

**U.S. Nuclear Regulatory Commission
Site-Specific
RO Written Examination**

Applicant Information

Name:

Date: 11/12/04

Facility/Unit: Waterford 3

Region: I / II / III (IV)

Reactor Type: CE

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 exam you must achieve a final grade of at least 80.00 percent. Examination papers will be collected six hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

Examination Value 75 Points

Applicant's Scores _____ Points

Applicant's Grade _____ Percent

1.

The PNPO performs a manual reactor trip from CP-2. What are the expected indications on the Reactor Trip Status panel above CP-7, prior to the CPCs generating automatic trips when Shutdown CEAs insert?

- A. K1 & K3 lights off, Reactor Trip Bkrs 1, 3, 5, & 7 open
- B. K1 & K4 lights off, Reactor Trip Bkrs 1, 4, 5 & 8 open
- C. K2 & K4 lights off, Reactor Trip Bkrs 2, 4, 6, & 8 open
- D. K2 & K3 lights off, Reactor Trip Bkrs 2, 3, 6 & 7 open

2.

The following conditions exist:

- RCS Pressure is currently 1050 psia and stable.
- 100 gpm HPSI flow to each cold leg loop indicated on CP-8.
- Containment pressure and Quench Tank pressure are 19 psia and slowly rising together.
- Representative CET temperature indicate 515 °F.
- QSPDS levels 1 through 3 indicate voided on QSPDS 1 and 2
- Rx Vessel Plenum level on CP-7 reads 100%
- SG 1 level is cycling between 68 and 71% WR
- SG 2 level is 57% WR and dropping slowly
- Pressurizer level is 100%.

Which course of action should you recommend to the CRS?

- A. Stop one HPSI pump and throttle flow on the other train.
- B. Stop Both HPSI pumps one pump at a time.
- C. Continue to allow full HPSI flow into the RCS.
- D. Restore Letdown to service to attain Pzr level 33 - 60%.

3.

Which of the following have a higher importance in the mitigation strategy for a small break LOCA vice a large break LOCA?

- A. HPSI pumps and the Safety Injection Sump
- B. Charging Pumps and the Boric Acid Makeup Pumps
- C. Containment Spray pumps and Shutdown Cooling Heat Exchangers
- D. Steam Generators and Emergency Feedwater Pumps

4.

A large break LOCA occurred 20 minutes ago and the following conditions exist:

- RCS Pressure = 500 psia
- Representative CET Temperature = 500°F
- HPSI flow = 200 gpm/cold leg
- LPSI train A and B flow rate = 0 gpm
- Charging Pump A and B are running, Charging Pump AB is secured with AB assignment switch in NORM

Which of the following is correct concerning the criteria for verifying satisfactory two-phase natural circulation?

- A. Representative CET temperature is not met.
- B. HPSI flow is not met.
- C. LPSI Flow is not met.
- D. Charging pump status is not met.

5.

Given the following:

- The reactor was tripped and 2A RCP secured due to 2A RCP ARRD High Temperature
- Reverse rotation was indicated on 2A RCP and all RCPs were secured
- OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery has been implemented.

Which of the following meets the criteria of OP-902-003 for maintaining SG levels using Main Feed Water and would be sufficient to support natural circulation heat removal?

SG 1

SG2

- | | |
|-------------------------|---------------------|
| A. 45% NR and lowering, | 55% WR and stable |
| B. 50% WR and stable, | 75% NR and rising |
| C. 72% NR and rising, | 48% NR and lowering |
| D. 48% NR and rising, | 55% NR and rising |

6.

The plant is at 100% power with T_{cold} at 545°F and T_{hot} 603°F. The running charging pump tripped due to the VCT Outlet Valve, CVC-183 closing. Letdown isolated on high temperature due to the loss of the running charging pump. Determine the minimum required Pressurizer level to remain at power for the given conditions and the reason for the minimum level.

- A. 46.0%, to ensure that the pressurizer does not empty on a reactor trip.
- B. 46.0%, to ensure that PZR heaters remain covered on a reactor trip.
- C. 55.6%, to ensure that the pressurizer does on empty on a reactor trip.
- D. 55.6%, to ensure that PZR heaters remain covered on a reactor trip.

7.

Given the following:

- The plant operated for 200 days and was shutdown on Nov 9 at 2130 hours to repair a tube leak in SG. 2.
- At 0930 on Nov 12, while draining down to remove the primary manways on SG 2, a total loss of SDC occurred.
- The following plant conditions existed at 0930 hours:
 - RCS temperature 123°F
 - RCS level 14.5 feet
 - SG #1 level 72% WR
 - Pressurizer Manway is removed.

Determine the estimated time for core Uncovery.

- A. 0.2 hours
- B. 1.0 hours
- C. 1.5 hours
- D. 1.8 hours

8.

Given the following conditions:

- The plant is at 100% power
- CCW Makeup Pumps A and B auto started
- Both DCTs are bypassed and isolated
- All CCW pump suction and discharge cross-connect valves are closed
- Train A and B isolations to the AB loop are isolated
- Initially A and B train surge tank dropped and then recovered to normal and stabilized
- Both CCW Makeup Valves and the normal CCW Surge Tank Makeup valve opened and are now closed

Which of the following could cause these indications?

- A. A leak on the discharge of CCW Pump A
- B. A leak upstream of EDG B Flow Control Valve
- C. A leak on the AB Loop Return Header
- D. A leak on HPSI Pump AB Seal Cooler Return

9.

What would be the effect if the Pressurizer Backup Heaters failed to energize on a Pressurizer in-surge during a plant transient in Mode 1? (assuming no subsequent outsurge immediately)

- A. Pressurizer water space would remain subcooled for a longer period of time.
- B. RCS Pressure would slowly lower to trip setpoint due to loss of Heater Capacity.
- C. Pressurizer heater wells and surge line would be more subject to thermal shock.
- D. Proportional Heater current will rise immediately then lower over time.

10.

The Main Turbine tripped and Reactor Cutback failed to actuate. RCS pressure reached 2370 psia and the Operators tripped the Reactor using the manual trip pushbuttons on CP-2. The plant has experienced a Main Steam Line Break upstream of the Number one (1) Steam Generator Main Steam Isolation Valve.

SELECT the statement which describes the expected response of the Anticipated Transient System (ATS) and the Emergency Feedwater Actuation System (EFAS) for the following plant conditions:

Steam Generator #1: 500 psia (lowering), 20% WR level (lowering)

Steam Generator #2: 707 psia (lowering), 39.5% WR level (lowering)

DEFAS: Enabled

DRTS : Enabled

RCS pressure: 1700 psia (lowering)

RCS max pressure 2380 psig

All Emergency Feedwater controllers in automatic:

- A. DRTS and DEFAS should have auto actuated.
- B. EFAS-2 only should have auto actuated.
- C. EFAS-1 and EFAS-2 should have auto actuated.
- D. DRTS and EFAS should have auto actuated.

11.

The following plant conditions exist:

- The plant is in MODE 1.
- The latest leak rate data is as follows:
 - 10.1 GPM - Total RCS leakage rate.
 - 5.2 GPM - Leakage into the Reactor Drain Tank.
 - 0.9 GPM - Leakage past check valves from RCS to SI system. (Leakage has been quantified and confirmed)
 - 0.7 GPM - Total primary to secondary leakage (0.55 GPM From S/G-1).
 - 3.1 GPM - Leakage from a PZR Safety into the Quench Tank.

Which of the following requires a plant shutdown per TS 3.4.5.2?

- A. Pressure boundary leakage
- B. Unidentified leakage
- C. Identified leakage
- D. Primary to secondary leakage

12.

A Main Steam Line Break is in progress inside Containment. The CRS requests that you use a post accident instrument to monitor Containment Pressure. How can you easily identify post accident instruments on the control boards?

- A. The nameplate is marked with a black star.
- B. The instrument number (UNID) ends with an "S".
- C. The nameplate is marked with a black square.
- D. An orange border surrounds the nameplate.

13.

The plant is at 100% power, the SNPO notes the following indications:

- SG1 Steam Flow reads 7.5 E6 lbm/hr
- SG1 Feed Flow reads 7.5 E6 lbm/hr
- SG2 Steam Flow reads 7.5 E6 lbm/hr
- SG2 Feed Flow reads 1.65 E6 lbm/hr

Which of the following has occurred?

- A. Steam Generator Feed Pump B tripped
- B. FW-173B, SG2 Main Feedwater Reg valve closed
- C. FW-184B, SG2 Main Feedwater Isolation closed
- D. FW-166B, SG2 Startup Feedwater Reg valve closed

14.

During a station blackout, the Loss of Offsite Power/Station Blackout Recovery Procedure (OP-902-005) directs the Operator to place the Containment Spray Pump control switches to OFF.

Which of the following describes the reason for this step?

- A. To prevent overloading the Emergency Diesel Generators when restored.
- B. To prevent initiating Containment Spray when electrical power is restored.
- C. To prevent starting the Containment Spray Pumps with no seal cooling after power is restored.
- D. To protect the Containment Spray Pumps from the effects of loss of DC control power if battery chargers cannot be restored.

15.

A Loss of Offsite Power has occurred. Plant conditions are as follows:

- RCS pressure is 1736 psia, slowly rising
- T_h is 590°F and constant
- CET temperature is 598°F
- T_c is 550°F and slowly lowering

All of the following conditions meet the criteria for single phase natural circulation in accordance with OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery Procedure with the exception of:

- A. T_c temperature trend
- B. T_h temperature trend
- C. Subcooled Margin
- D. T_h -Representative CET ΔT

16.

