

U. S. Nuclear Regulatory Commission Site-Specific SRO Written Examination	
Applicant Information	
Name: _____	
Date: 20 OCT 2015	Facility / Unit FARLEY 1 & 2
Region: I <input type="checkbox"/> II <input checked="" type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/>	Reactor Type: W <input checked="" type="checkbox"/> CE <input type="checkbox"/> BW <input type="checkbox"/> GE <input type="checkbox"/>
Start Time: _____	Finish Time: _____
<p style="text-align: center;">Instructions</p> <p>Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80 percent overall, with 70 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.</p>	
<p style="text-align: center;">Applicant Certification</p> <p>All work done on this examination is my own. I have neither given nor received aid.</p> <p style="text-align: right; margin-top: 20px;">_____</p> <p style="text-align: right;">Applicant's Signature</p>	
Results	
RO/SRO-Only/Total Examination Values Points	75 / 25 / 100
Applicant's Score Points	_____ / _____ / _____
Applicant's Grade Percent	_____ / _____ / _____

1. Unit 1 is starting up IAW UOP-1.2, Startup of Unit from Hot Standby to Minimum Load, with the following condition:

- Reactor Power is 13%.

The CONTROL ROD MOTION switch has been released following a rod withdrawal when the following occurs:

- Rods step out continuously.

Which one of the following completes the statements below?

The first action directed by AOP-19.0, Malfunction of Rod Control System, is to (1).

With NO operator action the C-1, IR Hi Flux Rod Stop, (2) stop the outward rod motion.

A. (1) manually Trip the Reactor

(2) will NOT

B✓ (1) place ROD CONTROL BANK SELECTOR SWITCH in AUTO

(2) will NOT

C. (1) manually Trip the Reactor

(2) WILL

D. (1) place ROD CONTROL BANK SELECTOR SWITCH in AUTO

(2) WILL

2. Unit 1 is performing a Reactor startup at MOL with the following conditions:

- UOP-1.2, Startup of Unit From Hot Standby to Minimum Load, is in progress.
- The OATC has stabilized Reactor power.
- NI-35 and NI-36, INTERMEDIATE RANGE, indicate 1×10^{-8} AMPS.

Subsequently, control rods are withdrawn 3 steps.

Which one of the following completes the statements below?

Reactor Power will rise then stabilize (1) the POAH.

The **first** indication of reaching the POAH is rising (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|-------------------|
| A. | below | Pressurizer Level |
| B✓ | at | Pressurizer Level |
| C. | below | S/G Pressure |
| D. | at | S/G Pressure |

3. Unit 1 is at 25% power when the following conditions occur:

At 1000:

- 1A RX COOLANT PUMP AMPS indicates 700 AMPS.

At 1002:

- The 1A RCP motor experiences a Sheared Shaft.

Which one of the following completes the statements below?

At 1002 the 1A RCP will draw (1) electrical current than it did at 1000.

The crew is required to immediately enter (2).

	<u>(1)</u>	<u>(2)</u>
A.	More	EEP-0.0, Reactor Trip and Safety Injection
B.	Less	EEP-0.0, Reactor Trip and Safety Injection
C.	More	AOP-4.0, Loss of Reactor Coolant Flow
D✓	Less	AOP-4.0, Loss of Reactor Coolant Flow

4. Unit 1 is operating at 100% power with the following conditions:

- PK-145, LP LTDN PRESS, is set to maintain Letdown Pressure at 275 psig.

Subsequently, the RCS filter becomes completely clogged and does not allow any flow.

Which one of the following completes the statements below?

PK-145 controller demand will (1).

AOP-16.0, CVCS Malfunction, entry conditions (2) been met.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | Rise | HAVE |
| B. | Rise | have NOT |
| C✓ | Lower | HAVE |
| D. | Lower | have NOT |

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

Charging Pump Suctions will automatically align to the RWST when (1)
sense(s) (2) VCT Level.

Level Transmitter Nomenclature

LT-115, VCT LVL

LT-112, VCT LVL

- | | <u>(1)</u> | <u>(2)</u> |
|-----|--------------------------------|------------|
| A. | either LT-115 or LT-112 | 5% |
| B.✓ | both LT-115 and LT-112 | 5% |
| C. | either LT-115 or LT-112 | 15% |
| D. | both LT-115 and LT-112 | 15% |

6. Unit 1 is in MODE 4 with the following conditions:

- Plant cooldown is in progress with the 'A' Train of RHR .
- The OATC **raises** demand on FK-605A,1A RHR HX BYP FLOW, by 25%.

Which one of the following completes the statements below?

Raising demand on FK-605A will (1) **CCW** temperature.

Per SOP-23.0, Component Cooling Water System, the maximum allowable CCW outlet temperature for the CCW HX used for cooldown is (2).

	<u>(1)</u>	<u>(2)</u>
A.	raise	120°F
B.	raise	135°F
C✓	lower	120°F
D.	lower	135°F

7. Unit 1 is shutdown when the following conditions occur:

- The 1A CCW pump tripped.
- The 'A' Train is the ON SERVICE Train.

Which one of the following completes the statement below?

Cooling is lost to the (1) RHR Heat Exchanger.

The affected RHR train (2) available for transfer to Cold Leg Recirculation.

	<u>(1)</u>	<u>(2)</u>
A.	1A	is NOT
B.	1A	IS
C✓	1B	is NOT
D.	1B	IS

8. Unit 1 has experienced a tube rupture on the 1A SG with the following conditions:

- A Loss of All Offsite Power has occurred.
- The operating crew is performing EEP-3, Steam Generator Tube Rupture.
- RCS cooldown is in progress.
- INTEGRITY Critical Safety Function Status Tree has turned ORANGE due to the 1A RCS LOOP cold leg temperature dropping rapidly.

Which one of the following completes the statements below?

The 1A RCS LOOP cold leg temperature drop was caused by increased (1) flow over the 1A RCS LOOP cold leg instrument.

(2) is the highest listed cold leg temperature that could lead to this ORANGE INTEGRITY condition.

	<u>(1)</u>	<u>(2)</u>
A.	Natural Circulation	270°F
B.	Natural Circulation	225°F
C.	High Head Safety Injection	270°F
D✓	High Head Safety Injection	225°F

9. A Safety Injection has just occurred on Unit 1.

Which one of the following completes the statement below?

The minimum valve actuations that would lead to HHSI Pump cavitation are ____.

Valve Nomenclature:

LCV-115C, VCT OUTLET ISO

LCV-115E, VCT OUTLET ISO

LCV-115D, RWST TO CHG PUMP

LCV-115B, RWST TO CHG PUMP

- A. LCV-115C **or** LCV-115E opening
- B. LCV-115C **and** LCV-115E opening
- C. LCV-115B **or** LCV-115D closing
- D✓ LCV-115B **and** LCV-115D closing

10. Nitrogen addition to the PRT on Unit 1 is in progress when the following occurs:

- V-042, PRT N2 PRESS REG, fails causing PRT pressure to RISE.
- PI-472, PRT PRESS, stabilizes at 15.0 psig.

Which one of the following completes the statements below?

HE5, PRT PRESS HI, (1) in alarm.

Per SOP-1.2, Reactor Coolant Pressure Relief System, normal nitrogen pressure prevents (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|---|
| A. | IS | excessive corrosion due to oxygen |
| B. | is NOT | excessive corrosion due to oxygen |
| C✓ | IS | an explosive mixture of oxygen and hydrogen |
| D. | is NOT | an explosive mixture of oxygen and hydrogen |

11. Unit 1 is operating at 100% power when the following conditions occur:

- A large break has occurred at the inlet of a Pressurizer Safety Valve.

Subsequently, the following condition exists:

- Pressurizer Pressure is 1600 psig.
- Charging Pump miniflow valves are **open**.

Which one of the following completes the statements below?

Per EEP-0, Reactor Trip or Safety Injection, the crew (1) required to **close** the Charging Pump miniflow valves.

Closing the Charging Pump miniflow valves when required will ensure (2).

- | | <u>(1)</u> | <u>(2)</u> |
|-----|------------|---------------------------------------|
| A. | IS | HHSI pump injection flow is maximized |
| B.✓ | is NOT | HHSI pump injection flow is maximized |
| C. | IS | HHSI pump heat is removed |
| D. | is NOT | HHSI pump heat is removed |

12. Unit 1 is operating at 100% power with the following conditions:

- A dual unit LOSP occurs.

Subsequently, **Unit 2** experiences a Safety Injection.

Which one of the following completes the statement below for **Unit 1**?

The (1) CCW pump is being powered by the (2) DG.

	<u>(1)</u>	<u>(2)</u>
A.	1A	1-2A
B.	1A	1C
C.	1C	1-2A
D✓	1C	1C

13. Unit 1 is in MODE 5 with the following conditions:

- A cooldown is in progress.
- RHR is on service.

Subsequently, the following conditions occur:

- V-8708A, RHR SUCTION RELIEF, has lifted and is stuck open.

Which of the following tank levels will immediately rise due to the malfunction?

A✓ PRT

B. RHT

C. WHT

D. RCDT

14. A Design Basis Large Break LOCA has occurred on Unit 1.

Which one of the following completes the statements below?

The Accumulators will inject directly to the (1).

The purpose of the Accumulator design capacity is to (2)
refill the Reactor Vessel following a design basis accident.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | Hot Legs | partially |
| B. | Hot Legs | completely |
| C✓ | Cold Legs | partially |
| D. | Cold Legs | completely |

15. Unit 1 is operating at 100% power and the following conditions exist:

- Pressurizer Pressure is 2240 psig.
- Tavg is 572°F.
- Pressurizer Level Control is in manual.
- Pressurizer Level is 60%.
- 600V LCC 1M has lost power.

Which one of the following completes the statements below?

Power has been lost to the (1) Pressurizer Heater Group.

