core Spray can be used for injection?

   A. When level is below 90 inches.

   B. When TAF cannot be maintained.

   C. When LL3 cannot be maintained.

   D. When LL4 cannot be maintained.

9. Unit One is at 100% power with DG1 under clearance.
Subsequently, a LOOP with an ATWS occurs.

The C41-CS-S1 (SLC Pump A & B) switch is placed in the Pump A/B run position.
Initial SLC tank level is approximately 2400 gallons.

Which one of the following completes both statements below?

SLC Explosive Squib Valve, C41-F004A, __(1)__ fire .

IAW 1OP-05, Standby Liquid Control System Operating Procedure, Section 6.1.2, Manual Initiation of SLC, it will take approximately __(2)__ to completely empty the SLC Storage Tank.

A. (1) will
(2) 29 minutes

B. (1) will
(2) 58 minutes

C. (1) will NOT
(2) 29 minutes

D. (1) will NOT
(2) 58 minutes

10. Unit One is at 30% rated thermal power when A-05 (6-7), *Turb CV Fast Clos/SV Trip Bypass,* alarms due to the failure of both RPS Channel A pressure switches.

    Which one of the following completes both statements below?

    If a load reject were to occur (actuation of the power/load unbalance circuit), a half scram __(1)__ occur.

    IAW APP A-05 (6-7), reactor power is required to be reduced to less than __(2)__ rated thermal power within two hours.

    A. (1) will
       (2) 20.6%

    B. (1) will
       (2) 26%

    C. (1) will NOT
       (2) 20.6%

    D. (1) will NOT
       (2) 26%

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

The RBM Channel A will automatically bypass itself when its primary reference _____ is below the RBM low power setpoint.

A. APRM 1

B. APRM 2

C. APRM 3

D. APRM 4

12. A Unit One reactor shutdown is in progress.
All IRMs on **range 3** reading between 15 and 20.
IRM B detector is failing downscale.

Which one of the following completes both statements below?

IAW APP A-05 (1-4) *IRM Downscale,* the alarm setpoint is __(1)__ ± 1.5 on the 125 scale.

When the IRM downscale alarm is received, a rod block __(2)__ be generated.

A. (1) 3
(2) will

B. (1) 3
(2) will NOT

C. (1) 5
(2) will

D. (1) 5
(2) will NOT

13. Which one of the following completes the statement below concerning the IRM System?

The __(1)__ passes only one of two sets of frequencies depending on the IRM range selector switch between ranges __(2)__.

A. (1) Pulse Preamplifier
   (2) 5 to 6

B. (1) Pulse Preamplifier
   (2) 6 to 7

C. (1) Voltage Preamplifier
   (2) 5 to 6

D. (1) Voltage Preamplifier
   (2) 6 to 7

14. Unit Two is in MODE 5 with the RPS shorting links removed.

Which one of the following identifies the condition that will cause an actuation of RPS?

A. SRM C fails upscale

B. SRM Channel C period meter fails upscale

C. SRM C drawer switch S1 placed in standby

D. Loss of SRM C High voltage power supply

15. A plant startup is in progress on Unit Two. A control rod block occurs with the following nuclear instrument indications:

SRM	Counts	Position
A	95	Mid Position
B	190	Mid Position
C	$6x10^4$	Full In
D	155	Mid Position

IRM	Counts	Range
A	25/125	3
B	60/125	2
C	35/125	3
D	15/125	3
E	65/125	2
F	55/125	3
G	30/125	3
H	25/125	3

Which one of the following completes the statement below?

This rod block can be cleared by __(1)__ or it can be bypassed by ranging __(2)__ to range 3.

A. (1) inserting SRM A
   (2) IRM B

B. (1) inserting SRM A
   (2) IRM E

C. (1) withdrawing SRM C
   (2) IRM B

D. (1) withdrawing SRM C
   (2) IRM E

16. A startup is being performed on Unit Two with power currently at 20%. APRMs 1 and 2 have the following number of operable LPRM inputs:

Level	A	B	C	D
APRM 1	4	3	5	4
APRM 2	5	4	2	6

Which one of the following completes both statements below?

APRM 1 __(1)__ generate a rod block signal.

APRM 2 __(2)__ generate a rod block signal.

A. (1) will
(2) will

B. (1) will
(2) will NOT

C. (1) will NOT
(2) will

D. (1) will NOT
(2) will NOT

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

The RCIC **minimum flow** line discharges to:

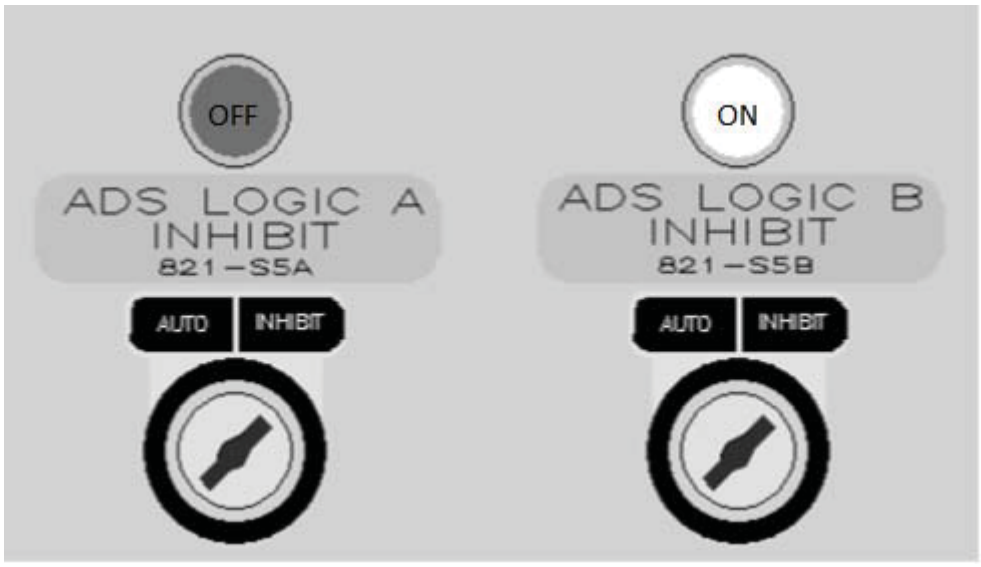
A. HPCI

B. RHR Loop A

C. RHR Loop B

D. Core Spray Loop B

18. Unit One was operating at 100% power with Core Spray Pump 1B under clearance when a small break LOCA occurs. The ADS switches have been aligned as shown.