Given the following conditions:

- Following a failure of SUPS MA inverter, ACC Pump A started due to ACC-126A failing Open
- ACC-126A was manually overridden closed and ACC Pump A was returned to standby
- SUPS MA is being restored on alternate power in accordance with OP-006-005, Inverters and Distribution

Prior to restoring power to CP-48, Train A Power and Annunciators, the operator prevents ACC Pump A from starting automatically on a:

- A. high Aux Component Cooling WCT basin temperature signal by racking out the pump breaker.
- B. high Aux Component Cooling pressure signal by removing the pump DC Control Power Fuses.
- C. high Component Cooling temperature signal by opening the pump DC Control Power knife switch.
- D. low Component Cooling pressure signal by placing the pump control switch to OFF.

17.

An SIAS occurred due to a LOCA. The SNPO is monitoring CCW temperatures. The following indications are noted:

- CCW Heat Exchanger A Outlet Temperature is 110 °F
- CCW Heat Exchanger B Outlet Temperature is 105 °F
- Wet Cooling Tower A Basin Temperature is 77 °F
- Wet Cooling Tower B Basin Temperature is 72 °F

What is the expected position of ACC-126A and B, ACC Header CCW HX Outlet Temp Control Valves?

- A. ACC-126A throttled OPEN, ACC-126B CLOSED
- B. ACC-126A CLOSED, ACC-126B throttled OPEN
- C. ACC-126A CLOSED, ACC-126B CLOSED
- D. ACC-126A throttled OPEN, ACC-126B throttled OPEN

18.

A LOCA is in progress. CSAS is actuated and Containment pressure is 17.9 psia and slowly lowering. The IA Header upstream of the IA dryers is ruptured and IA Receiver pressure indicates 20 psig.

Containment Spray Pump 'A' trips on overload 5 minutes after the Loss of IA pressure. Which of the following is true concerning closure of CS-125A to isolate the affected penetration?

- A. Essential Air must be aligned to CS-125A before it can be closed in accordance with the EOP appendix.
- B. CS-125A can still be closed using the EOP appendix utilizing the local air accumulator.
- C. An N2 accumulator provides motive force to operate CS-125A when closed from CP-8 C/S.
- D. Reset CSAS and CP-8 C/S to close CS-125A. Align Essential Air to ensure valve remains closed.

19.

Reactor power is 80 %; ASI is being controlled at the 100% ESI value. ASI is currently +0.020. Group P CEAs are being withdrawn for ASI control. During withdrawal, CEA 27 slips to 115 inches. All other Group P CEAs are at 140 inches. When attempts to realign CEA 27 are performed, it is determined to be mechanically bound.

When determining whether the CPCs are detecting the CEA misalignment, which of the following CPCs would have the most positive ASI value?

- A. CPC A
- B. CPC B
- C. CPC C
- D. CPC D

20.

Which of the following describes the signal used to generate the Fuel Handling Accident Signal?

- A. Fuel Handling Building (FHB) PIG Radiation Monitor Gas Channel High Alarm
- B. Fuel Handling Building Wide Range Gas Monitor High Alarm
- C. Any one of four safety FHB Area Radiation Monitors in High Alarm
- D. At least two of four safety FHB Area Radiation Monitors in High Alarm

21.

Given the following conditions:

- The Plant is in Mode 3 due to a tube leak in #1 S/G.
- OP-901-202, Steam Generator Tube Leakage or High Activity, is being implemented.
- Aux boiler is in operation
- Loop 1 $T_h = 495^\circ\text{F}$
- Both MSIVs and MFIVs are open
- RCPs 1A and 2A have been secured
- RC-301 A and B, PZR Spray Valves are in manual and open

What is the next major step to mitigate this situation and why?

- A. Perform cooldown to Shutdown Cooling entry conditions to minimize the impact on condensate inventory.
- B. Isolate # 1 S/G to minimize release of radioactive isotopes to the public and site personnel.
- C. Commence feed and bleed of #1 S/G via MFW and BD systems to dilute the radioactive isotopes in solution.
- D. Verify DWST is aligned as the feed source to the aux boiler to prevent contamination.

22.

Given the following:

- Reactor Power is 100%
- Condenser vacuum is 20.4 inches Hg and lowering .2 inches/minute
- OP-901-220, Loss of Condenser Vacuum is being implemented

Which of the following should be done at this time?

- A. Commence a rapid downpower until vacuum recovers to > 25 inches HG.
- B. Trip the reactor and verify the turbine tripped.
- C. Trip Feedwater Pump Turbines A and B.
- D. Verify SBCS Condenser Interlock actuated and steam bypass valves closed.

23.

OP-901-401, High Airborne Activity in the Control Room has been entered due to an inadvertent release of a Waste Gas Decay Tank with a temperature inversion condition. The Control Room Supervisor orders the SNPO to determine which set of Control Room Outside Air Intakes (CROAI) should be opened for makeup to the Control Room envelope. What should the SNPO base this decision on?

- A. The running Control Room Emergency Filtration Unit
- B. The running Control Room Normal Air Handling Unit
- C. The CROAI farthest from the Plant Stack
- D. The lowest pair of CROAI radiation monitor readings

24.

Which of the following Radiation Monitors are susceptible to Thermally Induced Currents (TIC) during a LOCA or Main Steam Line Break inside containment?

- A. Containment Purge Radiation Monitors
- B. Containment PIG Radiation Monitor
- C. Refueling Machine Area Radiation Monitor
- D. Containment High Range Radiation Monitors

25.

The OP-901-502, Control Room Evacuation attachment for taking local control of Atmospheric Dump Valves requires adjusting the inlet air regulator to match pressure at the outlet of the transducer prior to taking local control. What is the reason for performing this step?

- A. To ensure the valve closes prior to taking local control of the valve at the local air station.
- B. To equalize pressure across the valve operating piston prior to using the manual handwheel to operate the valve.
- C. To allow alignment of Essential Air to the valve without affecting valve position.
- D. To ensure the valve does not change position when taking local control of the valve at the local air station.

26.

A LOCA inside Containment has occurred. OP-902-002, Loss of Coolant Accident Recovery procedure has been implemented.

- Containment Pressure is 16.5 psia,
- RCS pressure is 1000 psia,
- T_{hot} is 550°F
- T_{cold} is 545°F.

The following Annunciators are in alarm on CP-36:

- A-4, Reactor Vessel Loss
- A-5, Reactor Core Cooling Inadequate
- B-4, QSPDS Subcooled Margin Low

Determine the condition of the RCS and the number of RCPs to be secured:

- A. RCS is Subcooled, 2 of 4 RCPs must be secured
- B. RCS is Subcooled, 4 of 4 RCPs must be secured
- C. RCS is Saturated, 2 of 4 RCPs must be secured
- D. RCS is Saturated, 4 of 4 RCPs must be secured

27.

A LOCA inside containment is in progress when a Tube Rupture on Steam Generator 1 occurs. All of the following would be performed to isolate the most affected Steam Generator **EXCEPT**:

- A. Verify ADV 1 closed and place controller in Manual
- B. Verify Main Steam Isolation Valve 1 is closed
- C. Verify Main Feedwater Isolation Valve 1 closed
- D. Verify SG 1 Blowdown Isolation Valves closed

28.

OP-902-005, Station Blackout Recovery, directs the operator to verify closed the CCW non-safety header containment isolation valves, CC-641, CC-710, ad CC-713 to isolate CCW to Containment. What is the reason for this?

- A. To prevent thermal shocking the CEDM coolers when restarting the CCW pumps.
- B. To prevent water hammer in Cntmt Bldg piping when restarting the CCW pumps.
- C. To prevent thermal shocking the RCPs when restarting the CCW pumps.
- D. To prevent running out the CCW pumps when restarting.

29.

The plant was initially in MODE 1 with the AB Safety busses powered from the A bus when the following sequence of events occurred: No other abnormal conditions are present other than those caused by the following conditions:

- The 3A bus de-energized due to an overcurrent trip on the 3A to 2A feeder breaker with EDG A OOS
- RCS pressure rapidly dropped to 1400 psia

Under these conditions what is supplying the suction path for the available charging pumps?

- A. Volume Control Tank
- B. Refueling Water Storage Pool
- C. Both BAMTs using BAM pumps and the Emergency Boration Valve
- D. Both BAMTs using the Gravity Feed Valves

30.

Given the following conditions:

- RCS temperature is 120°F and stable
- Shutdown Cooling A is in service
- RWLIS and RCSLMS indicate 14.5 ft
- All applicable actions of OP-001-003, RCS Drain Down have been completed

How would a loss of power to SI-129A, Shutdown Cooling Flow Control Valve, affect the RCS or SDC systems?

- A. An RCS cooldown commences
- B. An RCS heatup commences
- C. LPSI Pump A cavitates due to excessive vortexing
- D. LPSI Pump A experiences runout flow conditions

31.

Given the following:

- The RCS was drained to 14.5 “MSL.
- A loss of Shutdown Cooling event is in progress due to system leakage.
- No LPSI Pumps are running.
- HPSI Pump B was started IAW OP-901-131, Shutdown Cooling Malfunction for RCS makeup and level has been raised to 16’ MSL and stabilized.

Which of the following is correct concerning restoring a Shutdown Cooling Train?

- A. Vent and start LPSI Pump A, since HPSI Pump B is injecting to Hot Leg 1.
- B. Vent and start LPSI Pump A, since HPSI Pump B is injecting to Hot Leg 2.
- C. Vent and start LPSI Pump B, since HPSI Pump B is injecting to Hot Leg 1.
- D. Vent and start LPSI Pump B, since HPSI Pump B is injecting to Hot Leg 2.

32.

If a Pressurizer Relief Valve lifts at 100% power, steady-state operations, which of the following is correct?