Pressurizer Heater Groups A and B are currently (2).

	<u>(1)</u>	<u>(2)</u>
A✓	D	Energized
B.	D	De-Energized
C.	E	Energized
D.	E	De-Energized

16. Unit 1 is operating at 100% Power when the following conditions occur:

- A short circuit occurs in PT-445, PRZR PRESS.
- Pressurizer Pressure remains stable.

Which one of the following completes the statement below?

The Pressurizer Pressure input to the Reactor Protection System will NOT be affected by this malfunction due to the use of ____.

A✓ an independent control channel

B. a median signal selector

C. isolation devices

D. de-energize to actuate bistables

17. Unit 1 is operating at 100% power and the following occurs:

- A Safety Injection followed by an LOSP on Unit 1.

Several minutes following the safety injection the following condition exists:

- The 1B DG is running with the output breaker open.

Which one of the following completes the statements below?

SOP-0.8, Transient Response Procedure User's Guide, (1) require a procedure be used prior to closing the 1B DG output breaker.

The B1G sequencer (2) energize the 1C Air Compressor.

	<u>(1)</u>	<u>(2)</u>
A.	DOES	DOES
B✓	DOES	does NOT
C.	does NOT	DOES
D.	does NOT	does NOT

18. The 1D Vital Panel becomes de-energized on Unit 1.

Which one of the following completes the statements below.

The 'B' Train SI actuated MOVs (1) automatically stroke upon an SI actuation.

'B' Train ESF pumps (2) be started in LOCAL at the HSDP.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | WILL | CAN |
| B. | WILL | CANNOT |
| C✓ | will NOT | CAN |
| D. | will NOT | CANNOT |

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

The C-11, Bank D Stop, is actuated by input from (1) at a Bank D rod height of (2) steps.

	<u>(1)</u>	<u>(2)</u>
A.	Digital Rod Position Indication	220
B.	Digital Rod Position Indication	228
C✓	the Pulse-to-Analog Converter	220
D.	the Pulse-to-Analog Converter	228

20. Unit 1 is in MODE 3 and the following RCP temperatures are observed:

	Motor Bearing Temperature	Motor Stator Temperature
1A RCP	190°F	235°F
1B RCP	200°F	220°F
1C RCP	190°F	230°F

Which one of the following completes the statement below?

Only the ____ is (are) required to be secured.

- A. 1A RCP
- B✓ 1B RCP
- C. 1A and 1B RCPs
- D. 1A and 1C RCPs

21. Which one of the following conditions would cause a Core Exit Thermocouple (CETC) monitor alarm?

1. ANY CETC input disconnected.
2. ONLY 10 valid CETCs.
3. ANY CETC temperature at 650°F.

A✓ 1 ONLY

B. 1 AND 3 ONLY

C. 2 ONLY

D. 1, 2, AND 3

22. Unit 1 is operating at 100% power when the following conditions occurred:

- 1B Charging Pump is started.
- 1A Charging Pump is secured.
- 1B CHG PUMP AMPS, begins to oscillate.
- FI-122A, CHG FLOW, begins to oscillate.

Subsequently, the following annunciators come into alarm:

- EA2, CHG HDR FLOW HI-LO.
- DD1, RCP SEAL INJ FLOW LO.
- DE1, REGEN HX LTDN FLOW DISCH TEMP HI.

Which one of the following completes the statements below?

The alarms above are indicative of (1).

The maximum 1A RCP seal injection flowrate that would cause DD1 to alarm is (2).

	<u>(1)</u>	<u>(2)</u>
A. FCV-122 closing		6 gpm
B✓ 1B Charging Pump Cavitation		6 gpm
C. FCV-122 closing		3 gpm
D. 1B Charging Pump Cavitation		3 gpm

23. Unit 1 is operating at 100% power with the following conditions:

- A Large Break LOCA occurs.

Subsequently, a Loss of Offsite Power occurs.

Which one of the following completes the statement below **5 minutes after** the Loss of Offsite Power?

(1) Containment Cooler Fans are running in slow speed.

The reduced speed prevents CTMT cooler (2) due to high moisture content in the Containment atmosphere.

	<u>(1)</u>	<u>(2)</u>
A✓	2	fan motor overload
B.	4	fan motor overload
C.	2	cooling coil impingement damage
D.	4	cooling coil impingement damage

24. Unit 1 is in MODE 5 and the following condition exists:

- Both Trains of RHR are operating in the cooldown alignment.
- Power is aligned to the RHR suction valves.
- Tavg is 195°F.

Subsequently, the following condition occurs:

- PT-402, 1C LOOP RCS NR PRESS, fails to 500 psig.

Which one of the following completes the statements below?

MOV-8701A, 1C RCS LOOP TO 1A RHR PUMP, (1) automatically close.

IF MOV-8701A closes, then AOP-12.0, Residual Heat Removal System Malfunction, entry (2) required.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | DOES | is NOT |
| B. | does NOT | is NOT |
| C. | DOES | IS |
| D✓ | does NOT | IS |

25. Unit 1 is Shutdown following a LOCA with the following conditions:

- PR-950, CTMT PRESS, peaked at 3.2 psig.
- ECP-1.1, Loss of Emergency Coolant Recirculation, is in progress.

Which one of the following completes the statements below:

Per ECP-1.1, the minimum **CTMT Sump Level** that can support Containment Spray pump operation is ____.

A. 2.0 ft

B. ✓ 3.8 ft

C. 4.5 ft

D. 5.3 ft

26. Unit 1 is operating at 100% power when the following condition occurs:

- PK-444A, PRZR PRESS REFERENCE, demand fails to 0%.

Which one of the following completes the statements below?

Initially, (1) PORV(s) will OPEN automatically.

PCV-444C, 1A LOOP SPRAY VLV, will (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | only ONE | CLOSE |
| B✓ | only ONE | OPEN |
| C. | BOTH | CLOSE |
| D. | BOTH | OPEN |

27. Unit 1 is operating at 100% power with the following conditions:

- Containment Mini-Purge is in operation

Subsequently, the following conditions occur:

- A Main Steam Line breaks inside Containment
- PR-950Z, CTMT PRESS, stabilizes at 14.5 psig.

Which one of the following completes the statements below?

CTMT Mini-Purge supply and exhaust fans (1) tripped automatically due to a Containment Ventilation Isolation signal.

CTMT Mini-Purge supply and exhaust dampers (2) closed automatically due to a Containment Ventilation Isolation signal.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | HAVE | HAVE |
| B. | HAVE | have NOT |
| C✓ | have NOT | HAVE |
| D. | have NOT | have NOT |

28. Unit 1 is operating at 100% power with the following conditions:

- STP-33.2A, Reactor Trip Breaker Train A Operability Test, is in progress.
- Reactor Trip Breaker A is OPEN.
- Reactor Trip Bypass Breaker A is CLOSED.
- Reactor Trip Breaker B is CLOSED.

Subsequently, the following conditions occur:

- An automatic reactor trip signal is generated.
- The Reactor does NOT trip.

Which one of the following completes the statements below?

When the RX TRIP ACTUATION switch is taken to TRIP (1) will OPEN.

Per EEP-0, Reactor Trip or Safety Injection, if the RX TRIP ACTUATION switches fail to trip the Reactor, the next action required is to (2).

A. (1) ONLY Reactor Trip Breaker B

(2) trip the MG set supply breakers

B✓ (1) BOTH Reactor Trip Bypass Breaker A and Reactor Trip Breaker B

(2) trip the MG set supply breakers

C. (1) ONLY Reactor Trip Breaker B

(2) insert Control Rods manually

D. (1) BOTH Reactor Trip Bypass Breaker A and Reactor Trip Breaker B

(2) insert Control Rods manually

29. **Unit 2** is starting up per UOP-1.2, Startup of Unit From Hot Standby To Minimum Load, with the following conditions:

- Main Steam Header Warm Up is in Progress.

Which one of the following actions would cause the 2B SG Pressure to **lower** due to increased steam demand from the 2B SG?

A✓ Lower PC-3371B, 2B MS ATMOS REL VLV, SETPT in AUTO.

B. Lower PC-3371B, 2B MS ATMOS REL VLV, OUTPUT in MAN.

C. Lower PK-464, STM HDR PRESS, OUTPUT in MAN.

D. Lower PK-464, STM HDR PRESS, SETPT in AUTO.

30. Unit 1 is responding to a SGTR in the 1A SG with the following conditions:

At 1000:

- HIGHEST CORE EXIT TEMP CHAN A and B on the IPC, indicates 530°F.
- 1A SG PRESS is 810 psig.
- PI-403A, 1A LOOP RCS WR PRESS, indicates 1230 psig.
- RCS cooldown is in progress.

At 1045:

- HIGHEST CORE EXIT TEMP CHAN A and B, on the IPC indicates 450°F.
- 1A SG PRESS is 300 psig.
- PI-403A, 1A LOOP RCS WR PRESS, indicates 565 psig.

Which one of the following completes the statements below?

Compared to the conditions at 1000, RCS subcooling at 1045 has (1).

Compared to the conditions at 1000, SG tube leakage rate at 1045 has (2).

Reference Provided

	<u>(1)</u>	<u>(2)</u>
A.	risen	risen
B.	risen	lowered
C✓	lowered	lowered
D.	lowered	risen

31. Unit 1 is in Mode 3 at EOL with the following conditions:

- A Reactor Startup is being planned for 24 hours after a reactor trip.
- Tavg is being maintained by the Atmospheric Relief Valves (ARVs).
- The Estimated Critical Condition (ECC) calculation predicts criticality at 100 steps on Control Bank D.

Which one of the following conditions will result in critical rod height being HIGHER than the value predicted by the ECC?

For your answer, consider that no operator actions are taken to mitigate or compensate for the below events.