Annunciator A-03 (3-2) *Auto Depress Relays Energized* (red bar) is illuminated.

Based on the plant indications above, which one of the following identifies the ADS response if reactor water level remains less than LL-3 for 2 minutes?

A. ADS will not auto initiate.

B. ADS will auto initiate if 1A Core Spray Pump is running.

C. ADS will auto initiate if both RHR A Pump and RHR C Pump are running.

D. ADS will auto initiate if both RHR B Pump and RHR D Pump are running.

19.

Unit Two is at 100% power when A-01 (3-7), *Suppression Chamber Lvl Hi/Lo (*blue bar), illuminates.

CAC-LI-4177, Supp Pool Level, indicator on the left, indicates as shown.

Which one of the following completes both statements below?

The alarm and indications are consistent with a __(1)__ suppression pool level.

Entry into PCCP __(2)__ required.

A. (1) low
   (2) is

B. (1) low
   (2) is NOT

C. (1) high
   (2) is

D. (1) high
   (2) is NOT

20. Which one of the following completes both statements below concerning the Unit Two Group I isolation signal for Main Steam Line Flow High not in RUN.

This isolation signal is required on Unit Two because its bypass valve capacity results in inadequate margin to the __(1)__.

High steam line flow sensed in at least __(2)__ steam lines will auto close all MSIVs.

A. (1) LHGR limit
   (2) two

B. (1) LHGR limit
   (2) three

C. (1) MCPR
   (2) two

D. (1) MCPR
   (2) three

21. Unit Two is operating at 100% power.

Which one of the following completes the statement below?

2B RHR Pump is powered from Bus __(1)__ which is powered from BOP Bus __(2)__.

A. (1) E2
   (2) 1C

B. (1) E2
   (2) 1D

C. (1) E4
   (2) 2C

D. (1) E4
   (2) 2D

22. A Unit One core shuffle is in progress with the mode switch in REFUEL.
All control rods are fully inserted.
The refueling bridge is located in the Spent Fuel Pool.
The hoist is at the normal up position.

The Refuel SRO gives the following directions:

1) Move the bridge to core location 31-18.
2) Lower the main hoist to fuel bundle 31-18.
3) Close the grapple to latch fuel bundle 31-18.
4) Raise fuel bundle 31-18 to the normal up position.

Which one of the following identifies when the A-05 (2-2) *Rod Out Block* (yellow bar), will **first** illuminate during the performance of the steps above?

A. Step 1.

B. Step 2.

C. Step 3.

D. Step 4.

23. Unit One is at 100% power when a Group I isolation occurs. Reactor pressure peaks at 1145 psig during the transient.

Which one of the following completes the statement below?

____ SRV amber lights on the RTGB will illuminate.

A. Four

B. Seven

C. Eight

D. Eleven

24. Given the following conditions:

Reactor pressure	1130 psig
Torus pressure	5.3 psig

[Reference Provided]

Which one of the following completes both statements below?

The expected ERFIS tail pipe temperature for an open SRV is __(1)__.

The device that triggers annunciation of A-03 (1-10) *Safety / Relief Valve Open* (red bar) is the __(2)__.

A. (1) ~227°F
   (2) sonic detector

B. (1) ~227°F
   (2) temperature recorder

C. (1) ~320°F
   (2) sonic detector

D. (1) ~320°F
   (2) temperature recorder

25. Unit Two was at 100% power when a reactor scram occurred and the main turbine/generator was manually tripped due to a reactor scram.

Which one of the following completes both statements below?

The Motor Suction Pump will auto start when the main shaft oil pump suction pressure **first** lowers to __(1)__.

IAW 2OP-26, Turbine System Operating Procedure, Section 6.2.2, Shutdown After Unplanned Trip, the TBCCW To Main Turb Oil Cooler temperature controller setpoint is required to be adjusted to maintain bearing inlet oil temperature at __(2)__.

A. (1) 10 psig
   (2) 90°F

B. (1) 10 psig
   (2) 110°F

C. (1) 15 psig
   (2) 90°F

D. (1) 15 psig
   (2) 110°F

26. Unit Two startup is in progress with reactor power at 30%.
RFP B is in service with the FW-FV-47, RFP B Recirc Vlv, open with its control switch in the AUTO position.

Which one of the following completes both statements below?

The FW-FV-47, RFP B Recirc Vlv, will **auto close** when feedwater flow **first** increases above __(1)__.

If UA-03 (4-1), *RFP B Turbine Tripped* (red bar), alarms, the FW-FV-47, RFP B Recirc Vlv, indication will be __(2)__.

A. (1) 2.45 Mlbm/hr
(2) red

B. (1) 2.45 Mlbm/hr
(2) green

C. (1) 6.25 Mlbm/hr
(2) red

D. (1) 6.25 Mlbm/hr
(2) green

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

The Unit Two HPCI system initiation logic is powered from 125 VDC panel:

A. 1A

B. 2A

C. 3A

D. 4A

28. Unit One is operating at 80% power.
A reactor water level control malfunction has caused the recirc pumps to runback to Limiter 1.