- A. The downstream Safety Relief temperature detector will indicate $\sim T_{\text{sat}}$ for the current Pressurizer pressure.
- B. The downstream Safety Relief temperature detector will indicate $\sim T_{\text{sat}}$ for the current Quench Tank pressure.
- C. Quench Tank temperature will equal T_{sat} for the current Pressurizer pressure.
- D. Quench Tank pressure will equal the current Pressurizer pressure.

33.

Given the following:

- The plant is in Mode 1
- Annunciator, 'Quench Tank Pressure Hi' alarms
- Quench Tank pressure is 14 psig and rising slowly.
- RCS Vent Header Pressure indicator on CP-8 is reading 500 psia
- All RCS Vent valves indicate close
- A clamp-on LEFM, indicates flow passing through RC-3183, Pzr Vent to Quench Tank Solenoid Stop, and RC-1017, Rx/Pzr Vent to Quench Tank Isolation.

Based on this information, the crew should: (Take each action separately.)

- A. Isolate RC-3181.
- B. Isolate RC-1019.
- C. Ensure power removed from RC-1017 and isolate RC-1019.
- D. Ensure power removed from RC-3183 and RC-1017 and isolate RC-3181.

34.

CCW Pump A has tripped with CCW Pump AB OOS. Which of the following actions is performed to protect CCW Pump B from runout conditions?

- A. Split out the A and B CCW headers.
- B. Close the NNS loop isolations
- C. Secure Train B Containment Fan Coolers
- D. Align Chiller B cooling to the Wet Tower

35.

The plant is at 5% power:

If the controlling pressurizer pressure channel (PT-100X/Y) failed high, the reactor would most likely trip on: (Assume no operator actions)

- A. CPC RCS Pressure Aux Trip
- B. A calculated DNBR LO trip
- C. Pressurizer Pressure HI
- D. Pressurizer Pressure LO

36.

The reactor tripped from 100% power. Because of a malfunction of the PPS system the turbine is not tripped and the generator output breakers remain closed. If left unresolved this malfunction will cause:

- A. An increase in RCS temperature and pressure, resulting in lifting the pressurizer safeties.
- B. The main turbine will overspeed, resulting in damage to the main turbine blading and shaft.
- C. The main generator to motor, resulting in damage to the rotor or stator windings.
- D. An uncontrolled cool down of the RCS, resulting in a Main Steam Isolation Signal.

37.

A reactor trip occurred from 100% power on low SG 1 pressure due to a Main Steam Line Break inside containment. Currently conditions are at their most severe for each listed parameter:

- SG 1 Pressure is 750 psia, SG 2 Pressure is 850 psia
- SG 1 level is 17% NR, SG 2 level is 20% NR
- Containment Pressure is 16.5 psia
- RCS Pressure is 1750 psia
- No operator action has occurred

Which of the following components require action to place the component in the required condition?

- A. MS-401A, EFW Pump AB Turbine Steam Supply SG 1, is open
- B. EFW Pump A is not running
- C. MS-124B, Main Steam Line 2 MSIV SG 2, is closed
- D. MS-120A, MS Line 1 Upstream Drain Normal Isolation, is open

38.

Given the following conditions:

- Both LPSI Pumps are in service for Shutdown Cooling.
- PPS channel A is de-energized for maintenance.
- SUPS SMB faults and de-energizes.

Which of the following describes the impact on the LPSI Pumps?

- A. Both LPSI Pumps trip and are locked out until restoration of a PPS channel.
- B. Only LPSI pump A trips but can be restarted after a time delay.
- C. Only LPSI pump B trips and is locked out until restoration of a PPS Channel.
- D. Both LPSI pumps trip but can be restarted after a time delay.

39.

The plant is operating in MODE 1 with all system alignments normal when a Main Steam leak occurs inside Containment. The following conditions are noted:

- RCS pressure = 1750 psia
- Containment Pressure = 17.2 psia
- All Containment Fan Coolers (CFCs) are OPERABLE
- No manual operator actions have been taken

Determine the expected status of the Containment Cooling System at this point in time.

- A. 3 of 4 CFCs running in slow speed and discharging through the ring header.
- B. 4 of 4 CFCs running in slow speed and discharging through the safety dampers.
- C. 3 of 4 CFCs running in fast speed and discharging through the ring header.
- D. 4 of 4 CFCs running in fast speed and discharging through the safety dampers.

40.

All of the following will trip a CEDM Cooling Fan **EXCEPT**:

- A. Associated 31 Bus Undervoltage
- B. Safety Injection Actuation Signal
- C. Containment Isolation Actuation Signal
- D. Associated Fan inlet damper closes

41.

Given the following:

- Containment pressure is 17.9 psia
- The 31A feeder breaker trips on overcurrent and a Loss of Offsite Power occurs 1 minute later
- Both EDGs start and their output breakers close

After 205 seconds, which CS pump(s) are running? (assume no Operator action)

- A. CS Pump A and B
- B. Neither CS Pump
- C. CS Pump A
- D. CS Pump B

42.

The plant is operating at 50% with all systems aligned normally and primary and secondary heat removal are equal. The PNPO notes T_C starting to rise rapidly. Which of the following would cause this indication?

- A. Atmospheric Dump Valve 1 setpoint fails high.
- B. Main Turbine Governor Valve 3 indicates closed.
- C. MS-IPT-1010, MS crossover header pressure transmitter fails low.
- D. Main Turbine Throttle Valve 4 indicates closed.

43.

Plant conditions are as follow:

- Reactor power is 50% following a Reactor Power Cutback due to a loss of the Main Turbine
- Both Steam Generator Feed Pumps are running
- All 3 Condensate Pumps are running

What would be the expected configuration of the Feedwater Pumps if SUT B feeder breaker to bus B1 were to trip and what procedure would be applicable as a result of this malfunction?

- A. Both FWPTs would be operating; OP-902-000, Standard Post Trip Actions.
- B. Neither FWPT would be operating; OP-902-000, Standard Post Trip Actions.
- C. FWPT A would be operating; OP-901-101, Reactor Power Cutback.
- D. FWPT B would be operating; OP-901-101, Reactor Power Cutback.

44.

Which of the following will automatically close the Main Feedwater Regulating Valves and the S/U Feedwater Regulating Valves when their M/A stations are in manual?

- A. Reactor Trip Override
- B. High Level Override
- C. EFAS
- D. MSIS

45.

The output of the master controller for FWCS 1 became erratic and was taken to manual with an output of 60%. The level setpoint remains at 68% NR. Subsequently, a reactor trip occurs. Assuming no operator action occurs, what would be the response of the FW system?

- A. Level in SG 1 rises to the level setpoint, RTO clears, FW components go to program condition for 60% master controller output.
- B. Level in SG 1 rises to HLO setpoint of 81% NR; SUFRV 1 cycles between the HLO and RTO position around the HLO setpoint.
- C. Level in SG 1 rises, RTO does not clear, and MFIV 1 goes closed when SG 1 level reaches 96% WR.
- D. RTO is disabled, level rises rapidly in SG 1, and MFIV 1 goes closed when SG 1 level reaches 96% WR.

46.

Given the following:

- Containment pressure = 16.5 psia
- RCS pressure = 1900 psia
- S/G 1 & 2 pressures = 900 psia
- S/G 1 NR level = 30 %
- S/G 2 NR level = 25%

Which of the following valves should have repositioned due to an ESFAS actuation?

- A. MS-124A, Main Steam Line 1 MSIV SG 1
- B. FW-184B , Main FW Isol Valve Stm Gen 2
- C. BD-103B, SG Blowdown Isol Stm Gen 2 (Out)
- D. SSL-8006A, Sampling Isolation SG 1

47.

The shift is implementing OP-902-006, Loss of Main Feedwater Recovery procedure, and secured all RCPs. When performing a cooldown between MODE 3 and MODE 5 the cooldown limit is changed from the Technical Specification limit of 100°F/hr to 50°F/hr to minimize the probability of:

- A. Impeding natural circulation due to excessive heat removal causing abnormal density changes.
- B. Forming a bubble in the head when depressurizing the RCS during the cooldown.
- C. A rapid depressurization of the Steam Generators due to lower heat transfer from primary.
- D. Excessive thermal stresses due to large differential temperatures from the bottom to the top of the vessel.

48.

The plant is ready to parallel the Main Generator to the grid. A manual synchronization across the first Generator Output Breaker is desired. Incoming voltage is slightly higher than running voltage. You have observed 2 complete revolutions of the Synchroscope. The Synchroscope is rotating in the SLOW direction at 4 rpm. Which of following actions would be appropriate for the given conditions?

- A. Close the first Generator Output Breaker on the next rotation when the Synchroscope is slightly before the 12 o'clock position.
- B. Adjust the speed of the turbine to change the rotation of the Synchroscope to the FAST direction.
- C. Adjust the voltage of the Main Generator to obtain an incoming voltage slightly lower than running voltage.
- D. Adjust the speed of the turbine to lower the Synchroscope rotation speed in the SLOW direction.

49.

Which of the following statements is correct concerning the safety related Battery Chargers?

- A. A high voltage shutdown alarm light energizes when charger output voltage exceeds 144 VDC and must be manually reset.
- B. A low voltage alarm light energizes when charger output voltage falls below 132 VDC and automatically resets.
- C. A no charge alarm light will energize when battery charger amps falls below 10 amps and must be manually reset.
- D. During a battery charger startup up a phase fail light is not expected to energize and must be manually reset.

50.

The Power Supply for the Emergency Diesel Generator A Fuel Oil Storage Tank Transfer Pump is:

- A. 213A
- B. 213B
- C. 312A
- D. 312B

51.

The Monthly Channel Check of PRM-IRE-1900, Circulating Water Discharge Monitor is being performed IAW OP-004-001, Radiation Monitoring. Which of the following Status colors would indicate a failed Source Check?