- A. A dilution of 500 gallons is performed.
- B. Auxiliary Feedwater flow is RAISED to all SGs.
- C✓ A post maintenance test results in the closure of all ARVs.
- D. Reactor startup occurs 30 hours after the reactor trip.

32. Unit 2 is at 68% power ramping down due to a problem with #4 Governor Valve with the following conditions:

- EH is isolated to #4 Governor valve.
- A subsequent failure causes #2 Governor Valve to fail closed.
- Turbine load drops to 450 MW.

Which one of the following completes the statements below?

The #2 governor valve closure results in (1).

Per SOP-72.0, General Instructions for DEH Operators Console, the operating crew is required to (2).

- A. (1) automatic removal of the IMP Press Loop
(2) trip the Main Turbine
- B. (1) automatic removal of the IMP Press Loop
(2) match reactor power with turbine load
- C. (1) opposed governor valve closure
(2) trip the Main Turbine
- D✓ (1) opposed governor valve closure
(2) match reactor power with turbine load

33. Unit 1 is operating at 100% power with the following conditions:

AT 1000:

- 1A Circulating Water Pump Trips.

AT 1005:

- KK1, TURB COND VAC LO, comes into alarm

Which one of the following completes the statements below?

(1) is the earliest time AOP-8.0, Partial Loss of Condenser Vacuum, entry is required.

At 100% Reactor power, (2) is the lowest condenser pressure a **manual** Reactor Trip is required.

	<u>(1)</u>	<u>(2)</u>
A✓	1000	3.800 psia
B.	1005	3.800 psia
C.	1000	2.901 psia
D.	1005	2.901 psia

34. Unit 1 entered FRP-H.1, Response to Loss of Secondary Heat Sink, with the following conditions:

Time	1000	1015	1030	1100
1A S/G WR LVL (%)	37.00	28.00	18.00	11.00
1B S/G WR LVL (%)	32.00	20.00	10.00	6.00
1C S/G WR LVL (%)	29.00	19.00	9.00	3.00
CNMT PRESS (PSIG)	1.50	2.00	3.00	4.50
AFW TOTAL FLOW (GPM)	0	0	0	0

Which one of the following is the EARLIEST time that a manual Safety Injection is required due to meeting Bleed and Feed criteria per FRP-H.1?

- A. 1000
- B. 1015
- C✓ 1030
- D. 1100

35. Which one of the following is the purpose of depressurizing all intact SGs during the performance of ECP-0.0, Loss of All AC Power?

- A. Rapidly reduces DP across SG U-tubes to minimize RCS inventory loss from a potential tube rupture.
- B✓ Cools RCP seals in a controlled manner and minimizes loss of RCS inventory.
- C. Maximizes Natural Circulation flow before reflux cooling begins as the RCS becomes saturated.
- D. Maximizes Natural Circulation flow to allow reactor vessel head to cool since CRDM cooling fans are unavailable.

36. Unit 1 is operating at 100% power and the following condition exists:

- Main Condenser Pressure is rising due to a failure of the 1A SJAE.

Which one of the following completes the statements below?

Main Condenser Hotwell Temperature will initially (1).

AOP-8.0, Partial Loss of Condenser Vacuum, will direct placing (2) on service.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|-------------|
| A. | RISE | a Hogger |
| B. | LOWER | a Hogger |
| C✓ | RISE | the 1B SJAE |
| D. | LOWER | the 1B SJAE |

37. The following conditions exist:

- Unit 1 is in MODE 5.
- Unit 2 is operating at 100% power.
- The 1B DG is INOPERABLE.

Subsequently, the following occurs simultaneously:

- 4160V busses 1F, 1K, 1G, and 1L de-energize.
- 4160V busses 2F, 2K, 2G, and 2L de-energize.
- The 1-2A DG Trips and cannot be restored.

Which one of the following completes the statement below?

The first procedure the **Unit 1** Operating Crew is required to enter is (1).

The Operating Crew will restore power to **Unit 1** with the (2).

A. (1) AOP-5.0, Loss of A or B Train Electrical Power

(2) 1C DG

B. (1) ECP-0.0, Loss of All AC Power

(2) 1C DG

C✓ (1) AOP-5.0, Loss of A or B Train Electrical Power

(2) 2C DG

D. (1) ECP-0.0, Loss of All AC Power

(2) 2C DG

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

The Main Turbine exhaust hood sprays use (1) to automatically prevent excessive temperatures at the exhaust of the LP Turbine (2) 15% Turbine Load.

- | | <u>(1)</u> | <u>(2)</u> |
|----|-------------|------------|
| A. | demin water | above |
| B. | demin water | below |
| C. | condensate | above |
| D✓ | condensate | below |

39. Unit 1 is operating at 100% power when the following occurs:

- The 1C 120 VAC Vital Instrumentation Panel is de-energized.

Which one of the following completes the statements below?

LCV-459, LTDN LINE ISO, (1) automatically close if a Pressurizer Low Level condition occurs.

LCV-115A (2) immediately divert to the RHT.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | WILL | WILL |
| B✓ | WILL | will NOT |
| C. | will NOT | WILL |
| D. | will NOT | will NOT |

40. Unit 1 is operating at 8% power and the following conditions occur:

- The Battery Input Breaker on the 1B inverter trips.
- WD2, 1B INV FAULT, annunciator alarms.
- No Other Annunciators are in Alarm due to the fault.

Subsequently, the Rover reports the following indications from the 1B Inverter.

- INVERTER POWERING LOAD lamp NOT lit.
- BYPASS SOURCE AVAILABLE lamp is LIT.

Which one of the following completes the statements below?

The 1B 120V Vital AC panel is (1).

The 1B INVERTER AMPERES meter on the EPB indicates (2).

A. (1) Energized

(2) 0 Amps

B✓ (1) Energized

(2) Full Load Amps

C. (1) De-energized

(2) 0 Amps. When the MANUAL BYPASS SWITCH is taken to BYPASS SOURCE TO LOAD position it will indicate Full Load Amps.

D. (1) De-energized

(2) 0 Amps. When the MANUAL BYPASS SWITCH is taken to BYPASS SOURCE TO LOAD position it will continue to indicate 0 Amps.

41. Unit 1 is operating at 100% power when the following conditions occur:

- Annunciator KB4, SGFP SUCT PRESS LO, alarms
- PR-4039, SGFP SUCT PRESS, indicates 300 psig and lowering.

Which one of the following completes the statement below?

The earliest time the standby condensate pump will start is when ____.

- A. KB4 has been in alarm for 10 seconds
- B. KB4 has been in alarm for 30 seconds
- C✓ SGFP suction pressure has remained below 275 PSIG for 10 seconds
- D. SGFP suction pressure has remained below 275 PSIG for 30 seconds

42. A **gas transfer** is in progress to the #8 Waste Gas Decay Tank on Unit 1 when the following conditions occur:

- The #8 Waste Gas Decay Tank relief valve lifts.
- The relief valve fails to reseal.

Which one of the following completes the statements below?

The relief valve lifting will initially be detected by (1).

The release (2) be automatically isolated from the environment if an alarm condition exists.

- | <u>(1)</u> | <u>(2)</u> |
|-----------------------------|------------|
| A. R-13, WASTE GAS MONITOR | WILL |
| B. R-13, WASTE GAS MONITOR | will NOT |
| C. R-14, PLANT VENT MONITOR | WILL |
| D✓ R-14, PLANT VENT MONITOR | will NOT |

43. Unit 1 is Operating at 100% Reactor Power when the following conditions occur:

Time	1000	1005	1010	1015
1A S/G NR LVL (%)	26.00	23.00	21.00	7.00
1B S/G NR LVL (%)	34.00	27.00	25.00	8.00
1C S/G NR LVL (%)	35.00	33.00	31.00	12.00
1A SGFP STATUS	Running	Running	Tripped	Tripped
1B SGFP STATUS	Running	Running	Tripped	Tripped

Which one of the following is the **earliest** time when **all** AFW Pumps have recieved an AUTO START signal?

- A. 1000
- B. 1005
- C. 1010
- D. 1015

44. Unit 1 is operating at 100% power with the following condition:

- An LOSP occurs.

Which one of the following completes the statements below?

10 seconds after power is restored to the 1F 4160V bus:

1A CHG PUMP AMPS will indicate (1) AMPS.

1A MDAFWP AMPS will indicate (2) AMPS.

- | | <u>(1)</u> | <u>(2)</u> |
|-----|-------------------|-------------------|
| A. | greater than zero | greater than zero |
| B.✓ | greater than zero | zero |
| C. | zero | greater than zero |
| D. | zero | zero |

45. Unit 1 is operating at 100% power when the following condition occurs:

- The Reactor Trips

Subsequently, the following indications are displayed continously on the MCB.

- V-515, SW TO TURB BLDG ISO A TRN, RED and GREEN Lights are LIT.
- V-517, SW TO TURB BLDG ISO B TRN, RED and GREEN Lights are LIT.
- V-516, SW TO TURB BLDG ISO A TRN, RED and GREEN Lights are LIT.
- V-514, SW TO TURB BLDG ISO B TRN, RED and GREEN Lights are LIT.

Which one of the following completes the statement below?

The valve actuation was initiated by a (1).

The valve position prevents (2).

A. (1) Safety Injection

(2) damage to turbine building auxiliaries.

B. (1) Loss of Offsite Power

(2) complete isolation of SW flow to the Air Compressors

C. (1) Safety Injection

(2) complete isolation of SW flow to the Air Compressors

D✓ (1) Loss of Offsite Power

(2) damage to turbine building auxiliaries.

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

The (1) RCP(s) can be powered from the **1A** Startup Transformer.

The (2) RCP(s) can be powered from the **2B** Startup Transformer.