Which one of the following identifies the current speed of the Recirc Pumps?

A. 48%

B. 45%

C. 34%

D. 20%

29. Primary containment venting of the torus on Unit One is being performed IAW 1OP-10, Standby Gas Treatment System Operating Procedure, Section 6.3.2, Venting Containment Via SBGT, with primary containment pressure lowering.

Subsequently, UA-03 (4-5), *Process Rx Bldg Vent Rad Hi* (blue bar), is received.

Which one of the following completes both statements below?

The Standby Gas Train Fans "Fan On" light __(1)__ be illuminated.

Primary containment pressure __(2)__ continue to lower.

A. (1) will
   (2) will

B. (1) will
   (2) will NOT

C. (1) will NOT
   (2) will

D. (1) will NOT
   (2) will NOT

30. Which one of the following identifies the normal source of power to Caswell Beach Bus A?

A. Common A

B. Southport Feeder

C. Town Creek 230 kV Feeder

D. Unit One 230 kV Transformer Bus

31. Which one of the following completes both statements below?

The Stack Radiation Monitor is capable of being provided with power from either unit via a(an) __(1)__ transfer device.

If the Stack Rad Monitor Power Transfer Device has/was transferred to alternate, __(2)__ is supplying power to the Stack Radiation Monitor.

A. (1) automatic
   (2) Unit One

B. (1) automatic
   (2) Unit Two

C. (1) manual
   (2) Unit One

D. (1) manual
   (2) Unit Two

32. Unit Two has lost the 2B-2 battery and the 2B-2 battery charger.

Which one of the following completes both statements below?

Division II 250 VDC loads __(1)__ operate.

Unit Two Battery Bus __(2)__ is de-energized.

A. (1) will still
(2) N/P

B. (1) will still
(2) N

C. (1) will NOT
(2) N/P

D. (1) will NOT
(2) N

33. DG2 was running in Control Room Manual during performance of the 24-month load test portion of 0PT-12.2B, No. 2 Diesel Generator Monthly Load Test, when it tripped due to high lube oil temperature.

Which one of the following completes both statements below concerning the operation of DG2?

The high lube oil temperature trip setpoint is __(1)__.

If a LOOP occurs, with the high lube oil temperature condition still present, DG2 __(2)__ auto start.

A. (1) 180°F
   (2) will

B. (1) 180°F
   (2) will NOT

C. (1) 190°F
   (2) will

D. (1) 190°F
   (2) will NOT

34. Unit Two is operating at 100% power when Process Reactor Building Ventilation Radiation Monitor A (D12-RM-K609A) fails upscale.

NOTE: Valve Nomenclature
2A-BFIV-RB, RB Vent Inbd Supply Isol Valve
2B-BFIV-RB, RB Vent Otbd Supply Isol Valve
2C-BFIV-RB, RB Vent Inbd Exhaust Isol Valve
2D-BFIV-RB, RB Vent Otbd Exhaust Isol Valve

Which one of the following completes both statements below?

Reactor building ventilation __(1)__ isolation valves will isolate.

Standby Gas Treatment train(s) __(2)__ will auto start.

A. (1) inboard ONLY
   (2) A ONLY

B. (1) inboard ONLY
   (2) A & B

C. (1) inboard & outboard
   (2) A ONLY

D. (1) inboard & outboard
   (2) A & B

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

The alternate power supply to the Electric Fire Pump is Bus:

A. E1

B. E2

C. E3

D. E4

36. Unit Two is at 100% and no cooling water is available to the vital header.

Temperatures are rising in the reactor building and area temperatures in the RHR and Core Spray rooms are at 102°F

Which one of the following completes both statements below concerning the status of RHR and Core Spray room coolers?

RHR room coolers __(1)__ running.

Core Spray room coolers __(2)__ running.

A. (1) are
   (2) are

B. (1) are
   (2) are NOT

C. (1) are NOT
   (2) are

D. (1) are NOT
   (2) are NOT

37. Unit Two is operating at 100% power when a jet pump failure occurs.

IAW 2AOP-4.0, Low Core Flow, which one of the following completes the statement below?

Total core flow from Process Computer Point __(1)__ will be inaccurate because it will indicate __(2)__ than actual core flow.

A. (1) U2CPWTCF
   (2) higher

B. (1) U2CPWTCF
   (2) lower

C. (1) U2NSSWDP
   (2) higher

D. (1) U2NSSWDP
   (2) lower

38. A complete loss of off site power occurs with a loss of all DGs.

IAW 1(2)EOP-01-SBO, Station Blackout, which one of the following completes both statements below?

The battery chargers are required to be in operation within __(1)__.

IF either division battery charger cannot be restored, THEN load strip the affected battery within __(2)__.

A. (1) 30 minutes
   (2) 60 minutes

B. (1) 30 minutes
   (2) 2 hours

C. (1) 60 minutes
   (2) 60 minutes

D. (1) 60 minutes
   (2) 2 hours

39. The following battery chargers have no power: 2A-1, 2A-2, 2B-1, and 2B-2.
Battery Charger 2A-1 DC Output Breaker is tripped open.

Which one of the following completes both statements below?

The Bus 2A-1 DC voltage meter, 2-BAT-VM-737 on Panel XU-1, will indicate __(1)__.

IAW 0AOP-39.0, Loss of DC Power, loads must be removed to maintain battery voltage greater than or equal to a **minimum** of __(2)__.

A. (1) 0 VDC
(2) 105 VDC

B. (1) 0 VDC
(2) 129 VDC

C. (1) Bus 2A-1 DC voltage
(2) 105 VDC

D. (1) Bus 2A-1 DC voltage
(2) 129 VDC

40. Unit One is performing a unit shutdown for a refueling outage.
A rapid shutdown is NOT desired.

IAW 1OP-26, Turbine System Operating Procedure, Section 6.2.1, Normal Shutdown, which one of the following completes both statements below?