- A. Purple (Magenta)
- B. Medium Blue
- C. Yellow
- D. White

52.

All of the following would require a full flow sweep of the Auxiliary Component Cooling Water system EXCEPT:

- A. ACCW Pump A running at less than 1000 gpm for greater than 1 hour
- B. ACC 126A failed open for 1 hour with ACCW Pump A OOS
- C. ACCW Jockey Pump A aligned to prevent runout condition.
- D. ACCW pump A OOS and Jockey Pump A trips

53.

Given the following:

- Plant is in Mode 3
- CW Pumps A, B, C and D are running
- TC Pump A running,
- TC pump B OOS

Which of the following would require alignment of alternate cooling to the instrument air compressors in order to maintain the compressors in operation?

- A. 86B1 actuation
- B. SUT 86STB actuation
- C. SUT 86STA actuation
- D. 86A1 actuation

54.

Given the following:

- Containment Pressure = 16.9 psia
- RCS Pressure = 1450 psia
- CS-125B, Containment Spray Header B Isolation Valve is closed
- CC-963A, CCW Shutdown Heat Exchanger A Outlet Valve is closed
- SI-228A, HPSI Cold Leg Injection 2B Flow Control Valve is open
- CAR-200B, Containment Pressure Exhaust Inlet Valve is open

Based on the given conditions which valve did not automatically reposition to its ESFAS actuation position?

- A. CS-125B
- B. CC-963A
- C. SI-228A
- D. CAR-200B

55.

A LOCA inside containment has occurred and OP-902-002 is being implemented. A leak develops between CC 808A, Containment Fan Cooler A CCW Inlet and CC 822A, Containment Fan Cooler A CCW Outlet. Which actions are required to isolate the leak in accordance with OP-902-009?

- A. Take Containment Fan Cooler A control switch to STOP.
- B. Manually gag CC-808A and CC-822A, Containment Fan Cooler A CCW Inlet and Outlet closed.
- C. Place the keyswitch for CC 808A and CC 822A on Aux Panel 1 to OVERRIDE
- D. Place the keyswitch on CP 18 to OVERRIDE .

56.

Which of the following components would result in a loss of CEA MG Set A, if an overcurrent condition for the component occurred and its load breaker failed to open?

- A. CEDM Fan Cooler C
- B. Polar Crane
- C. Back up Heater Bank 1
- D. Proportional Heater Bank 1

57.

The reactor is at 100% power when a turbine trip occurs. The PNPO notes that RCS pressure is 2775 psia and no reactor trip breakers opened. What action must be accomplished per TS 2.1.2, Safety Limit – RCS Pressure?

- A. Restore RCS pressure to < 2500 psia within 5 minutes.
- B. Be in Hot Standby with RCS pressure < 2750 psia within 1 hour.
- C. Be in Hot Standby with RCS pressure between 2025 and 2275 psia within 2 hours.
- D. Restore RCS pressure to < 2250 psia within 15 minutes; be in Cold Shutdown in the next 30 hrs.

58.

The plant is operating steady state at 55% power. Tavg is being maintained on the program. A Pressurizer Level Control system malfunction has occurred, requiring Pressurizer Level Control to be placed in Manual. The CRS wants Pzr level to be restored to program level prior to placing the pressurizer level controller back in Auto. What is your target level?

- A. 38.0%
- B. 43.0%
- C. 48.0%
- D. 53.0%

59.

Reg Group 6 stops while being withdrawn for ASI control. The NPO notes the following CEA position indication:

- CEA 20 – 145.5”
- CEA 21 – 147”
- CEA 22 – 147.75”
- CEA 23 – 148.5”

Which of the following stopped Reg Group 6?

- A. CEA 20
- B. CEA 21
- C. CEA 22
- D. CEA 23

60.

Given the following conditions:

- ENI Control Channel 1 failed low
- Reactor Power is currently 75%
- AMI Threshold controller potentiometer set at 50
- SBCS valve 6 permissive switch is in OFF
- CEDMCS Mode Select switch in Auto Sequential
- CPC pretrips present on at A and B channels
- Both RRS Channels have High Rate Insert lights illuminated
- Reactor Reg 1 is selected

Reg Group 6 CEA's will automatically insert if:

- A. The AMI threshold is lowered
- B. Place SBCS valve 6 Permissive switch to AUTO or MANUAL
- C. At least 1 CPC supplied pretrip is cleared
- D. RRS Select switch is placed to Channel 2

61.

Airborne Radioactivity Removal Unit A is running. The following PMC alarms and reports are received:

- ARRU A CHAR FLT TEMP – HI
- ARRU A CHAR FILTER TEMP – TROUBLE
- E-13 (3A) ARRU CHAR ABSD TEMP – HI HI
- ARRU A HEPA FLTR AIR DP – HI
- NAO reports indications of fire in Airborne Radioactivity Removal Unit A Charcoal Filter

Which of the following is true?

- A. Airborne Radioactivity Removal Unit A should be secured, and ARRS Deluge System should be manually initiated from the Control Room
- B. Airborne Radioactivity Removal Unit A will trip automatically, and ARRS Deluge System should be manually initiated from the Control Room
- C. Airborne Radioactivity Removal Unit A should be secured, the ARRS Deluge System will automatically initiate due to High Charcoal Bed Temperature.
- D. Airborne Radioactivity Removal Unit A will trip automatically, the ARRS Deluge System will automatically initiate due to High Charcoal Bed Temperature

62.

A discharge of BACT A is in progress when the NPO notes that Boron Management to Circulating Water Shutoff and Control Valves, BM-547 and BM-549, are closed. Any of the following could have caused these valves to close **EXCEPT**:

- A. Low sample flow through the radiation monitor.
- B. Low process flow from BACT A due to low level.
- C. Radiation monitor detector output fails high.
- D. Radiation monitor detector output fails low.

63.

Given the following:

- GDT A release in progress.
- Containment purge in progress under continuous release permit.
- Control Room Emergency Filtration Unit A running for surveillance.
- FHB Emergency Filtration unit B running due to handling spent fuel with FHB Emergency Filtration unit A inoperable.

Which of the following would require the GDT release to be manually secured?

- A. Switchgear Main Air Handling Unit A trips.
- B. Broad Range Gas Monitor in HIGH alarm.
- C. Control Room Emergency Filtration Unit A trips.
- D. FHB Emergency Filtration Unit B trips.

64.

When conducting a discharge to the Circulating Water system from a Waste Condensate Tank, the discharge could be automatically isolated due to a high _____ .

- A. River water level.
- B. BM Radiation Monitor alarm.
- C. LWM Radiation Monitor alarm.
- D. Circulating Water Radiation Monitor alarm.

65.

Given the following:

- The plant is at 100% power
- Excessive Instrument Air (IA) usage has been noted on the PMC AIR mimic
- Initial Instrument Air header pressure was 115 psig and is slowly dropping

As IA header pressure drops, which one of the following actions occur?

- A. The SA to IA Crossconnect valve starts to open at 105 psig to provide a backup source of air.
- B. The running IA compressor loads at 100 psig IA header pressure to raise air compressor output.
- C. The IA compressor selected for standby starts at 90 psig to double air compressor capacity.
- D. The Instrument Air Dryers are bypassed at 80 psig to ensure desiccant blockage is not a factor.

66.

Which of the following is prohibited by OP-100-001, Operations Standards and Expectations?

- A. A Turbine load reduction is performed by a non-licensed Level A NAO currently standing on the job training watches for Reactor Operator Class and supervised by the SNPO.
- B. A Shutdown Cooling Purification valve lineup verified by a Level B NAO who has successfully completed Level A NAO classroom training.
- C. The Outside Watch is assigned as Emergency Communicator and as a Fire Brigade member.
- D. Moving CEAs for ASI control performed by a Reactor Operator, whose license is inactive per the requirements of 10 CFR 55, under the supervision of an operator with an active license.

67.

Which of the following would require making a plant page announcement and repeating the announcement at least two more times?

- A. Starting HPSI Pump A with no Operator in attendance at the pump.
- B. Entry into the Control Room Evacuation Procedure.
- C. Entry into the Reactor Trip Recovery Procedure.
- D. The plant has declared an Unusual Event.

68.

A Reactor Startup is in progress. The PNPO withdraws CEA group 5 to 50 inches and stops all rod motion. The following indications are observed by the PNPO:

- Positive Startup rate
- Reactor Power steadily rising.

Which of the following actions would be correct?

- A. Manually drive all CEAs to lower electrical limit and commence direct boration.
- B. Trip the reactor and commence emergency boration.
- C. Manually drive all Reg Group CEAs to lower electrical limit and recalculate ECC.
- D. Commence emergency boration and recalculate ECC.

69.

Which of the following statements best describes a Temporary Alteration as defined in UNT-005-004, Temporary Alteration Control?

- A. Removing a failed circuit card from a Seismic Class I cabinet under an approved Work Authorization with the equipment declared out of service.
- B. Gagging Feedwater Pump Suction relief valve to prevent weepage while evaluating the need to change relief setpoint.
- C. Installing electrical jumpers in an approved maintenance procedure with independent verification signatures for installation and removal.
- D. Attaching hoses or tubing to system drain connections to facilitate draining within the boundaries of an approved clearance.

70.

A normal plant shutdown is in progress for refueling, the reactor is at 30 % power. The Regulating Groups CEAs are being used for ASI control. Regulating Group 6 CEAs are at 80 inches. Regulating Group 5 may not be inserted beyond _____ inches.

- A. 75
- B. 80
- C. 90
- D. 95

71.

Which of the following is TRUE about Containment Purge during Mode 6 with the Containment Equipment Hatch open?