- | | <u>(1)</u> | <u>(2)</u> |
|----|----------------|----------------|
| A✓ | 1A RCP | 2A RCP |
| B. | 1A RCP | 2B and 2C RCPs |
| C. | 1B and 1C RCPs | 2A RCP |
| D. | 1B and 1C RCPs | 2B and 2C RCPs |

47. Unit 1 is at 100% power when the following condition occurs in the Aux Bldg DC distribution system:

- The 125V DC Bus 1B has been de-energized.

Subsequently, an LOSP occurs on Unit 1.

Which one of the following completes the statements below?

The 1B DG (1) be started from the EPB.

The B1G Sequencer (2) automatically sequence loads.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | CAN | WILL |
| B✓ | CANNOT | will NOT |
| C. | CANNOT | WILL |
| D. | CAN | will NOT |

48. Which one of the following completes the statement below for the 1B DG Air Recievers?

The maximum Air Receiver pressure that will cause an alarm on the 1B DG Local Control Panel is (1).

At the alarm setpoint there is enough air pressure to ensure a maximum of (2) start attempts are available.

	<u>(1)</u>	<u>(2)</u>
A.	200 psig	3
B.	200 psig	5
C.	350 psig	3
D✓	350 psig	5

49. Unit 1 is operating at 100% power when the following conditions occur:

- MH1, FIRE, annunciator on the Unit 1 Main Control Board (MCB) alarms.
- "Aux Bldg EI 139 W Side Det 1A-39, 43, 46, 53 1A-55, 59, 106", light is lit on the Control Room Fire Panel.
- The Rover reports that the window for 1A-59 at the PYR-A-LARM panel is lit.

What is (are) the **minimum** required action(s) to ensure MH1, FIRE, will alarm again if 1A-39 comes into alarm?

- A. The Control Room Fire Panel alarm must be acknowledged.
and
1A-59 must be placed in OVERRIDE on the PYR-A-LARM panel.
- B✓ The Control Room Fire Panel alarm must be acknowledged.
and
The Reflash Panel alarm for detection system 1A-59 must be acknowledged.
- C. ONLY 1A-59 must be placed in OVERRIDE on the PYR-A-LARM panel.
- D. ONLY the Reflash Panel alarm for detection system 1A-59 must be acknowledged.

50. AOP-28.0, Control Room Inaccessibility, is in progress on Unit 1.

Which one of the following completes the statements below?

The 1A MDAFWP will be operated in LOCAL at the (1) HSDP.

Operator action is required to control the MDAFWP FCVs in LOCAL at the HSDP in order to prevent (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|--|
| A. | F | low SG water level due to valve position |
| B. | F | isolating letdown due to cooldown |
| C. | A | low SG water level due to valve position |
| D✓ | A | isolating letdown due to cooldown |

51. Unit 2 is at 100% power with the following conditions:

- A #1 Waste Monitor Tank (WMT) release is in progress with the #1 WMT pump running.
- RCV-18, WMT DISCH TO ENVIRONMENT, is open.

Subsequently R-18, LIQ WASTE DISCH, alarms HIGH.

Which one of the following completes the statements below?

RCV-18 will (1).

The #1 WMT pump will (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|-------------|-----------------|
| A. | remain open | trip |
| B. | remain open | continue to run |
| C. | close | trip |
| D✓ | close | continue to run |

52. Unit 1 is operating at 100% power with the following condition:

- A SG Tube Leak is in progress.
- FCV-1152, SGBD HX Outlet Flow Control Valve, is stuck in the OPEN position.

Which one of the following radiation monitors is able to automatically stop a release to the environment due to the SG Tube Rupture?

A. R-23A, SGBD SRG TK INLET

B✓ R-23B, SGBD SRG TK DISCH

C. R-19, SGBD SAMPLE

D. R-70A, SG TUBE LEAK DET

53. Unit 1 is operating at 100% power when the following occurs:

- A Large Break LOCA occurs inside containment.
- Containment Pressure reaches 35 psig.

Which one of the following completes the statements below?

MOV-3024A, EMERG SW FROM 1A CTMT CLR, opened due to a(n) (1) signal.

Each CTMT Cooler will be supplied with approximately (2) GPM of Service Water flow.

	<u>(1)</u>	<u>(2)</u>
A✓	Safety Injection	2000
B.	Safety Injection	800
C.	Containment Spray	2000
D.	Containment Spray	800

54. Unit 1 experienced a Safety Injection with LOSP.

Which one of the following completes the statements below?

The 1A Charging Pump Room Cooler will automatically start due to a signal generated by the 1A Charging Pump (1).

Controls for starting the Charging Pump Room Coolers (2) located on the BOP Panel.

- | | <u>(1)</u> | <u>(2)</u> |
|----|-----------------|------------|
| A✓ | Breaker | ARE |
| B. | Breaker | are NOT |
| C. | Room Thermostat | ARE |
| D. | Room Thermostat | are NOT |

55. Unit 1 is operating at 100% power with the following conditions:

- The Gross Failed Fuel Detector (GFFD) has steadily indicated 2500 cpm during the entire fuel cycle.

Subsequently, the following readings are recorded:

Time	1000	1100	1200	1300
GFFD Indication (cpm)	1.1×10^4	1.5×10^4	4.4×10^4	1.3×10^5

Which one of the following is the earliest time the GFFD will be in High Alarm?

- A. 1000
- B. 1100
- C. 1200
- D. 1300

56. Unit 1 is operating at 100% power with the following conditions:

- AOP-5.2, Degraded Grid, has just been entered.
- Voltage on all emergency busses for both units is reading 3875 volts.
- MEGAVARS are reading (+) 100 on the MCB.
- The Shift Supervisor has directed the UO to maintain (+) 400 MVARs in accordance with the voltage schedule.
- The Unit 2 UO maintains MVARs stable on Unit 2 during the adjustment.

Which one of the following will occur when the Unit 1 UO performs the adjustment as directed by the Shift Supervisor?

The operator will (1) Voltage, to reach (+) 400 MVARs.

After adjusting voltage, the temperature of large pump motors, such as the RCP or CW pump motors, will (2) .

	<u> (1) </u>	<u> (2) </u>
A✓	raise	lower
B.	raise	rise
C.	lower	lower
D.	lower	rise

57. Unit 1 was manually tripped from 100% power and the following conditions exist:

- AOP-6.0, Loss of Instrument Air, is in progress.
- The TDAFW pump automatically started.
- BOTH MDAFW pumps failed to start.
- The MSVR **is not accessible**.

Subsequently, the following report is received from Mechanical Maintenance:

- Restoration of Instrument Air will take 3 hours.

Which one of the following describes the required AOP-6.0 operator action(s), if any, and the reason?

- A. No action is required because the TDAFWP steam admission valves fail to the "as is" position.
- B. Manually close the TDAFWP steam admission valves to avoid causing an uncontrolled cooldown.
- C. Manually open the TDAFWP steam admission valves to provide an adequate heat sink.
- D✓ Manually align emergency air to the TDAFW pump steam admission valves to provide an adequate heat sink.

58. Unit 1 is operating at 100% power when the following occurs:

At 1000

- An Instrument Air malfunction occurs.

At 1015

- PI-4004B, INST AIR PRESS, indicates 50 psig and stable

Which one of the following completes the statements below?

At 1015 V904, Instrument Air to the Service Building, is (1).

A(n) (2) maintains MSIV air pressure following loss of instrument air pressure.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------------------------|
| A. | OPEN | accumulator |
| B. | OPEN | compressed nitrogen cylinder |
| C✓ | CLOSED | accumulator |
| D. | CLOSED | compressed nitrogen cylinder |

59. Unit 1 is shutdown following a LOCA with the following conditions:

- PI-402A and PI-403A, RCS WR PRESS, indicate 600 psig and stable.
- PR-950Z, CTMT PRESS, indicates 32 psig and slowly lowering.

Subsequently, ONLY the following actions are taken:

- SI BLOCK RESET A TRN pushbutton is depressed.
- SI BLOCK RESET B TRN pushbutton is depressed.
- PHASE B CTMT ISO RESET A TRN pushbutton is depressed.
- PHASE B CTMT ISO RESET B TRN pushbutton is depressed.

Which one of the following completes the statements below:

PHASE A CNMT ISO (1) reset.

PHASE B CNMT ISO (2) reset.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | IS | is NOT |
| B. | IS | IS |
| C. | is NOT | is NOT |
| D✓ | is NOT | IS |

60. Unit 1 is operating at 100% power when the following conditions occur:

- Phase A is actuated using the MCB handswitches.

How has the Phase A signal affected the following valve positions?

Valve Nomenclature:

HV-8152, LTDN LINE CTMT ISO

MOV-8112, RCP SEAL WTR RTN ISO

HV-8149A, LTDN ORIF ISO 45 GPM

MOV-3052, CCW TO RCP CLRS

A✓ Only HV-8152, HV-8149A, and MOV-8112 have closed.

B. Only HV-8152, MOV-8112, and MOV-3052 have closed.

C. Only HV-8152, and HV-8149A have closed.

D. Only HV-8152 has closed.

61. A Main Control Board Deficiency related to a MCB handswitch has been identified.

Which one of the following completes the statements below IAW SOP-0.10, FNP Operations Site Specific Policies?

A (1) is required to be created to identify the deficiency.

The identifier (Deficiency Tag/Control Room DOT) will be (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------------|-----------------------------------|
| A. | Deficiency Tag | affixed to the MCB handswitch |
| B. | Deficiency Tag | placed in the deficiency notebook |
| C✓ | Control Room DOT | affixed to the MCB handswitch |
| D. | Control Room DOT | placed in the deficiency notebook |

62. Unit 1 experiences a Reactor Trip with Safety injection.

Subsequently, the following occurs:

- The UO directs the Turbine Building Systems Operator (TB SO) to perform the TB SO Actions Following a Reactor Trip or Safety Injection.