Prior to tripping the main turbine, power must be reduced to __(1)__.

IF the bypass valves do NOT open when the Emergency Trip System trip pushbutton is depressed, THEN the **initial** plant response is a(n) __(2)__ in core power.

A. (1) 23 - 26%
(2) decrease

B. (1) 23 - 26%
(2) increase

C. (1) 100 - 110 MWe
(2) decrease

D. (1) 100 - 110 MWe
(2) increase

41. Which one of the following completes both statements below?

IAW RSP, the reactor is shutdown without boron under all conditions if __(1)__ rod(s) is(are) fully withdrawn.

If TS LCO 3.1.1, Shutdown Margin, is not met in MODE 3 following a scram, the required action is to fully insert all insertable control rods __(2)__.

A. (1) ONLY one
   (2) immediately

B. (1) ONLY one
   (2) within one hour

C. (1) NO more than 10
   (2) immediately

D. (1) NO more than 10
   (2) within one hour

42. Unit One has been operating at 100% power for the last 12 months.
RVCP is being implemented following a LOOP.

Which one of the following completes both statements below?

IAW RVCP, Step RC/P-3, IF any SRV is cycling, THEN open SRVs until pressure drops to __(1)__.

The RCIC System has a capacity approximately equal to the reactor water boil-off rate __(2)__ minutes after shutdown.

A. (1) 950 psig
(2) 20

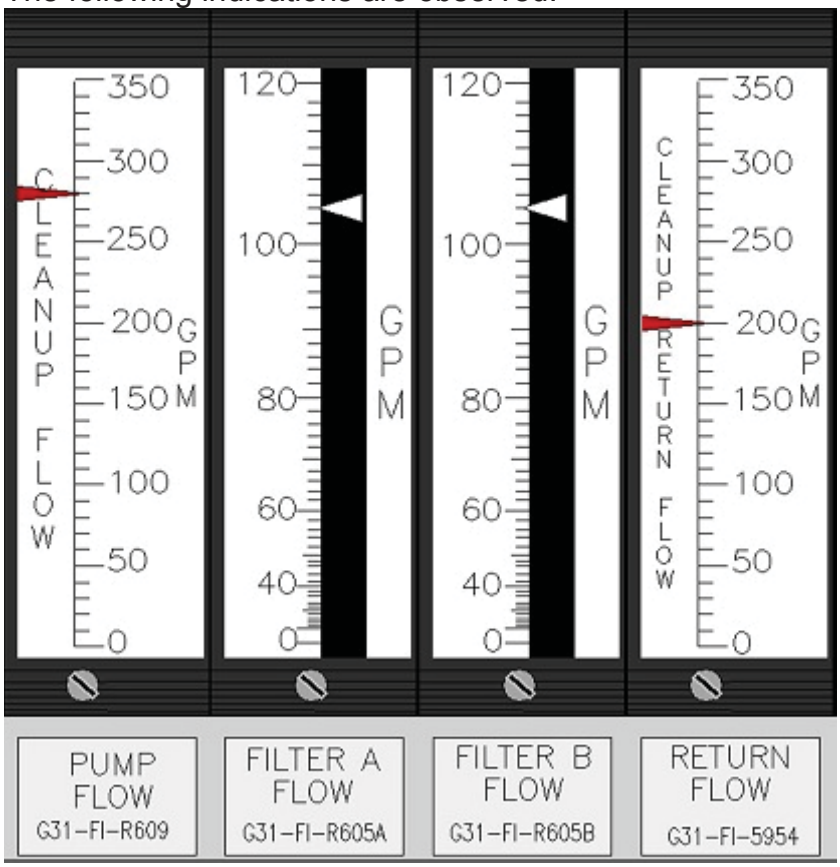
B. (1) 950 psig
(2) 60

C. (1) 1050 psig
(2) 20

D. (1) 1050 psig
(2) 60

43. Unit Two is performing a RWCU blowdown to radwaste IAW Post Scram Level Control – High RPV Level Hardcard.

The following indications are observed:



Which one of the following identifies the RWCU reject flowrate?

A. 8 gpm

B. 72 gpm

C. 80 gpm

D. 176 gpm

44. Following a line break in the drywell, Unit One conditions are:

Drywell pressure	8 psig
Drywell temperature	220°F
Torus pressure	7 psig
Torus level	-28 inches

[Reference Provided]

Which one of the following completes the statement below IAW PCCP?

Initiation of __(1)__ Spray is required, which must be terminated at __(2)__.

A. (1) Torus
(2) 1.7 psig

B. (1) Torus
(2) 2.5 psig

C. (1) Drywell
(2) 1.7 psig

D. (1) Drywell
(2) 2.5 psig

45. Unit Two is operating at 100% power when a loss of feedwater heating transient occurs.

Which one of the following completes the statement below IAW Unit Two Tech Specs?

The MCPR safety limit for this condition is __(1)__.

IAW 2AOP-03.0, Positive Reactivity Addition, IF the current operating point is outside the analyzed region of the Power/Flow Map, THEN action must be taken to restore operation to within the analyzed region within __(2)__.

A. (1) 1.07
   (2) 15 minutes

B. (1) 1.07
   (2) 4 hours

C. (1) 1.09
   (2) 15 minutes

D. (1) 1.09
   (2) 4 hours

46. 0AOP-32.0, Plant Shutdown From Outside Control Room, is being performed. SRV B was the last SRV to be closed while performing a cooldown, no SRVs are currently open.

Which one of the following completes both statements below?

SRV __(1)__ is the next SRV to be opened IAW the sequence established in 0AOP-32.0.

IAW 0AOP-32.0 the cooldown rate __(2)__ allowed to exceed 100°F/Hr.