- A. The Airborne Radioactivity Removal System is prohibited from running during Containment Purge.
- B. If Containment Purge continues for more than 10 hours, the release will be covered by the Plant Stack Continuous Permit.
- C. Containment Purge must be secured if ambient barometric pressure is 29.8 INHG.
- D. Containment Purge may be interrupted due to high differential pressure if CAP 102, Containment Purge Make-up valve is stuck closed.

72.

A valve must be worked in the RCA. The dose rate in the area is 40 mrem/hr. Two options exist to complete the work.

Option 1: Operator X can perform the assignment in seventy five (75) minutes alone.

Option 2: Operators Y and Z, can perform the assignment in forty five (45) minutes together.

Which of the following options is preferable and consistent with the ALARA program?

- A. Option 1 since Operator X exposure is 50 mrem.
- B. Option 1 since Operator X exposure is 60 mrem.
- C. Option 2 since the exposure per person is 15.0 mrem.
- D. Option 2 since the exposure per person is 30.0 mrem.

73.

The following plant conditions exist:

- A feed line break has occurred inside containment.
- Containment pressure is 17.4 psia.
- Containment radiation levels are normal.
- PZR pressure is 1825 psia.
- RWSP level is 90%.
- S/G #1 is at 925 psia and 50% WR.
- S/G #2 is at 580 psia and 20% WR.

Which of the following groups of actuation signals are present?

- A. SIAS, MSIS, CIAS, EFAS-1
- B. SIAS, MSIS, CIAS, EFAS-2
- C. SIAS, CIAS, CSAS, EFAS-1
- D. MSIS, CSAS, CIAS, EFAS-2

74.

Safety Functions are checked during EOP implementation by each of the following methods with the exception of:

- A. Safety Function Status Checklists of each Optimal Recovery Procedure.
- B. The performance of OP-902-000, Standard Post Trip Actions.
- C. Safety Function prioritization in the Functional Recovery Procedure.
- D. The performance of the OP-902-009 Att. 1, Diagnostic Flowchart.

75.

Plant conditions are as follow:

- 100% power, steady-state operations
- No major equipment out of service
- Subgroups 5 and 11 are selected
- The following annunciators are received on CP-1
 - FWPT A TRIP LUBE OIL PRESS LO
 - FWPT A FLOW LO
- The SNPO reports that Feed Water Pump A has tripped

What are the PNPO's immediate actions as a result of this condition?

- A. Place CEDM Mode Select Switch to AS, verify selected Subgroups dropped
- B. Place CEDM Mode Select Switch to MS, verify selected Subgroups dropped
- C. Place CEDM Mode Select Switch to AS, verify Main Turbine load < 576 MW
- D. Place CEDM Mode Select Switch to MS, verify Main Turbine load < 576 MW

END OF TEST

**U.S. Nuclear Regulatory Commission
Site-Specific
SRO Written Examination**

Applicant Information

Name:

Date: 11/12/04

Facility/Unit: Waterford 3

Region: I / II / III / IV

Reactor Type: CE

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 exam you must achieve a final grade of at least 80.00 percent overall, with a 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require an 80.00 percent to pass. You have eight hours to complete the combined examination, and three hours if you are only taking the SRO portion.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

RO / SRO-Only / Total Examination Values _____ / 25 / 25 Points

Applicant's Scores _____ / _____ / _____ Points

Applicant's Grade _____ / _____ / _____ Percent

1.

Which of the following situations require entry into OP-902-008, Functional Recovery Procedure? (Assume all other equipment is operating as designed unless specified otherwise)

- A. SGTR in progress combined with a loss of offsite power and EDG B trips.
- B. Large Break LOCA in progress and reactor trip using DRTS was required.
- C. 3 CEA's fail to insert into the core and a Station Blackout is in progress.
- D. SG 1 Main Steam Line Break with Charging Pumps A/B and B unavailable.

2.

A Steam Generator Tube Rupture has occurred in S/G 2 and the following conditions exist:

- Highest $T_{\text{cold}} = 490^{\circ}\text{F}$
- Highest $T_{\text{hot}} = 500^{\circ}\text{F}$
- S/G 2 is isolated and pressure = 800 psia
- RCPs 1B and 2B are running to enhance the cooldown

Determine the minimum RCS pressure that you should order the PNPO to maintain at this time:

- A. 850 psia
- B. 870 psia
- C. 900 psia
- D. 950 psia

3.

Which of the following would require steam generator tube inspections to be performed during the next shutdown after the event? (assume no other malfunctions occurred)

- A. A line break upstream of the letdown flow control valves that was manually isolated by the PNPO prior to auto isolation.
- B. A rupture occurs on the suction line to FWPT A.
- C. The EFW pump AB supply line ruptures upstream of MS-401B.
- D. A seismic event is felt in the Control Room, the amber and red lights are OFF on the Seismic Monitoring panel.

4.

A trip of the 1B 6.9 KV Bus occurs followed by, a complete loss of condenser vacuum. Shortly thereafter the Condensate Storage Pool (CSP) develops an unisolable leak. Which of the following procedures should be implemented and what action should be taken when CSP level lowers less than 25%?

- A. OP-901-220, Loss of Condenser Vacuum, open CMU-141, CSP Level Control Valve Bypass.
- B. OP-902-001, Reactor Trip Recovery, start the Auxiliary Feedwater Pump and establish flow.
- C. OP-902-003, Loss of Offsite Power/Loss of Forced Circulation, transfer EFW pump suction to both Wet Cooling Tower basins.
- D. OP-902-006, Loss of Main Feedwater and transfer EFW pump suction to one Wet Cooling Tower basin.

5.

The initial availability verification of a Temporary Emergency Diesel has been performed for an Emergency Diesel Generator outage. Per the TS Bases, all of the following are required for the subsequent availability verification except:

- A. Verify a 24 hr on-site fuel supply is available.
- B. Ensure TEDG aligned to supply through the non-safety bus to the safety bus.
- C. Start the TEDG and verify proper operation.
- D. Verify the TEDG is mechanically and electrically ready for manual operation.

6.

Given the following:

- Jockey Pump B is running
- ACC Pump B Secured
- ACC-126B, ACC B Temp Cntrl Vlv is closed
- ACC-110B, ACC Pump B Disch Isol is closed
- Component Cooling Water Pump A is OOS
- Component Cooling Water Pump B is Operable

Wet Cooling Tower (WCT) B Level starts lowering and ACC Pump B starts and ACC-126B remains closed. WCT B level is 95% and slowly lowering. What is the location of the leak and what is the maximum time frame to be in Mode 3 if no equipment is returned to service?

- A. Between ACC-108B, ACC Pump B Outlet Check Valve and ACC-110B, ACC Pump B Disch Isol. Mode 3 must be reached within the next 7 hours.
- B. Between ACC-108B, ACC Pump B Outlet Check Valve and ACC-110B, ACC Pump B Disch Isol. Mode 3 must be reached within the next 78 hours.
- C. Between ACC-110B, ACC Pump B Disch Isol, and ACC-126B, ACC B Temp Cntrl Vlv. Mode 3 must be reached within the next 7 hours.
- D. Between ACC-110B, ACC Pump B Disch Isol, and ACC-126B, ACC B Temp Cntrl Vlv. Mode 3 must be reached within the next 78 hours.

7.

An instrument air leak has resulted in IA header pressure lowering to 80 psig. The PMC is unavailable and OP-901-501, PMC or COLSS Inoperable. The Control Room staff has implemented OP-901-511, Att. 4, Safety related Valve Accumulator checks. The RCA operator calls in the following readings:

- CC-710, Cntmt CCW Return Hdr Inside Cntmt Isol 92 psig
- CC-641, CCW to Containment Cntmt Outside Isol 95 psig
- CC-713, Cntmt CCW Return Hdr Outside Cntmt Isol 89 psig

Which of the following is correct?

- A. Declare CC-641 inoperable. Enter TS 3.0.3, restore to operable status within 1 hour or be in Hot Standby with the following 6 hours.
- B. Declare CC-710 inoperable. Enter TS 3.6.3, restore to operable status within 4 hours or be in Hot Standby with the following 6 hours.
- C. Declare CC-713 inoperable. Enter TS 3.6.3, restore to operable status within 4 hours or be in Hot Standby with the following 6 hours.
- D. Declare CC-710 and CC-713 inoperable. Enter TS 3.0.3, restore to operable status within 1 hour or be in Hot Standby with the following 6 hours.

8.

Given the following:

- Reactor power is 99.5%
- Group P is inserted to 115 inches.
- The PNPO pulls Group P out 3 steps in MANUAL GROUP and returns the CEA Mode Selector Switch to the OFF position.
- Reg Group P CEAs continue stepping out.

As the CRS, which of the following orders to the NPO is warranted?

- A. Initiate emergency boration.
- B. Manually insert Group P.
- C. Manually trip the reactor.
- D. Open the 32A(B) bus feeder bkrs.

9.

Given the following:

- Reactor Power = 100% steady
- PZR Level indicators RC-IPI-0110X and Y = 54%, slowly lowering
- RCS pressure indicators = 2245 psia, slowly lowering
- RRS1 and RRS 2 Tave recorders show a step drop on both Tavg pens from 574°F to 555°F
- Letdown Flow = 126 gpm
- Charging flow = 44 gpm

Determine the correct procedure and subsection to implement.

- A. OP-901-110, Pressurizer Level Control Malfunction, Subsection E1, Pressurizer Level Control Channel Malfunction
- B. OP-901-110, Pressurizer Level Control Malfunction, Subsection E2, Pressurizer Level Setpoint Malfunction
- C. OP-901-110, Pressurizer Level Control Malfunction, Subsection E3, Pressurizer Level Controller Malfunction
- D. OP-901-112, Charging/Letdown Malfunction, Subsection E2, Letdown Malfunction

10.