Which one of the following completes the statements below per SOP-0.0, Appendix A, TB SO Actions Following a Reactor Trip and/or Safety Injection?

The TB SO is required to close V-503A, 1A MSR 2ND STG STM SUPP ISO (1).

The TB SO is required to close V-905A, 1A MS LINE DRN POT TO COND ISO (2).

(1)

(2)

- | | | |
|----|---------------------------------|---------------------------------|
| A. | following any Reactor trip | following any Reactor trip |
| B✓ | following any Reactor trip | only when specifically directed |
| C. | only when specifically directed | following any Reactor trip |
| D. | only when specifically directed | only when specifically directed |

63. Which one of the following completes the statements below per NMP-AP-001-003, Review and Approval of Site Procedures?

The "Pen and Ink" Change Process may be used for (1) changes.

A Condition Report (2) required following use of a procedure with "Pen and Ink" changes.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A✓ | editorial | IS |
| B. | editorial | is NOT |
| C. | temporary | IS |
| D. | temporary | is NOT |

64. Unit 1 is in a Refueling Outage with fuel being loaded into the core.

Which one of the following completes the statements below?

Per TRM 13.1.6, Borated Water Source - Shutdown, the minimum operable BAT Tank Temperature is (1).

Per TRM 13.1.6, the minimum operable BAT Tank Volume is (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|---------------|
| A. | 35°F | 2000 gallons |
| B. | 35°F | 11336 gallons |
| C✓ | 65°F | 2000 gallons |
| D. | 65°F | 11336 gallons |

65. Unit 1 is exiting a refueling outage with the following conditions:

Time	1000	1200	1400	1600
Average Coolant Temp (°F)	300	450	547	547
Rated Thermal Power (%)	0	0	2	6
Keff	<.99	<.99	1.00	1.00

Which one of the following completes the statements below?

The earliest time Unit 1 is in MODE 4 is at (1).

The earliest time Unit 1 is in MODE 1 is at (2).

- | | | |
|-----|------------|------------|
| | <u>(1)</u> | <u>(2)</u> |
| A. | 1000 | 1400 |
| B.✓ | 1000 | 1600 |
| C. | 1200 | 1400 |
| D. | 1200 | 1600 |

66. A Plant Operator has been assigned a portable RAM 100 frisker for personnel monitoring when exiting the dry cask storage area with the following condition:

- The Frisker Response Checks were last performed 7 days ago.

Which one of the following completes the statements below?

The frisker detects (1).

The Frisker Response Checks for the assigned frisker are required to be performed (2).

A✓ (1) Beta and Gamma radiation

(2) prior to use

B. (1) Beta and Gamma radiation

(2) 6 months from the date of the last response check

C. (1) ONLY Gamma radiation

(2) prior to use

D. (1) ONLY Gamma radiation

(2) 6 months from the date of the last response check

67. You are assigned a task:

- Your current TEDE is 1500 mrem.
- Dose rate in the area you are required to work is 1500 mr/hr.

Which one of the following is the maximum amount of time you can stay in the area without exceeding Farley Administrative TEDE limits with no additional approval?

- A✓ 20 minutes
- B. 100 minutes
- C. 120 minutes
- D. 140 minutes

68. EEP-0.0, Reactor Trip or Safety Injection, provides specific Reactor Coolant Pump (RCP) trip criteria on the foldout page.

Which one of the following is the reason for tripping the RCPs when these conditions occur?

- A✓ Conserves RCS inventory during a Small Break LOCA with subsequent LOSP.
- B. Prevents RCP seal damage following a Small Break LOCA.
- C. Prevents pump runout following a Large Break LOCA.
- D. Ensures core reflood following a Large Break LOCA.

69. Unit 1 and Unit 2 are operating at 100% power when the following condition occurs:

- The Outside System Operator reports a fire in the Liquid hydrogen storage tank vent stack.

Which one of the following completes the statement below?

Per AOP-29.0, Plant Fire, and SOP-34.0, Hydrogen-Oxygen System the fire will be extinguished by ____.

- A. spraying water directly on the vent stack and isolating the leak.
- B. discharging a portable fire extinguisher into the vent stack and isolating the leak.
- C✓ establishing a helium purge and isolating the leak.
- D. isolating the leak ONLY.

70. The following condition exist on Unit 1:

- The TSC is fully manned and is directing the plant response to a NOUE.

Subsequently, the following occurs:

- The Emergency Director declares a SITE AREA EMERGENCY.

Which one of the following completes the statements below?

Per NMP-EP-111, Emergency Notifications, a (1) tone will be sounded prior to the onsite notification announcement.

Per NMP-EP-111, Emergency Notifications, the (2) is responsible for approving notifications to State and Local Authorities of the emergency condition.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|--------------------|
| A. | YELP | Emergency Director |
| B✓ | WARBLE | Emergency Director |
| C. | YELP | Shift Manager |
| D. | WARBLE | Shift Manager |

71. An RCS soak is in progress per FRP-P.1, Response to Imminent Pressurized Thermal Shock Condition, on Unit 1.

Which one of the following actions is permitted?

- A. Start a Charging Pump.
- B. Energize PZR heaters.
- C. Start an RCP.
- D✓ Isolate Accumulators.

72. Unit 1 is shutdown following a Large Break LOCA followed by an LOSP. The following conditions occur:

At 1000:

- WA2, 1-2A DG GEN FAULT TRIP, alarms.

At 1015:

- CF3, 1A OR 1B RHR PUMP OVERLOAD TRIP, alarms.
- RWST level is 3 ft.
- Containment Spray pump suctions are aligned to the RWST.

Which one of the following completes the statements below?

At 1015 (1) train(s) of emergency coolant recirculation capability has(have) been lost.

The operating crew (2) required to secure all CTMT Spray **at 1015**.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | ONLY one | IS |
| B. | ONLY one | is NOT |
| C✓ | BOTH | IS |
| D. | BOTH | is NOT |

73. Unit 1 is shutdown with ECP-2.1, Uncontrolled Depressurization of All Steam Generators in progress. The following conditions exist:

- All MSIV - TRIP handswitches have been taken to CLOSE.
- JH1, 1A SG MSIV CLOSED is NOT lit.
- JH2, 1B SG MSIV CLOSED is NOT lit.
- JH3, 1C SG MSIV CLOSED is NOT lit.

Which one of the following completes the statements below?

The next action the crew is required to take per ECP-2.1 is (1).

If an MSIV is closed, ECP-2.1 directs use of (2) to determine if a Steam Generator has been isolated.

- A. (1) Place the MSIV -TEST handswitch to TEST
(2) Cold Leg Temperature
- B✓ (1) Place the MSIV - TEST handswitch to TEST
(2) SG Pressure
- C. (1) Manually remove air pressure from the MSIVs
(2) Cold Leg Temperature
- D. (1) Manually remove air pressure from the MSIVs
(2) SG Pressure

74. Unit 1 is shutdown with the following conditions:

- 1A SG Pressure is 1145 psig and rising.
- The 1A Atmospheric Relief Valve is mechanically bound and cannot be opened.
- All MSIV and MSIV Bypasses are closed.

Which one of the following completes the statements below?

Entry conditions for FRP-H.2, Response to Steam Generator Overpressure (1) been met

When FRP-H.2 is entered, the crew would be directed to lower 1A SG Pressure by (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|-----------------------------|
| A. | have NOT | dumping steam to the TDAFWP |
| B. | HAVE | dumping steam to the TDAFWP |
| C. | have NOT | opening MSIV bypasses |
| D✓ | HAVE | opening MSIV bypasses |

75. Unit 1 has experienced a Large Break LOCA with the following conditions:

- PR-0950Z, CTMT PRESS NR, indicates 30 psig.
- LI-3594A, CTMT SUMP LVL, indicates 8 FT.
- FI-958 A and B, CS FLOW, indicate 1200 GPM each.

Which one of the following completes the statements below?

Per CSF-0.5, Containment, the crew is required to enter a(n) (1) path FRP due to (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|-----------------|
| A. | RED | CTMT Pressure |
| B. | RED | CTMT Sump Level |
| C. | ORANGE | CTMT Pressure |
| D✓ | ORANGE | CTMT Sump Level |

76. Unit 1 was operating at 100% power when the following occurred:

At 1000:

- All Control Banks are at 231 steps.

At 1010:

- Rod K4 fell to 130 steps.
- Rod M6 fell to 150 steps.
- RCS Tavg lowered.
- Pressurizer pressure lowered.

Which one of the following completes the statement below?

Per AOP-19, Malfunction of Rod Control System, the operating crew is required to _____.

- A. shutdown the unit using UOP-3.1, Power Operation
- B✓ trip the Reactor and go to EEP-0.0, Reactor Trip and Safety Injection
- C. reduce power to less than 75% within 1 hour using UOP-3.1, Power Operation
- D. address restoration of rods using SOP-41.0, Control Rod Drive and Position Indication System

77. Unit 1 is operating at 100% power when the following occurs:

At 1000:

- HH4, RCP VIB TRBL (WHITE annunciator window), comes into alarm.
- 1A RCP shaft vibration is reported as 21 mils and stable.
- DC2, RCP #1 SEAL LKOF FLOW HI (YELLOW annunciator window), comes into alarm.
- FR145A, RCP SEAL LKOF HIGH RANGE, for the 1A RCP indicates 6.5 gpm and stable.

At 1600:

- The Unit is in MODE 3.
- The Reactor Trip Breakers are open.
- 1B and 1C RCPs are running.
- 1A RCP is tagged out.

Which one of the following completes the statements below?

At 1000, the operating crew is required to (1) , then secure the 1A RCP.

At 1600, RCS pressure control is via (2) .