A. (1) E
   (2) is

B. (1) E
   (2) is NOT

C. (1) G
   (2) is

D. (1) G
   (2) is NOT

47. Unit Two is operating at 100% power.
UA-01 (1-9) *Conv Hdr Serv Water Press-Low* (yellow bar) alarms.
SW to TBCCW Hxs Outbd and Inbd Isolation valves, SW-V3 and SW-V4, have automatically throttled.
Conventional Service water header pressure is 35 psig, due to a leak.

IAW 0AOP-19.0, Conventional Service Water System Failure, which one of the following completes both statements below?

The standby CSW pump selected to the CSW header, auto-started at __(1)__.

A reactor scram __(2)__ required.

A. (1) 40 psig
(2) is

B. (1) 40 psig
(2) is NOT

C. (1) 42 psig
(2) is

D. (1) 42 psig
(2) is NOT

48. Unit Two is at 15% power with the following conditions:

Division I PNS header pressure	90 psig
Division II PNS header pressure	93 psig
Div I Backup N2 supply pressure	98 psig
Div II Backup N2 supply pressure	90 psig

Which one of the following completes both statements below?

The Backup Nitrogen System __(1)__ designed to supply pneumatics to the Suppression Chamber to Drywell Vacuum Breakers (A-J).

A reactor scram __(2)__ required IAW 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures.

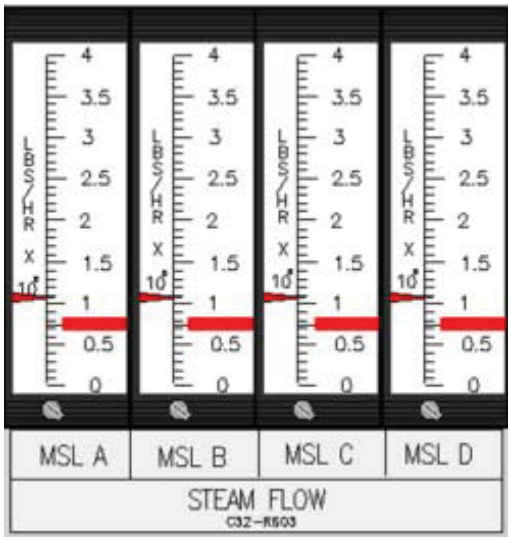
A. (1) is
   (2) is

B. (1) is
   (2) is NOT

C. (1) is NOT
   (2) is

D. (1) is NOT
   (2) is NOT

49. Following a manual reactor scram on Unit Two from 35% power, the OATC places the MODE switch to the STARTUP/HOT STANDBY position with the following Main Steam Line Flow indications:



Which one of the following completes both statements below?

The B32-F019 and F020, Reactor Recirc Sample Inboard and Outboard Isolation Valves, ___(1)___ auto close.

IAW 0OI-37.3, Reactor Scram Procedure Basis Document, RVCP ___(2)___ required to be entered.

A. (1) will
   (2) is

B. (1) will
   (2) is NOT

C. (1) will NOT
   (2) is

D. (1) will NOT
   (2) is NOT

50. Unit Two is in Cold Shutdown with both Reactor Recirculation pumps shutdown. SDC has been lost. The crew has determined that Alternate SDC using the SRVs is required.

Which one of the following completes the statement below for establishing alternate shutdown cooling with the SRVs IAW 0AOP-15.0, Loss of Shutdown Cooling?

RPV Level must be raised and maintained __(1)__, which can be verified on the __(2)__ Level instrument.

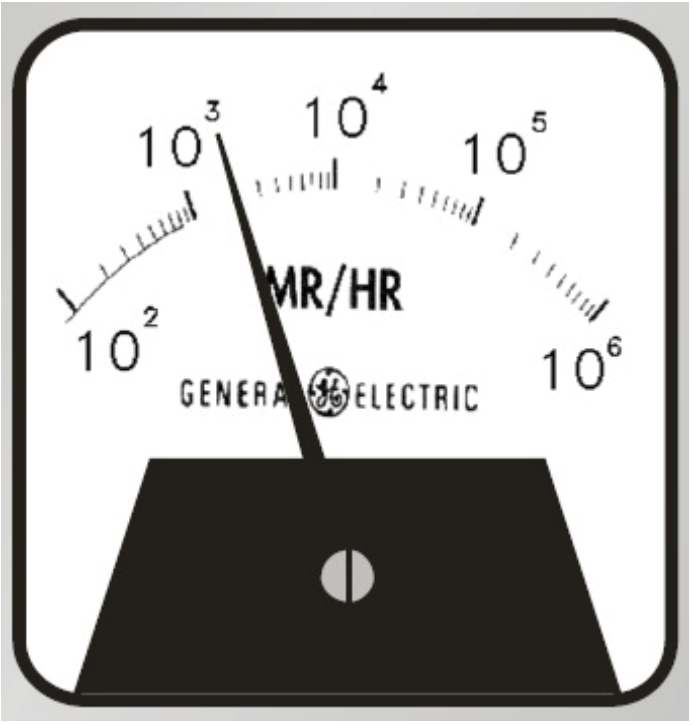
A. (1) 200 to 220 inches
   (2) N026, Wide Range

B. (1) 200 to 220 inches
   (2) N027, Shutdown Range

C. (1) greater than 254 inches
   (2) N026, Wide Range

D. (1) greater than 254 inches
   (2) N027, Shutdown Range

51. Unit Two is in a refueling outage performing the first fuel shuffle.
A fuel bundle is inadvertently dropped in the "cattle chute".
UA-03 (4-7) *Area Rad New Fuel Storage High* alarms.
The following indications are observed for ARM Channel 2-28, U-2 RX Bldg Between RX and Fuel Storage Pool Elev 117 Ft:



[Reference Provided]

Which one of the following completes both statements below for this condition?