Given the following:

- The plant is in Mode 6
- Startup Channel 1 reads 150 cps
- Startup Channel 2 reads 0 cps
- Startup Channel 2 Offnormal annunciator is alarming
- Startup Channel 1 and 2 HV Select switches are in On per RF-001-001
- Refueling personnel are installing the reactor head
- RF-004-001, Att. 9.1, Dilution Flowpath Isolation Verification has been completed.
- Mode 6 minimum required boron concentration is 2400 ppm
- Charging Pump A breaker is racked in, the pump is not running
- Charging Pump AB and B breakers are racked out

What actions must be done?

- A. Enter TS 3.9.2.a, immediately suspend installation of reactor head
- B. Enter TS 3.9.2.a, & 3.1.2.9.b, sample RCS boron within an hour
- C. Enter TS 3.1.2.9.b, sample RCS boron every 2.25 hours
- D. Enter TS 3.9.2.a, stop work that could add water < 2400 ppm to the RCS

11.

Given the following:

- CARS Train B is in service for containment pressure reduction
- CS Pump A is tagged out with CS-117A, SDCHX A Outlet Stop Check and CS-118A, SDCHX A Outlet Isolation to RWSP are tagged closed
- CFC A, B, and C are in service, CFC D is in standby

A LOCA occurs and Containment Pressure is 18.0 psia and rising. Which of the following would constitute a loss of the containment integrity safety function and requires manual actions to regain integrity? (Assume no other malfunctions occurred)

- A. CAR-202B, CARS Exhaust Header B Upstream Isolation fails to close on CIAS.
- B. CFC A trips on overload due to fan flooding from ruptured CCW cooling coils.
- C. CS-125A, CS Header A Isolation Valve opens on CSAS.
- D. CVC-101, Letdown Stop Valve fails to close on its associated ESFAS actuation.

12.

Given the following:

- A maintenance outage requiring an RCS draindown is in progress
- SI-406A, LTOP Relief Valve A was declared out of service 1 hour ago due to setpoint calibration errors which would result in the valve not lifting until 450 psia. The RCS cooldown is stopped until the valve setpoint can be recalibrated.
- An overcooling event occurs that lowers RCS average temperature from 235° to 195°F over a 5 minute period. RCS cold leg temperatures are 190°F.

Operator action stops the cooldown but SI-405B failed closed due to a DC bkr failure. How much time remains to have the RCS depressurized and vented?

- A. 8 Hrs
- B. 24 Hrs
- C. 32 Hrs
- D. 175 Hrs

13.

Wet reference leg level transmitter CVC-ILT-0227 equalizing valve is leaking by its seat and the reference and variable legs have equalized. Determine the effect on the operation of the CVC system and the correct procedure to implement?

- A. Auto Makeup to the VCT would stop if in service. Implement OP-901-112, Letdown or Charging Malfunction.
- B. The VCT inlet valve diverts to the Holdup Tanks if the C/S is in the AUTO position. Implement OP-901-113, VCT Makeup Malfunction.
- C. Charging pump suction automatically realigns to the Refueling Water Storage Pool. Implement OP-901-113, VCT Makeup Malfunction.
- D. Annunciators actuate for VCT Level Lo and VCT Level Lo-Lo on Panel CP-4. Implement OP-901-112, Letdown or Charging Malfunction.

14.

Given the following initial conditions:

- The plant is in MODE 5 with both SDC trains in service.
- PZR level is 50% Cold Cal with a bubble in the pressurizer.
- RCS Pressure is 370 psia.
- RCP 1A is running.
- Letdown and charging are currently in service.

While performing PPS surveillances, a SIAS signal is generated and all auto actions occur. Which procedure should you enter and what action needs to be performed expeditiously?

- A. OP-901-131, Shutdown Cooling Malfunction, secure both LPSI pumps
- B. OP-901-504, Inadvertent ESFAS Actuation, secure both HPSI pumps
- C. OP-902-000, Standard Post Trip Actions; secure all charging pumps
- D. OP-902-008, Functional Recovery, secure RCP 1A.

15.

Given the following:

- The plant operated for 120 days at 100% power
- An automatic reactor trip occurred on SG 1 level lo due to a FWCS valve failure
- The reactor has been shutdown for 5 hours
- No PPS surveillances have been performed since the trip
- It is desired to close the reactor trip breakers to support maintenance testing

Which of the following sections of OP-903-107, PPS Channel Functional Test must be performed for all four channels of PPS to allow reclosing the reactor trip breakers with the CEA disconnects closed and the CEA MG sets operating?

- A. DNBR Low
- B. High Linear Power
- C. High Logarithmic Power
- D. Low Steam Generator 1 Level

16.

The plant is in Mode 3. Emergency Diesel Generator B tripped on overspeed during a surveillance run. No other equipment is out of service. OP-903-066, Electrical Breaker Alignment Check was performed by an NPO and the following conditions were noted:

• Grid Line Voltage	A – 236 KV	B – 230 KV
• SUT Disconnect Status	A - Closed	B - Closed
• SUT Feeder Bkr to 2 Bus Control Power Status	A – On	B – On
• 2 Bus to 3 Bus Tie Bkr Status	A – Closed	B – Closed
• 3 Bus to 2 Bus Tie Bkr Status	A – Closed	B – Closed
• 31 Bus Fdr Bkr Status	A- Closed	B - Closed
• 2 Bus Volts	A – 4200 V	B – 4030 V
• 3 Bus Volts	A- 4150 V	B – 3990 V
• 31 Bus Volts	A – 475 V	B – 430 V
• Switchyard OCB Status	7176 – Closed	7186 - Closed
• Switchyard OCB Status	7172 – Open	7182 - Closed

Which of the following action statements need to be entered?

- A. 3.8.1.1.a & d
- B. 3.8.1.1.b & d
- C. 3.8.1.1.c & d
- D. 3.0.3

17.

A batch gaseous release is in progress from containment through the Containment Purge and RAB Ventilation system. The release has been in progress for 1 hour when the NPO reports that 10 meter wind speed is 1.2 meters/sec and the 199 – 33' delta T is 0.8°C. Determine the direction you need to give the NPO to comply with the release permit requirements

- A. Secure Containment Purge immediately.
- B. Secure Containment Purge if 10 meter wind direction is $\geq 68^\circ$ but $\leq 339^\circ$.
- C. Secure Containment Purge if 10 meter wind direction is $> 339^\circ$ but $< 68^\circ$.
- D. Continue Containment Purge with no restrictions.

18.

Given the following conditions:

- The plant is at 100% power
- All systems are aligned normally
- A spurious 86G1 actuation trips the Main Generator and Turbine
- Plant systems respond normally to the event

Which of the following procedures needs to be implemented immediately for this event?

- A. OP-901-211, Generator Malfunction
- B. OP-901-210, Turbine Trip
- C. OP-901-101, Reactor Power Cutback
- D. OP-902-000, Standard Post Trip Actions

19.

Given the following conditions:

- An ECC has been calculated for Group P at 75”
- RCS boron concentration is at ECC boron concentration
- A reactor startup is in progress

MODE 2 will be entered when commencing withdrawal of:

- A. Shutdown Group A
- B. Shutdown Group B
- C. Reg Group 1
- D. Group P

20.

Refer to Control Room envelope figures 1 through 4. The plant is in Mode 3. Which figure shows a Control Room staff configuration in violation of OP-100-001, Operations Standards and Management Expectations? (Assume that each watchstander is qualified no higher than the minimum requirements to stand the position)

- A. Fig 1
- B. Fig 2
- C. Fig 3
- D. Fig 4

21.

During core unload, the Refueling Machine is positioned over a spent fuel assembly in an upender basket. When the fuel assembly is grappled in the upender, a S/G nozzle dam fails. The Fuel Handling Supervisor notes that reactor cavity level is lowering at approximately one foot per minute. In addition to closing the transfer tube gate valve, the Fuel Handling Supervisor should order the crew to:

- A. Ungrangle the fuel assembly, move the refueling machine out of the upender zone, and lower the upender to the horizontal position.
- B. Raise the fuel hoist to the up limit, move the Refueling Machine to a temporary storage rack, and lower the assembly into the temporary storage rack.
- C. Raise the the fuel hoist to the up limit, move the Refueling Machine to the designated core location, and lower the assembly into the core.
- D. Raise the fuel hoist to the up limit, move the Refueling Machine to the deep end of the refueling cavity, and lower the assembly to the hoist down stop.

22.

Which of the following would require a Priority 1 Work Request be initiated in Mode 1? (assume associated A and B pumps are operable)

- A. Charging Pump AB trips on overload during In-service testing.
- B. Essential Chillwater Pump AB vibration in the alert range during In-service Testing.
- C. CCW Pump AB does not generate acceptable differential pressure during In-Service Testing.
- D. EFW Pump AB trips on overspeed during In-service testing and cannot be reset.

23.

An accident with significant core damage has occurred. An entry into the -35' Wing Areas is needed to retrieve an injured person. The dose for this task has been estimated at 19 Rem TEDE. Which of the following is correct?

- A. The entry can **NOT** be allowed because it exceeds the federal exposure limits of 10 CFR 20.
- B. The entry can be allowed under the Planned Special Exposure limits per RP-207, Planned Special Exposures.
- C. The entry can **NOT** be allowed since the estimated exposure exceeds the associated emergency exposure limit.
- D. The entry can be allowed since the expected exposure is less than the associated emergency exposure limit.

24.

The plant is at 24% power and Main Feedwater Isolation Valve 1 goes closed. The crew manually trips the reactor at 23% NR in SG 1. During SPTAs the A3 to A2 bus breaker opens and EDG A trips on overspeed. Which of the following is correct concerning E-Plan classification? (Assume no equipment OOS initially)

- A. No classification criteria are met
- B. Unusual Event should be declared
- C. Alert should be declared
- D. Site Area Emergency should be declared

25.