- A✓ (1) trip the Reactor and go to EEP-0.0, Reactor Trip or Safety Injection
(2) Normal Spray
- B. (1) perform a controlled shutdown per the appropriate Unit Operating Procedures
(2) Normal Spray
- C. (1) trip the Reactor and go to EEP-0.0, Reactor Trip or Safety Injection
(2) Auxiliary Spray
- D. (1) perform a controlled shutdown per the appropriate Unit Operating Procedures
(2) Auxiliary Spray

78. Unit 1 is operating at 100% power when the following occurs:

- Due to a Pressurizer pressure control malfunction, PCV-445A, PRZR PORV opens and reseats several times.
- PRT parameters are:
 - Level: 84% and is stable.
 - Temperature: 180°F and stable.
 - Pressure: 30 psig and stable.

Which one of the following completes the statements below?

HE4, PRT LVL HI-LO, (1) in alarm.

Draining the PRT using the RCDT pump per Section 4.3, Filling and Draining the PRT, of SOP-1.2 (2) restore **all** PRT parameters to within normal log specifications.

Procedure name: SOP-1.2, Reactor Coolant Pressure Relief System

	<u>(1)</u>	<u>(2)</u>
A.	is NOT	will NOT
B.✓	IS	will NOT
C.	is NOT	WILL
D.	IS	WILL

79. Unit 1 is in MODE 3 with the following conditions:

At 1000:

- The Shutdown Banks are withdrawn.

At 1005:

- A complete loss of offsite power occurs.

Which one of the following completes the statements below?

At 1005, manual action (1) required to generate a P-4 signal.

Per the BASES of Tech Spec 3.3.2, ESFAS Instrumentation, P-4 is required to be OPERABLE to prevent (2).

A. ✓ (1) IS

(2) excessive Containment pressure due to a steamline break

B. (1) is NOT

(2) excessive Containment pressure due to a steamline break

C. (1) IS

(2) damage to the Main Steam lines and SG safeties due to SG overfill

D. (1) is NOT

(2) damage to the Main Steam lines and SG safeties due to SG overfill

80. Unit 1 is operating at 100% power with the following conditions:

- A malfunction occurred resulting in PCV-444B, PRZR PORV, opening.

Subsequently, the immediate operator actions of AOP-100, Instrumentation Malfunction, were performed and the following conditions exist:

- PCV-444B GREEN light is LIT.
- MOV-8000B, PRZR PORV ISO, RED light is LIT.
- RCS pressure is 2180 psig and stable.
- PRT pressure, level and temperature are stable.
- HA4, PRZR SAFETY VLV TEMP HI, is in alarm.
- HA5, PRZR PORV TEMP HI, is in alarm.
- HD1, PRZR PRESS REL VLV 445A OR B/U HTRS ON, is in alarm.

Which one of the following completes the statements below?

PCV-444B (1) leaking by.

Per Tech Spec 3.4.11, Pressurizer Power Operated Relief Valves (PORVs), PCV-444B (2) OPERABLE.

	<u>(1)</u>	<u>(2)</u>
A.	IS	IS
B.	IS	is NOT
C✓	is NOT	IS
D.	is NOT	is NOT

81. Unit 1 is at 100% power with the following conditions:

- PT-950, CTMT PRESS (Channel 1), was declared INOPERABLE.
- PT-950 bistables were positioned as required by Tech Spec 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, for continuous operation with an inoperable channel.

Which one of the following completes the statements below?

The Safety Injection function (1) affected by the PT-950 malfunction.

Per Tech Spec 3.3.2, the REQUIRED ACTION is to place the PT-950 bistables in (2) .

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | IS | TRIP |
| B. | IS | BYPASS |
| C. | is NOT | TRIP |
| D✓ | is NOT | BYPASS |

82. Unit 1 is in MODE 3 with the following conditions:

- All RCPs are running.
- A CCW leak occurs on the 1A RCP Oil Cooler inlet connection.

Which one of the following completes the statements below?

The method used in the **Main Control Room (MCR)** to isolate the CCW leak is to (1).

Per the BASES of Tech Spec 3.7.7 - CCW System, once the CCW leak is isolated from the MCR, the CCW System is (2).

A. (1) isolate CCW to ALL RCPs

(2) INOPERABLE

B. (1) isolate CCW to the 1A RCP ONLY

(2) INOPERABLE

C✓ (1) isolate CCW to ALL RCPs

(2) OPERABLE

D. (1) isolate CCW to the 1A RCP ONLY

(2) OPERABLE

83. Unit 1 has experienced a LOCA. The following conditions exist:

- EEP-1.0, Loss of Reactor or Secondary Coolant, is in progress.
- Containment Hydrogen is 6% by volume of dry air.

Which one of the following completes the statements below?

The hydrogen concentration (1) exceed the lower **FLAMMABILITY** limit.

Hydrogen concentration will be lowered using (2) .

A✓ (1) DOES

(2) SOP-10.0, POST LOCA Containment Pressurization and Vent System

B. (1) DOES

(2) Attachment 3 of EEP-1.0, Post LOCA Hydrogen Recombiner Operation

C. (1) does NOT

(2) SOP-10.0, POST LOCA Containment Pressurization and Vent System

D. (1) does NOT

(2) Attachment 3 of EEP-1.0, Post LOCA Hydrogen Recombiner Operation

84. Unit 1 is operating at 100% when a Pressurizer level control malfunction occurs and the following conditions exist:

- Pressurizer level is 70% and rising.
- Charging flow is 120 gpm.
- Letdown is 60 gpm.
- RCP seal injection is 8 gpm to each RCP.
- RCP seal leakoff is 3 gpm per pump.
- Actions in the field are being taken to regain control of Charging.
- It will take 8 minutes to regain control of Charging.

Which one of the following completes the statements below?

An **automatic** reactor trip (1) occur before control of Charging is regained.

Per the BASES of Tech Spec 3.3.1, Reactor Trip System (RTS) Instrumentation, the purpose of the automatic Reactor Trip on Pressurizer Water Level - High is to (2).

Reference Provided

A. (1) WILL

(2) provide protection against water relief through the PORV's

B. (1) WILL

(2) prevent thermal shock of the Spray Nozzle

C✓ (1) will NOT

(2) provide protection against water relief through the PORV's

D. (1) will NOT

(2) prevent thermal shock of the Spray Nozzle

85. Unit 1 is conducting a fuel reload and the following occurs:

At 1015: An Intermediate Leg leak is in progress on the 1A RCS loop with the following conditions.

- R-2, CTMT 155 FT, is in alarm.
- EH2, SFP LVL HI-LO is in alarm.
- Both RHR pumps have been secured due to cavitation.

Which one of the following completes the statements below?

At 1030, an emergency classification, per NMP-EP-110, Emergency Classification Determination and Initial Action, (1) required.

Per AOP-12, Residual Heat Removal System Malfunction, the maximum time to complete Containment closure is (2) hour(s).

	<u>(1)</u>	<u>(2)</u>
A.	IS	1
B.✓	IS	2
C.	is NOT	1
D.	is NOT	2

86. A fuel shuffle is in progress in the Unit 1 SFP with the following conditions:

At 1000:

- An 1800 lb. load is being moved over spent fuel.

At 1015:

- The load is dropped causing damage to the spent fuel.

At 1015, which one of the following describes the **minimum** Radiation Monitor(s) required to be in alarm to meet AOP-30, Refueling Accident, entry conditions?

AND

Which one of the following describes the the expected worst case consequences of dropping an 1800 lb. load onto the spent fuel Per the Bases of TR 13.9.4, Crane Travel-Spent Fuel Storage Building?

A✓ • R-5 OR R-25A

- The activity release will be limited to that contained in a single fuel assembly.

B. • R-5 OR R-25A

- The offsite dose may be as high as but not more than the 10 CFR 100 limit.

C. • R-5 AND R-25A

- The activity release will be limited to that contained in a single fuel assembly.

D. • R-5 AND R-25A

- The offsite dose may be as high as but not more than the 10 CFR 100 limit.

87. Unit 1 was operating at 100% power with the following conditions:

At 1000: A Loss of Offsite Power occurs.

At 1015: The following conditions exist -

- DG-02, 1G 4160 V bus tie to 1L 4160 V bus, has AMBER and GREEN Lights LIT.
- 4160V BUS 1L AC PWR AVAIL lights are NOT lit.

Which one of the following completes the statements below?

At 1015: The 1B DG (1) have cooling water supplied.

At 1015: The REQUIRED ACTION(S) of Tech Spec(s) (2) is(are) required to be performed.

Tech Spec nomenclature: 3.8.9, Distribution Systems - Operating
3.7.8, Service Water System (SWS)

	<u>(1)</u>	<u>(2)</u>
A.	WILL	3.8.9 AND 3.7.8
B.	will NOT	3.8.9 AND 3.7.8
C.	WILL	3.8.9 ONLY
D✓	will NOT	3.8.9 ONLY

88. Unit 1 is in Mode 3 with the following conditions:

- Pressurizer level is 22% and stable.

Subsequently, a rupture occurs on the Instrument Air header piping in the MSVR and AOP-6.0, Loss of Instrument Air, is in progress.

Which one of the following completes the statements below?

Pressurizer level will (1).

Per AOP-6.0, to maintain Pressurizer level, the operating crew is required to perform actions of (2) in conjunction with AOP-6.0.

Procedure Names: AOP-16.0, CVCS Malfunction
SOP-2.1, CVCS Plant Startup and Operation

	<u>(1)</u>	<u>(2)</u>
A.	lower	AOP-16.0
B✓	rise	AOP-16.0
C.	lower	SOP-2.1
D.	rise	SOP-2.1

89. Unit 1 is operating at 100% power when the following occurs:

- R-27B, CTMT HIGH RANGE, is tagged out.
- The instrument power supply fuse to R-27A, CTMT HIGH RANGE, blows.

Which one of the following completes the statements below?

R-27A indication will fail (1).