SCCP __(1)__ required to be entered.

0AOP-5.0, Radioactive Spills, High Radiation, and Airborne Activity, states that Control Room Emergency Ventilation is required to be in service within __(2)__.

A. (1) is
(2) 15 minutes

B. (1) is
(2) 20 minutes

C. (1) is NOT
(2) 15 minutes

D. (1) is NOT
(2) 20 minutes

52. Unit Two was operating at 100% power with torus cooling in service for HPCI testing.

Subsequently, a LOCA occurs, with the following plant conditions:

Drywell pressure	1.2 psig and rising
RPV water level	65 inches and stable
RPV pressure	400 psig and slowly lowering
Torus Temperature	125°F and rising

Which one of the following completes both statements below?

As drywell pressure rises, the E11-F024A, Torus Cooling Isolation Valve, will **first** auto close at __(1)__.

IAW PCCP T/T leg, Containment Cooling (Table M-3, Minimum Containment Cooling Requirements) is required to be established before torus water temperature reaches __(2)__.

A. (1) 1.7 psig
   (2) 150°F

B. (1) 1.7 psig
   (2) 190°F

C. (1) 2.7 psig
   (2) 150°F

D. (1) 2.7 psig
   (2) 190°F

53. Unit Two is executing RVCP following a Group I isolation from 100% power. HPCI is being operated in pressure control (per hardcard).

IAW 2OP-19, High Pressure Coolant Injection System Operating Procedure, which one of the following completes both statements below?

In order to lower reactor pressure, the E41-F008, Bypass To CST Vlv, is required to be throttled in the __(1)__ direction.

IF E41-F008 is throttled too far in this direction, THEN HPCI __(2)__.

A. (1) open
   (2) speed may be reduced below 2100 RPM

B. (1) open
   (2) steam flow may exceed the ability of RCIC to maintain reactor vessel level

C. (1) closed
   (2) speed may be reduced below 2100 RPM

D. (1) closed
   (2) steam flow may exceed the ability of RCIC to maintain reactor vessel level

54. Unit One is operating at 100% power and the crew has entered 0AOP-14.0, Abnormal Primary Containment Conditions, due to a leaking SRV.

Which one of the following completes both statements below?

Primary Containment Control Procedure (PCCP) is required to be entered when the torus water temperature **first** exceeds __(1)__.

When PCCP is entered, 0AOP-14.0 is required to be __(2)__.

A. (1) 95°F
(2) performed concurrently

B. (1) 95°F
(2) exited

C. (1) 105°F
(2) performed concurrently

D. (1) 105°F
(2) exited

55. Unit One is spraying the drywell IAW 0EOP-01-SEP-02, Drywell Spray Procedure, with the following containment parameters:

Drywell temperature	335°F and lowering (peaked at 340°F)
Drywell pressure	5 psig and lowering (peaked at 12 psig)

[Reference Provided]

Which one of the following completes the statement below IAW SEP-02 and PCCP?

Drywell sprays:

A. may continue until torus level reaches -21 inches

B. may continue until drywell pressure reaches 2.5 psig

C. are required to be immediately stopped because the Drywell Spray Initiation Limit has been violated

D. are required to be immediately stopped because Emergency Depressurization is required

56. Following a LOCA on Unit Two, the 2A and 2B Core Spray pumps are injecting from their normal suction source, and plant conditions are as follows:

Reactor water level	55 inches and rising
Reactor pressure	150 psig
Torus temperature	220°F
Torus pressure	10.5 psig
Torus level	-43 inches
CST level	11 feet
2A Core Spray pump flow	5000 gpm
2B Core Spray pump flow	2800 gpm

[Reference Provided]

Which one of the following completes both statements below?

Core Spray pump(s) __(1)__ damage is expected due to __(2)__.

A. (1) 2A ONLY
   (2) air entrainment

B. (1) 2A ONLY
   (2) pump cavitation

C. (1) 2A and 2B
   (2) air entrainment

D. (1) 2A and 2B
   (2) pump cavitation

57. During an accident, Unit Two plant conditions are:

Reactor water level	-35 inches, lowering
RPV pressure	50 psig
Injection sources	Core Spray A injection at 5000 gpm
	Core Spray B injection at 5000 gpm

Which one of the following completes the statement below IAW the definition of "Adequate Core Cooling" in 0OI-37.4, Reactor Vessel Control Procedure Basis Document?

For the above conditions, __(1)__ Core Spray pump(s) is/are required, as long as level remains above __(2)__.

A. (1) ONLY one
   (2) LL-5

B. (1) ONLY one
   (2) the elevation of the jet pump suctions

C. (1) both of the
   (2) LL-5

D. (1) both of the
   (2) the elevation of the jet pump suctions

58. Unit Two is operating at 100% power when the following alarm is received:

UA-05 (6-7), *Rx Bldg Static Press Diff - Low* (blue bar)
Reactor building pressure has stabilized at a negative value.

Which one of the following completes both statements below?

Reactor Building Supply and Exhaust Fans __(1)__ tripped.

SCCP __(2)__ required to be entered.

A. (1) have
(2) is

B. (1) have
(2) is NOT

C. (1) have NOT
(2) is

D. (1) have NOT
(2) is NOT

59. Unit Two is performing SCCP due to a primary leak causing rising water level in the HPCI and South RHR areas. The following timeline for water levels in these areas is as follows:

Time	Event
1300	HPCI area at Max Safe Operating Level.
1305	South RHR area at Max Normal Operating Level
1310	HPCI area lowers to Max Normal Operating Level
1315	South RHR area at Max Safe Operating Level
1320	HPCI area again at Max Safe Operating Level

Which one of the following completes both statements below?

IAW SCCP, the **earliest** time that an Emergency Depressurization is required is at __(1)__.