Which of the following conditions would indicate a need to exit the Station Blackout procedure and perform diagnostics?

- A. AB-DC Voltage is 0 Volts
- B. T_C is 550°F and stable
- C. Cntnmt Temp is 170°F, rising 5 °F/min
- D. Pzr level is 35% and lowering slowly

End of Test

1.

The PNPO performs a manual reactor trip from CP-2. What are the expected indications on the Reactor Trip Status panel above CP-7, prior to the CPCs generating automatic trips when Shutdown CEAs insert?

- A. K1 & K3 lights off, Reactor Trip Bkrs 1, 3, 5, & 7 open
- B. K1 & K4 lights off, Reactor Trip Bkrs 1, 4, 5 & 8 open
- C. K2 & K4 lights off, Reactor Trip Bkrs 2, 4, 6, & 8 open
- D. K2 & K3 lights off, Reactor Trip Bkrs 2, 3, 6 & 7 open

2.

The following conditions exist:

- RCS Pressure is currently 1050 psia and stable.
- 100 gpm HPSI flow to each cold leg loop indicated on CP-8.
- Containment pressure and Quench Tank pressure are 25 psia and rising together.
- T-cold, T-hot, and Representative CET temperatures indicate 545 °F.
- QSPDS levels 1 through 6 indicate voided on QSPDS 1 and 2
- Vessel Plenum level on CP-7 reads 40%
- SG 1 level is cycling between 68 and 71% WR
- SG 2 level is 57% WR and dropping slowly
- Pressurizer level is 100%.

Which course of action should you order?

- A. Stop one HPSI pump and throttle flow on the other train.
- B. Stop Both HPSI pumps one pump at a time.
- C. Continue to allow full HPSI flow into the RCS.
- D. Restore Letdown to service and attain Pzr level 33 - 60%.

3.

Which of the following have a higher importance in the mitigation strategy for a small break LOCA vice a large break LOCA?

- A. HPSI pumps and the Safety Injection Sump
- B. Charging Pumps and the Boric Acid Makeup Pumps
- C. Containment Spray pumps and Shutdown Cooling Heat Exchangers
- D. Steam Generators and Emergency Feedwater Pumps

4.

A large break LOCA occurred 20 minutes ago and the following conditions exist:

- RCS Pressure = 500 psia
- Representative CET Temperature = 500°F
- HPSI flow = 200 gpm/cold leg
- LPSI train A and B flow rate = 0 gpm
- Charging Pump A and B are running, Charging Pump AB is secured with AB assignment switch in NORM

Which of the following is correct concerning the criteria for verifying satisfactory two-phase natural circulation?

- A. Representative CET temperature is not met.
- B. HPSI flow is not met.
- C. LPSI Flow is not met.
- D. Charging pump status is not met.

5.

Given the following:

- The reactor was tripped and 2A RCP secured due to 2A RCP ARRD High Temperature
- Reverse rotation was indicated on 2A RCP and all RCPs were secured
- OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery has been implemented.

Which of the following meets the criteria of OP-902-003 for maintaining SG levels using Main Feed Water and would be sufficient to support natural circulation heat removal?

SG 1

SG2

- | | |
|-------------------------|---------------------|
| A. 45% NR and lowering, | 55% WR and stable |
| B. 50% WR and stable, | 75% NR and rising |
| C. 72% NR and rising, | 48% NR and lowering |
| D. 48% NR and rising, | 55% NR and rising |

6.

The plant is at 100% power with T_{cold} at 545°F and T_{hot} 603°F. The running charging pump tripped due to the VCT Outlet Valve, CVC-183 closing. Letdown isolated on high temperature due to the loss of the running charging pump. Determine the minimum required Pressurizer level to remain at power for the given conditions and the reason for the minimum level.

- A. 46.0%, to ensure that the pressurizer does not empty on a reactor trip.
- B. 46.0%, to ensure that PZR heaters remain covered on a reactor trip.
- C. 55.6%, to ensure that the pressurizer does on empty on a reactor trip.
- D. 55.6%, to ensure that PZR heaters remain covered on a reactor trip.

7.

Given the following:

- The plant operated for 200 days and was shutdown on Nov 9 at 2130 hours to repair a tube leak in SG. 2.
- At 0930 on Nov 12, while draining down to remove the primary manways on SG 2, a total loss of SDC occurred.
- The following plant conditions existed at 0930 hours:

RCS temperature	123°F
RCS level	14.5 feet
SG #1 level	72% WR
Pressurizer Manway	is removed.

Determine the estimated time for core Uncovery.

- A. 0.2 hours
- B. 1.0 hours
- C. 1.5 hours
- D. 1.8 hours

8.

Given the following conditions:

- The plant is at 100% power
- CCW Makeup Pumps A and B auto started
- Both DCTs are bypassed and isolated
- All CCW pump suction and discharge cross-connect valves are closed
- Train A and B isolations to the AB loop are isolated
- Initially A and B train surge tank dropped and then recovered to normal and stabilized
- Both CCW Makeup Valves and the normal CCW Surge Tank Makeup valve opened and are now closed

Which of the following could cause these indications?

- A. A leak on the discharge of CCW Pump A
- B. A leak upstream of EDG B Flow Control Valve
- C. A leak on the AB Loop Return Header
- D. A leak on HPSI Pump AB Seal Cooler Return

9.

What would be the effect if the Pressurizer Backup Heaters failed to energize on a Pressurizer in-surge during a plant transient in Mode 1? (assuming no subsequent outsurge immediately)

- A. Pressurizer water space would remain subcooled for a longer period of time.
- B. RCS Pressure would slowly lower to trip setpoint due to loss of Heater Capacity.
- C. Pressurizer heater wells and surge line would be more subject to thermal shock.
- D. Proportional Heater current will rise immediately then lower over time.

10.

The Main Turbine tripped and Reactor Cutback failed to actuate. RCS pressure reached 2370 psia and the Operators tripped the Reactor using the manual trip pushbuttons on CP-2. The plant has experienced a Main Steam Line Break upstream of the Number one (1) Steam Generator Main Steam Isolation Valve.

SELECT the statement which describes the expected response of the Anticipated Transient System (ATS) and the Emergency Feedwater Actuation System (EFAS) for the following plant conditions:

Steam Generator #1: 500 psia (lowering), 20% WR level (lowering)

Steam Generator #2: 707 psia (lowering), 39.5% WR level (lowering)

DEFAS: Enabled

DRTS : Enabled

RCS pressure: 1700 psia (lowering)

RCS max pressure 2380 psig

All Emergency Feedwater controllers in automatic:

- A. DRTS and DEFAS should have auto actuated.
- B. EFAS-2 only should have auto actuated.
- C. EFAS-1 and EFAS-2 should have auto actuated.
- D. DRTS and EFAS should have auto actuated.

11.

The following plant conditions exist:

- The plant is in MODE 1.
- The latest leak rate data is as follows:
 - 10.1 GPM - Total RCS leakage rate.
 - 5.2 GPM - Leakage into the Reactor Drain Tank.
 - 0.9 GPM - Leakage past check valves from RCS to SI system. (Leakage has been quantified and confirmed)
 - 0.7 GPM - Total primary to secondary leakage (0.55 GPM From S/G-1).
 - 3.1 GPM - Leakage from a PZR Safety into the Quench Tank.

Based upon current Plant conditions, which of the following requires a plant shutdown per TS 3.4.5.2?

- A. Pressure boundary leakage
- B. Unidentified leakage
- C. Identified leakage
- D. Primary to secondary leakage

12.

A Main Steam Line Break is in progress inside Containment. The CRS requests that you use a post accident instrument to monitor Containment Pressure. How can you easily identify post accident instruments on the control boards?

- A. The nameplate is marked with a black star.
- B. The instrument number (UNID) ends with an "S".
- C. The nameplate is marked with a black square.
- D. An orange border surrounds the nameplate.

13.

The plant is at 100% power, the SNPO notes the following indications:

- SG1 Steam Flow reads 7.5 E6 lbm/hr
- SG1 Feed Flow reads 7.5 E6 lbm/hr
- SG2 Steam Flow reads 7.5 E6 lbm/hr
- SG2 Feed Flow reads 1.65 E6 lbm/hr

Which of the following has occurred?

- A. Steam Generator Feed Pump B tripped
- B. FW-173B, SG2 Main Feedwater Reg valve closed
- C. FW-184B, SG2 Main Feedwater Isolation closed
- D. FW-166B, SG2 Startup Feedwater Reg valve closed

14.

During a station blackout, the Loss of Offsite Power/Station Blackout Recovery Procedure (OP-902-005) directs the Operator to place the Containment Spray Pump control switches to OFF.

Which of the following describes the reason for this step?

- A. To prevent overloading the Emergency Diesel Generators when restored.
- B. To prevent initiating Containment Spray when electrical power is restored.
- C. To prevent starting the Containment Spray Pumps with no seal cooling after power is restored.
- D. To protect the Containment Spray Pumps from the effects of loss of DC control power if battery chargers cannot be restored.

15.

A Loss of Offsite Power has occurred. Plant conditions are as follows:

- RCS pressure is 1736 psia, slowly rising
- T_h is 590°F and constant
- CET temperature is 598°F
- T_c is 550°F and slowly lowering

All of the following conditions meet the criteria for single phase natural circulation in accordance with OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery Procedure **EXCEPT**:

- A. T_c temperature trend
- B. T_h temperature trend
- C. Subcooled Margin
- D. T_h -Representative CET ΔT

16.