Per Tech Spec 3.3.3, Post Accident Monitoring Instrumentation, the
REQUIRED ACTION is to (2).

Reference Provided

A. (1) HIGH

(2) immediately initiate action in accordance with Specification 5.6.8

B. (1) HIGH

(2) restore R-27A OR R-27B to OPERABLE status in 7 days

C. (1) LOW

(2) immediately initiate action in accordance with Specification 5.6.8

D✓ (1) LOW

(2) restore R-27A OR R-27B to OPERABLE status in 7 days

90. Unit 1 is operating at 100% power and the following occurs:

- R-15A, SJAE EXH, power supply becomes erratic causing its indication to become unreliable but it does **not** alarm.

Per the ODCM, which one of the following actions are required to continue the release via this pathway, if any?

- A. No actions are required.
- B. Continuously collect samples using auxiliary equipment.
- C. Place SJAE filtration in service until R-15A is restored to operable.
- D✓ Perform grab samples at least once per 8 hours and analyze them within 24 hours.

91. Unit 1 is in MODE 6 with the following conditions:

- Core reload is complete.
- Control Rod Drive Shaft Latching and RCCA Drag Testing is about to begin per FHP-5.1, Control Rod Drive Shaft Latching/Unlatching Tool Operating Instruction.

Which one of the following completes the statements below?

Per FHP-0.0, Refueling Organization, the Fuel Handling Supervisor (1) .

Per UOP-4.1, Controlling Procedure for Refueling, two Source Range Nuclear Instruments (2) required to be OPERABLE.

A. (1) is required to be in Containment

(2) are NOT

B. (1) is required to be in Containment

(2) ARE

C. (1) may be in the Control Room in direct Communication with Containment

(2) are NOT

D. (1) may be in the Control Room in direct Communication with Containment

(2) ARE

92. A tagout is required to be cleared during night shift and the Work Document Holder is **not** on site and **cannot** be contacted to gain their approval.

Per NMP-AD-003, Equipment Clearance and Tagging, which one of the following can **sign off** the Work Document Holder?

A✓ Shift Manager

B. Operations Director

C. Maintenance Director

D. Maintenance Manager

93. Unit 1 is at 6% power with the following conditions:

- The 1A SGFP has been started.
- AFW is secured.
- The Main Feed Regulating Valves are closed.

At 1000 on January 1, 2015:

- MOV-3232B, MAIN FW TO 1B SG STOP VLV , is declared INOPERABLE.

At 1200 on January 1, 2015:

- FCV-489, 1B SG FW BYP FLOW, is declared INOPERABLE.

Subsequently it is determined that repairs will take 96 hours for each valve.

Which one of the following completes the statement below?

Per Tech Spec 3.7.3, Main Feedwater Stop Valves and Main Feedwater Regulation Valves (MFRVs) and Associated Bypass Valves, the **earliest** time that feed flow to the 1B SG must be isolated is _____ .

Reference Provided

- A. 1800 on January 1, 2015
- B✓ 2000 on January 1, 2015
- C. 1000 on January 4, 2015
- D. 1200 on January 4, 2015

94. A General Emergency on Unit 1 has been declared with following conditions:

- An Emergency Response Team is required to be dispatched to isolate an offsite release source.
- The TSC has not yet been manned.
- The expected exposure for the job is 35 REM TEDE per person.

Which one of the following completes the statements below?

To receive the dose listed above, operators (1) required to be volunteers.

The (2) will authorize the exposure.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|---------------|
| A. | are NOT | RP Supervisor |
| B. | are NOT | Shift Manager |
| C. | ARE | RP Supervisor |
| D✓ | ARE | Shift Manager |

95. Unit 1 is in MODE 6 with core offload in progress with the following condition:

- A spent fuel assembly is being moved from its assigned location in the core to the upender.

Subsequently, AOP-30.0, Refueling Accident, is entered

Which one of the following completes the statements below?

Per AOP-30.0, the Refueling SRO will direct the fuel assembly to be (1).

Per the BASES of Tech Spec 3.9.6, Refueling Cavity Water Level, 23 ft of water is required to be maintained above the fuel to (2).

- A. (1) placed in **any** empty fuel location in the core
(2) provide back up decay heat removal
- B. (1) placed in **any** empty fuel location in the core
(2) retain iodine fission product activity in the water during a fuel handling accident
- C. (1) returned to its assigned location in the core
(2) provide back up decay heat removal
- D✓ (1) returned to its assigned location in the core
(2) retain iodine fission product activity in the water during a fuel handling accident

96. Unit 2 reactor startup is in progress and the following conditions exist:

- NI31, SR1 COUNT RATE is 10^6 cps and stable.
- NI32, SR2 COUNT RATE is 10^4 cps and stable.
- TSLB-3 1-1, SR HI Q NC-31D is lit.
- TSLB-3 1-2, SR HI Q NC-32D is NOT lit.
- GA1, SR HI FLUX TRIP, is in alarm.
- The Reactor Trip breakers are **closed**.

Subsequently, The Shift Supervisor directs a manual Reactor trip.

- The Reactor Trip breakers **open**.

Which one of the following completes the statements below?

An emergency classification threshold value (1) been exceeded per NMP-EP-110-GL01, FNP EALS - ICs, Threshold Values And Basis.

The **latest** time the NRC can be notified is (2) hour(s) after the event / emergency declaration.

	<u>(1)</u>	<u>(2)</u>
A.	has NOT	4
B.	HAS	4
C.	has NOT	1
D✓	HAS	1

97. Unit 1 is performing the actions of EEP-0.0, Reactor Trip or Safety Injection, and AOP-9, Loss of Component Cooling Water. Conditions are as follows:

- 1F 4160V bus is de-energized.
- B Train CCW is the “on service” Train.
- 1B CCW pump is Tagged Out.
- 1A CCW pump tripped.
- 1C CHG PUMP is running.

Subsequently, the Shift Supervisor determines that Firewater is required to be aligned to the **1B Charging pump**.

Which one of the following completes the statements below?

The 1C Charging pump will be (1) while aligning Firewater to the 1B Charging pump.

(2) Charging pump CCW oil cooler piping will become chemically contaminated.

- | | <u>(1)</u> | <u>(2)</u> |
|----|--------------------|----------------|
| A. | secured | ONLY the 1B |
| B. | secured | BOTH 1B and 1C |
| C✓ | maintained running | ONLY the 1B |
| D. | maintained running | BOTH 1B and 1C |

98. Unit 1 operating crew has exited EEP-0.0, Reactor Trip or Safety Injection, and is now performing ECP-1.2, LOCA Outside Containment with the following conditions:

- The leak isolation steps are completed.
- RWST level is 12.5 ft.
- RCS pressure continues to lower.

Which one of the following completes the statement below?

The **next** procedure the operating crew is required to transition to is _____.

- A. EEP-0.0, Reactor Trip or Safety Injection
- B. ESP-1.3, Transfer to Cold Leg Recirculation
- C. EEP-1.0, Loss of Reactor or Secondary Coolant
- D✓ ECP-1.1, Loss of Emergency Coolant Recirculation

99. Unit 2 is performing the actions of FRP-H.1, Response to Loss of Secondary Heat Sink, and the following conditions exist:

- The TDAFW pump has been returned to service.
- Containment pressure is 0 psig.
- RCS Bleed and Feed was initiated, but has now been secured.
- RCS pressure is 1600 psig and rising.
- Pressurizer level is 23% and rising.

Which one of the following completes the statements below?

The **minimum** SG level that permitted securing Bleed and Feed was at least one SG (1).

The operating crew will transition to (2) from FRP-H.1.

- A. (1) Wide Range level at 14%
(2) ESP-1.1, SI Termination
- B. (1) Wide Range level at 14%
(2) EEP-1, Loss of Reactor or Secondary Coolant
- C✓ (1) Narrow Range level at 33%
(2) ESP-1.1, SI Termination
- D. (1) Narrow Range level at 33%
(2) EEP-1, Loss of Reactor or Secondary Coolant

100. Unit 1 is cooling down per ESP-0.2, Natural Circulation Cooldown to Prevent Reactor Vessel Head Steam Voiding, and the following conditions exist:

- RVLIS is not available.
- RCS Hot leg is 450°F and slowly lowering.
- RCS Cold leg is 425°F and slowly lowering.
- The crew is cooling down at the maximum rate allowed by procedure.
- Pressurizer level has just rapidly risen to 78% and is stable
- RCS pressure reduction is not required.
- CST level is 9ft.

Which one of the following completes the statements below?

The operating crew will transition to ESP-0.4, Natural Circulation Cooldown with Allowance for Reactor Vessel Head Steam Voiding (Without RVLIS), based on (1).

The **maximum** allowable cooldown rate in ESP-0.4 is (2).