IAW 0EOP-01-UG, EOP Users Guide, the basis for Emergency Depressurization in this condition is that __(2)__.

A. (1) 1315
   (2) safe shutdown equipment may fail

B. (1) 1315
   (2) personnel access to these areas is precluded

C. (1) 1320
   (2) safe shutdown equipment may fail

D. (1) 1320
   (2) personnel access to these areas is precluded

60. During an ATWS on Unit One, plant conditions are:

APRMs	Downscale
SLC	Tank injected (pumps secured)
RPV water level	70 inches, lowering
MSL Flow	0.5 Mlbm/hr
Drywell ref leg temp	200°F

The CRS has directed a RPV pressure band of 700 - 900 psig.

[Reference Provided]

If RPV water level continues to lower, which one of the following completes the statement below IAW ATWS Procedure and 0OI-37.11, Transient Mitigation Guidelines?

Emergency Depressurization must be performed when RPV water level first reaches:

A. -65 inches

B. -70 inches

C. -77.5 inches

D. -82.5 inches

61. Unit One is 100% power.
Unit Two is in MODE 3 with RHR Loop A in SDC with the following indications:

RHR Hx 2A RHR Sys Press	325 psig
RHR SW Pump A Disch Press	310 psig

Subsequently, UA-03 (5-5), *Service Wtr Effluent Rad High*, is received.

Which one of the following completes the both statements below?

The radiation detector for the D12-R604, Service Water Rad Monitor, is located __(1)__ of E11-PVD-F068A, Heat Exchanger 2A SW Discharge Vlv.

RRCP __(2)__ required to be entered for this condition.

A. (1) upstream
(2) is

B. (1) upstream
(2) is NOT

C. (1) downstream
(2) is

D. (1) downstream
(2) is NOT

62. Unit One is in MODE 3 following a seismic event and reactor scram with the following plant conditions:

Reactor level	55 inches
Reactor pressure	500 psig
Drywell pressure	9 psig
Division I PNS header pressure	93 psig
Division II PNS header pressure	98 psig

Which one of the following completes both statements below?

Div I Backup N2 Rack Isol Vlv, RNA-SV-5482 is ___(1)___.

Div I Non-Inrpt RNA, RNA-SV-5262 is ___(2)___.

A. (1) open
   (2) open

B. (1) open
   (2) closed

C. (1) closed
   (2) open

D. (1) closed
   (2) closed

63. Unit One is operating at 100% power when the following events occur:

LOOP occurs
Unit One NSW header ruptures in the Service Water Building
All Unit One Service Water pumps supplying the NSW Header are manually tripped.

Which one of the following completes the statement below concerning the Diesel Generators (DG) cooling water supply?

Cooling water for DG1 and __(1)__ will auto transfer to __(2)__.

A. (1) DG2
   (2) Unit One CSW

B. (1) DG2
   (2) Unit Two NSW

C. (1) DG3
   (2) Unit One CSW

D. (1) DG3
   (2) Unit Two NSW

64. Which one of the following completes both statements below concerning the operation of the brass handled ASSD keylock switches used in 0ASSD-02, Control Building, Section E, Diesel Generator Actions?

The six switches in a row must be placed in *LOCAL* __(1)__ placing the seventh switch in *LOCAL*.

The purpose of this sequence is to prevent a loss of DG2 due to a loss of the redundant power supply fuses for the __(2)__ circuitry.

A. (1) before
   (2) output breaker

B. (1) before
   (2) engine run control

C. (1) after
   (2) output breaker

D. (1) after
   (2) engine run control

65. Unit Two is operating at 100% power with a grid system disturbance when UA-13 (2-4), *Generator Field Overexcitation,* is received due to activation of the inverse time maximum excitation limit relay.

Which one of the following completes both statements below?

IAW 2OP-27, Generator and Exciter System Operating Procedure, the System Load Dispatcher is required to be notified as soon as practical, but within __(1)__, of any change in status of the voltage regulator.

If the condition does not clear, voltage regulation __(2)__ automatically swap to the manual voltage regulator.

A. (1) 30 minutes
   (2) will

B. (1) 30 minutes
   (2) will NOT

C. (1) 1 hour
   (2) will

D. (1) 1 hour
   (2) will NOT

66. Which one of the following completes both statements below regarding motor operated valves (MOVs)?

IAW AD-OP-ALL-0110, General Equipment Operating Standards, the preferred method for verifying an energized MOV's position is __(1)__.

IAW 0AP-013, Plant Equipment Control, control switches for throttle MOVs shall be held in the CLOSED position for an additional __(2)__ after the full closed indication is received.

A. (1) control indicating lights
   (2) 1-5 seconds

B. (1) control indicating lights
   (2) 10-15 seconds

C. (1) locally at the valve
   (2) 1-5 seconds

D. (1) locally at the valve
   (2) 10-15 seconds

67. Which one of the following completes both statements below IAW 0AP-013, Plant Equipment Control?

DC Limitorque valves have a specific duty cycle, which is defined as the maximum number of starts in __(1)__.

After the duty cycle for a DC Limitorque valve is exceeded, the motor needs to be allowed to cool for at least __(2)__.

A. (1) 5 minutes
   (2) 50 minutes

B. (1) 5 minutes
   (2) 15 minutes

C. (1) 10 minutes
   (2) 50 minutes

D. (1) 10 minutes
   (2) 15 minutes

68. IAW AD-OP-ALL-1000, Conduct Of Operations, which one of the following completes both statements below?

__(1)__ plant PA announcement(s) must be made when starting or stopping plant equipment from the main control room.

A PA announcement __(2)__ required for starting TBCCW Pump 2B from the control room.

A. (1) One
   (2) is

B. (1) One
   (2) is NOT

C. (1) Two
   (2) is

D. (1) Two
   (2) is NOT

69. Which one of the following completes both statements below IAW 2OI-03.4.1, Unit 2 Reactor Operator Daily Check Sheets?

The limit for reactor power averaged over the previous 8 hours, on PPC Screen 850, is ≤ (1).

The limit for reactor pressure, on the Core Mon Printout, is ≤ (2).

A. (1) 2923 MWT
(2) 1030 psia

B. (1) 2923 MWT
(2) 1045 psia

C. (1) 2981 MWT
(2) 1030 psia

D. (1) 2981 MWT
(2) 1045 psia

70. Which one of the following completes both statements below IAW Tech Specs Definitions, Table 1.1-1, MODES?

In MODE 3, the MODE switch __(1)__ allowed to be in the Start & Hot S/B position.

In MODE 5, the MODE switch __(2)__ allowed to be in the Shutdown position.

A. (1) is
(2) is

B. (1) is
(2) is NOT

C. (1) is NOT
(2) is

D. (1) is NOT
(2) is NOT

71. While performing a pre-job brief, it is discovered that plant conditions are different from the expected conditions for which a procedure was written. The plant conditions are expected to return to normal. The CRS has determined that a temporary procedure change is required.

IAW AD-DC-ALL-0201, Development and Maintenance of Controlled Procedure Manual Procedures, which one of the following completes both statements below in regards to the temporary procedure change?

The electronic copy of the procedure __(1)__ required to be placed on a Change Hold Status.

The expiration date shall not exceed __(2)__ from the interim approval date.

A. (1) is
   (2) 7 days

B. (1) is
   (2) 4 months

C. (1) is NOT
   (2) 7 days

D. (1) is NOT
   (2) 4 months

72. Unit One is operating at 100% power when the following annunciator is received:

UA-03 (3-3), *Turb Bldg Vent Rad High* (blue bar)

The CRS has entered RRCP due to Turbine Building Ventilation WRGM indication being at the EAL ALERT level.

Which one of the following completes both statements below?

The normal mode of Turbine Building Ventilation on Unit One is __(1)__.

IF the TB WRGM indication remains at the EAL ALERT level, THEN a reactor scram __(2)__ required.

A. (1) once-through
   (2) is

B. (1) once-through
   (2) is NOT

C. (1) recirculation
   (2) is

D. (1) recirculation
   (2) is NOT

73. Which one of the following completes both statements below concerning primary containment entry requirements?

IAW 0OI-01.03, Non Routine Activities, Attachment 11, Drywell Entry Requirements, the TIP detectors __(1)__ to be stored at the Indexer.

IAW 0E&RC-0261, Drywell Entry, Drywell entries are NOT allowed when reactor power is above __(2)__.

A. (1) are required
   (2) 15%

B. (1) are required
   (2) 25%

C. (1) are NOT allowed
   (2) 15%

D. (1) are NOT allowed
   (2) 25%

74. The Unit One OATC determines that all of the Panel XU-80 annunciators (UA-48, 49, & 50) are inoperable.

IAW 0AOP-29.0, Malfunction of Annunciators, which one of the following completes both statements below?

The reactor building __(1)__ required to be evacuated.

Control Room access __(2)__ required to be restricted.

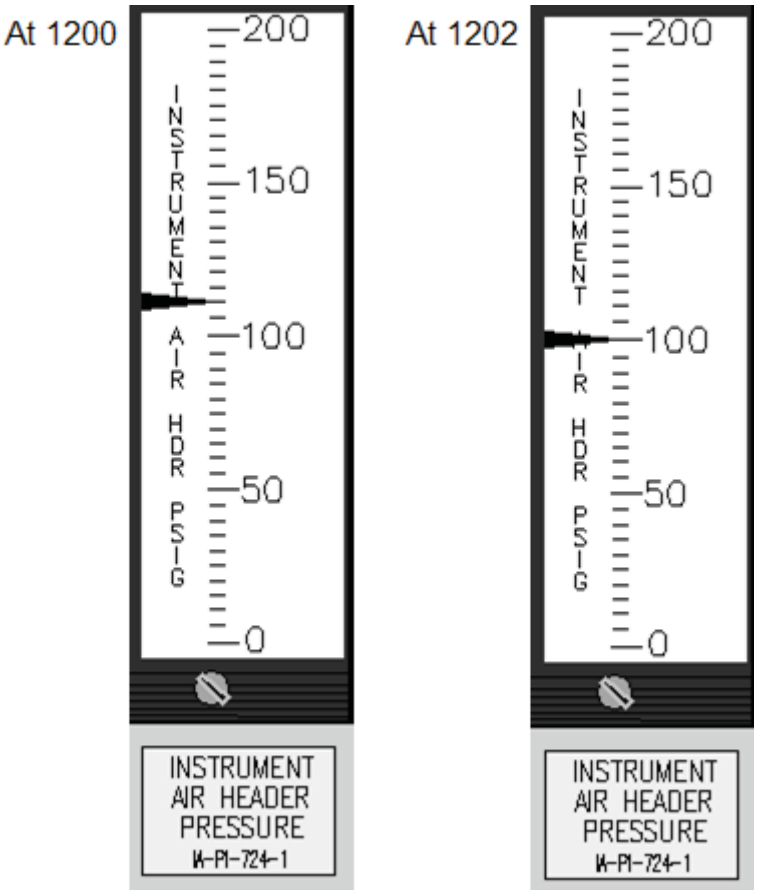
A. (1) is
(2) is

B. (1) is
(2) is NOT

C. (1) is NOT
(2) is

D. (1) is NOT
(2) is NOT

75. During operation at 100% power with the instrument air NOT cross-tied, the following indication is observed:



Assuming the situation continues to degrade at the current rate, which one of the following represents the **earliest** time that the MSIVs may start drifting closed IAW 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures?

A. 1203

B. 1208

C. 1210

D. 1212