Reference Provided

A✓ (1) CST Level

(2) <100°F in any 60 minute period

B. (1) CST Level

(2) <50°F/hr

C. (1) Reactor Vessel void formation being indicated

(2) <100°F in any 60 minute period

D. (1) Reactor Vessel void formation being indicated

(2) <50°F/hr

Pressurizer (Q1B31K001) Capacity vs. % Level

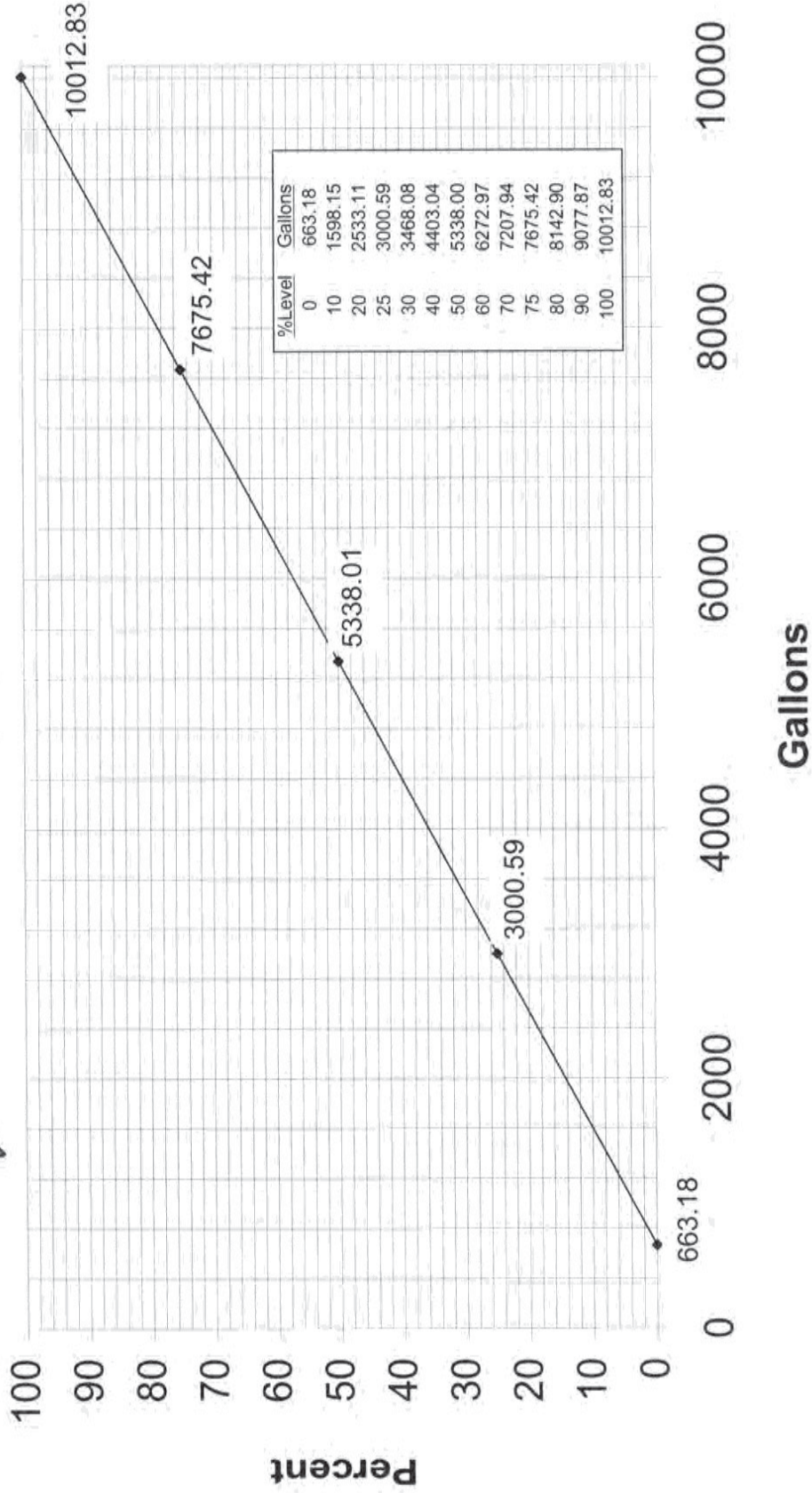
Unit 1 Volume II Curve 42

Hot Calibrated*

Approved *[Signature]*
ES Manager

Date 1/29/23

Rev. No. 3.0



*Based on saturated liquid temperature at 2235 psig

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.8.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.3-1.	E.1 Be in MODE 3. <u>AND</u>	6 hours
	E.2 Be in MODE 4.	12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.3-1.	F.1 Initiate action in accordance with Specification 5.6.8.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTE-----
SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	In accordance with the Surveillance Frequency Control Program
SR 3.3.3.2	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1
1. RCS Hot Leg Temperature (Wide Range)	2	E
2. RCS Cold Leg Temperature (Wide Range)	2	E
3. RCS Pressure (Wide Range)	2	E
4. Steam Generator (SG) Water Level (Wide or Narrow Range)	2/SG	E
5. Refueling Water Storage Tank Level	2	E
6. Containment Pressure (Narrow Range)	2	E
7. Pressurizer Water Level	2	E
8. Steam Line Pressure	2/SG	E
9. Auxiliary Feedwater Flow Rate	2	E
10. RCS Subcooling Margin Monitor	2	E
11. Containment Water Level (Wide Range)	2	E
12. Core Exit Temperature - Quadrant 1	2(a)	E
13. Core Exit Temperature - Quadrant 2	2(a)	E
14. Core Exit Temperature - Quadrant 3	2(a)	E
15. Core Exit Temperature - Quadrant 4	2(a)	E
16. Reactor Vessel Level Indicating System	2	F
17. Condensate Storage Tank Level	2	E
18. Deleted		
19. Containment Area Radiation (High Range)	2	F

(a) A channel consists of two core exit thermocouples.

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Stop Valves and Main Feedwater Regulation Valves (MFRVs) and Associated Bypass Valves

LCO 3.7.3 Three Main FW Stop Valves, three MFRVs, and associated bypass valves shall be OPERABLE.

APPLICABILITY: MODES 1 and 2, except when all main feedwater lines are isolated by either a Main FW Stop Valve, a MFRV and its associated bypass valve or by a closed manual valve.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Main FW Stop Valves inoperable.	A.1 Close or isolate Main FW Stop Valve.	72 hours
	<u>AND</u> A.2 Verify Main FW Stop Valve is closed or isolated.	Once per 7 days
B. One or more MFRVs inoperable.	B.1 Close or isolate MFRV.	72 hours
	<u>AND</u> B.2 Verify MFRV is closed or isolated.	Once per 7 days

Main FW Stop Valves and MFRVs and Associated Bypass Valves
3.7.3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more MFRV bypass valves inoperable.	C.1 Close or isolate bypass valve.	72 hours
	<u>AND</u> C.2 Verify bypass valve is closed or isolated.	Once per 7 days
D. Two valves in the same flow path inoperable.	D.1 Isolate affected flow path.	8 hours
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

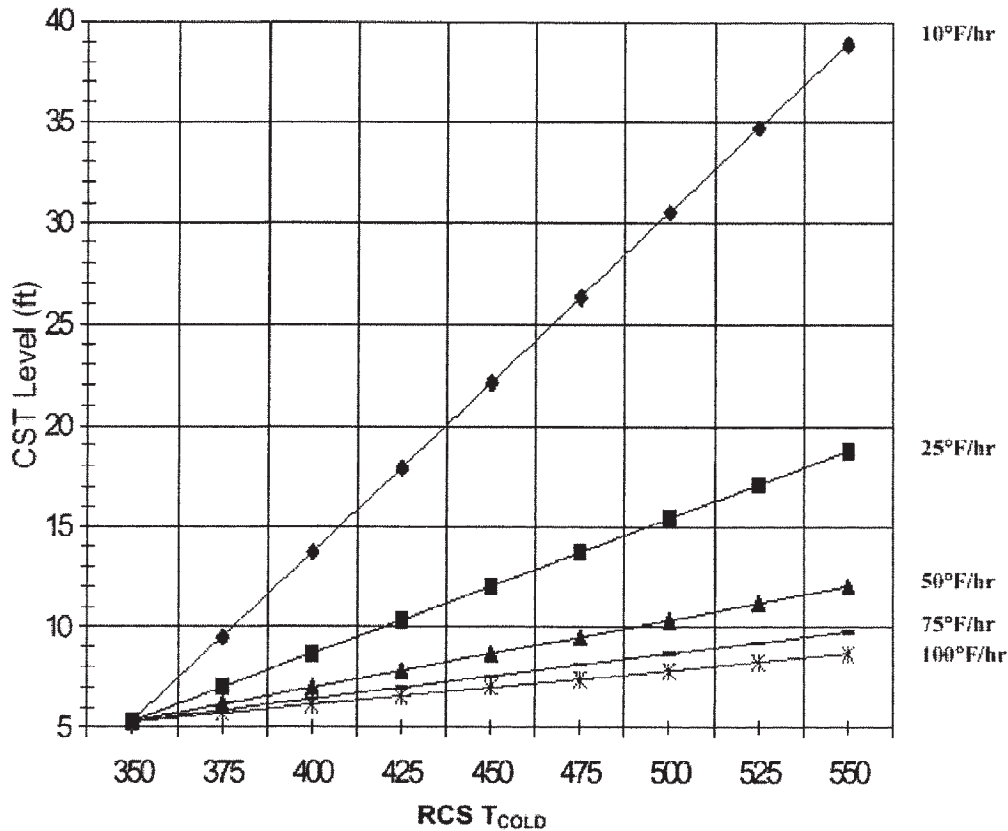
SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Verify the closure time of each Main FW Stop Valve, MFRV, and associated bypass valve is in accordance with the time requirement in the Inservice Testing Plan.	In accordance with the Inservice Testing Program.

ATTACHMENT 3

CALCULATION FOR ADEQUATE AVAILABLE CST INVENTORY

RCS Cooldown Rate vs Minimum Required CST Level



NOTE: These plots are based on an AFW flowrate of 350 gpm. An accurate assessment of required CST inventory can be made using the following calculation and that result used to make a determination if a transition to ESP-0.3 or 0.4 is required.

$$\left[\left(\frac{\text{RCS } T_{\text{COLD}} - 350^{\circ}\text{F}}{\text{Cooldown Rate}} \right) \times \text{AFW flowrate} \times 60 \div 12500 \right] + 5.3 = \text{Required CST Level}$$

Basis:

- Current Cooldown Rate is in Degrees F per hour.
- Current AFW flowrate is in Gallons per minute.
- 350°F = Temperature required to place RHR on-service.
- 12500 = Gallons per foot of CST level.
- 60 = Minutes per hour.
- 5.3 = Minimum CST level in feet before having to shift AFW suction to SW.