Given the following conditions:

- Following a failure of SUPS MA inverter, ACC Pump A started due to ACC-126A failing Open
- ACC-126A was manually overridden closed and ACC Pump A was returned to standby
- SUPS MA is being restored on alternate power in accordance with OP-006-005, Inverters and Distribution

Prior to restoring power to CP-48, Train A Power and Annunciators, the operator prevents ACC Pump A from starting automatically on a:

- A. high Aux Component Cooling WCT basin temperature signal by racking out the pump breaker.
- B. high Aux Component Cooling pressure signal by removing the pump DC Control Power Fuses.
- C. high Component Cooling temperature signal by opening the pump DC Control Power knife switch.
- D. low Component Cooling pressure signal by placing the pump control switch to OFF.

17.

An SIAS occurred due to a LOCA. The SNPO is monitoring CCW temperatures. The following indications are noted:

- CCW Heat Exchanger A Outlet Temperature is 110 °F
- CCW Heat Exchanger B Outlet Temperature is 93 °F
- Wet Cooling Tower A Basin Temperature is 77 °F
- Wet Cooling Tower B Basin Temperature is 72 °F
- Prior to the LOCA, the setpoint for both ACC-126A and B was 95 °F.

What is the expected position of ACC-126A and B, ACC Header CCW HX Outlet Temp Control Valves?

- A. ACC-126A throttled OPEN, ACC-126B CLOSED
- B. ACC-126A CLOSED, ACC-126B throttled OPEN
- C. ACC-126A CLOSED, ACC-126B CLOSED
- D. ACC-126A throttled OPEN, ACC-126B throttled OPEN

18.

A LOCA is in progress. CSAS is actuated and Containment pressure is 17.9 psia and slowly lowering. The IA Header upstream of the IA dryers is ruptured and IA Receiver pressure indicates 20 psig.

Containment Spray Pump 'A' trips on overload 5 minutes after the Loss of IA pressure. Which of the following is true concerning closure of CS-125A to isolate the affected penetration?

- A. Essential Air must be aligned to CS-125A before it can be closed in accordance with the EOP appendix.
- B. CS-125A can still be closed using the EOP appendix utilizing the local air accumulator.
- C. An N2 accumulator provides motive force to operate CS-125A when closed from CP-8 C/S.
- D. Reset CSAS and CP-8 C/S to close CS-125A. Align Essential Air to ensure valve remains closed.

19.

Reactor power is 80 %; ASI is being controlled at the 100% ESI value. ASI is currently +0.020. Group P CEAs are being withdrawn for ASI control. During withdrawal, CEA 27 slips to 115 inches. All other Group P CEAs are at 140 inches. When attempts to realign CEA 27 are performed, it is determined to be mechanically bound.

When determining whether the CPCs are detecting the CEA misalignment, which of the following CPCs would have the most positive ASI value?

- A. CPC A
- B. CPC B
- C. CPC C
- D. CPC D

20.

Which of the following describes the signal used to generate the Fuel Handling Accident Signal?

- A. Fuel Handling Building (FHB) PIG Radiation Monitor Gas Channel High Alarm
- B. Fuel Handling Building Wide Range Gas Monitor High Alarm
- C. Any one of four safety FHB Area Radiation Monitors in High Alarm
- D. At least two of four safety FHB Area Radiation Monitors in High Alarm

21.

Given the following conditions:

- The Plant is in Mode 3 due to a tube leak in #1 S/G.
- OP-901-202, Steam Generator Tube Leakage or High Activity, is being implemented.
- Aux boiler is in operation
- Loop 1 $T_h = 495^\circ\text{F}$
- RCS temperature is being controlled using SBCS and feeding both S/Gs with Main Feedwater
- RCPs 1A and 2A have been secured
- RC-301 A and B, PZR Spray Valves are in manual and open

What is the next major step to mitigate this situation and why?

- A. Perform cooldown to Shutdown Cooling entry conditions to minimize the impact on condensate inventory.
- B. Isolate # 1 S/G to minimize release of radioactive isotopes to the public and site personnel.
- C. Commence feed and bleed of #1 S/G via MFW and BD systems to dilute the radioactive isotopes in solution.
- D. Verify DWST is aligned as the feed source to the aux boiler to prevent contamination.

22.

Given the following:

- Reactor Power is 100%
- Condenser vacuum is 20.4 inches Hg and lowering .2 inches/minute
- OP-901-220, Loss of Condenser Vacuum is being implemented

Which of the following should be done at this time?

- A. Commence a rapid downpower until vacuum recovers to > 25 inches HG.
- B. Trip the reactor and verify the turbine tripped.
- C. Trip Feedwater Pump Turbines A and B.
- D. Verify SBCS Condenser Interlock actuated and steam bypass valves closed.

23.

OP-901-401, High Airborne Activity in the Control Room has been entered due to an inadvertent release of a Waste Gas Decay Tank with a temperature inversion condition. The Control Room Supervisor orders the SNPO to determine which set of Control Room Outside Air Intakes (CROAI) should be opened for makeup to the Control Room envelope. What should the SNPO base this decision on?

- A. The running Control Room Emergency Filtration Unit
- B. The running Control Room Normal Air Handling Unit
- C. The CROAI farthest from the Plant Stack
- D. The lowest pair of CROAI radiation monitor readings

24.

Which of the following Radiation Monitors are susceptible to Thermally Induced Currents (TIC) during a LOCA or Main Steam Line Break inside containment?

- A. Containment Purge Radiation Monitors
- B. Containment PIG Radiation Monitor
- C. Refueling Machine Area Radiation Monitor
- D. Containment High Range Radiation Monitors

25.

The OP-901-502, Control Room Evacuation attachment for taking local control of Atmospheric Dump Valves requires adjusting the inlet air regulator to match pressure at the outlet of the transducer prior to taking local control. What is the reason for performing this step?

- A. To ensure the valve closes prior to taking local control of the valve at the local air station.
- B. To equalize pressure across the valve operating piston prior to using the manual handwheel to operate the valve.
- C. To allow alignment of Essential Air to the valve without affecting valve position.
- D. To ensure the valve does not change position when taking local control of the valve at the local air station.

26.

A LOCA inside Containment has occurred. OP-902-002, Loss of Coolant Accident Recovery procedure has been implemented.

- Containment Pressure is 16.5 psia,
- RCS pressure is 1000 psia,
- T_{hot} is 550°F
- T_{cold} is 545°F.

The following Annunciators are in alarm on CP-36:

- A-4, Reactor Vessel Loss
- A-5, Reactor Core Cooling Inadequate
- B-4, QSPDS Subcooled Margin Low

Determine the condition of the RCS and the number of RCPs to be secured:

- A. RCS is Subcooled, 2 of 4 RCPs must be secured
- B. RCS is Subcooled, 4 of 4 RCPs must be secured
- C. RCS is Saturated, 2 of 4 RCPs must be secured
- D. RCS is Saturated, 4 of 4 RCPs must be secured

27.

A LOCA inside containment is in progress when a Tube Rupture on Steam Generator 1 occurs. All of the following would be performed to isolate the most affected Steam Generator **EXCEPT**:

- A. Verify ADV 1 closed and place controller in Manual
- B. Verify Main Steam Isolation Valve 1 is closed
- C. Verify Main Feedwater Isolation Valve 1 closed
- D. Verify SG 1 Blowdown Isolation Valves closed

28.

OP-902-005, Station Blackout Recovery, directs the operator to verify closed the CCW non-safety header containment isolation valves, CC-641, CC-710, and CC-713 to isolate CCW to Containment. What is the reason for this?

- A. To prevent thermal shocking the CEDM coolers when restarting the CCW pumps.
- B. To prevent water hammer in Contmt Bldg piping when restarting the CCW pumps.
- C. To prevent thermal shocking the RCPs when restarting the CCW pumps.
- D. To prevent running out the CCW pumps when restarting.

29.

The plant was initially in MODE 1 with the AB Safety busses powered from the A bus when the following sequence of events occurred: No other abnormal conditions are present other than those caused by the following conditions:

- The 3A bus de-energized due to an overcurrent trip on the 3A to 2A feeder breaker with EDG A OOS
- RCS pressure rapidly dropped to 1400 psia

Under these conditions what is supplying the suction path for the available charging pumps?

- A. Volume Control Tank
- B. Refueling Water Storage Pool
- C. Both BAMTs using BAM pumps and the Emergency Boration Valve
- D. Both BAMTs using the Gravity Feed Valves

30.

Given the following conditions:

- RCS temperature is 120°F and stable
- Shutdown Cooling A is in service
- RWLIS and RCSLMS indicate 14.5 ft
- All applicable actions of OP-001-003, RCS Drain Down have been completed

How would a loss of power to SI-129A, Shutdown Cooling Flow Control Valve, affect the RCS or SDC systems?

- A. An RCS cooldown commences
- B. An RCS heatup commences
- C. LPSI Pump A cavitates due to excessive vortexing
- D. LPSI Pump A experiences runout flow conditions

31.

Given the following:

- The RCS was drained to 14.5 ft MSL.
- A loss of Shutdown Cooling event is in progress due to system leakage.
- No LPSI Pumps are running.
- HPSI Pump B was started IAW OP-901-131, Shutdown Cooling Malfunction for RCS makeup and level has been raised to 16 ft MSL and stabilized.

Which of the following is correct concerning restoring a Shutdown Cooling Train?

- A. Vent and start LPSI Pump A, since HPSI Pump B is injecting to Hot Leg 1.
- B. Vent and start LPSI Pump A, since HPSI Pump B is injecting to Hot Leg 2.
- C. Vent and start LPSI Pump B, since HPSI Pump B is injecting to Hot Leg 1.
- D. Vent and start LPSI Pump B, since HPSI Pump B is injecting to Hot Leg 2.

32.

If a Pressurizer Relief Valve lifts at 100% power, steady-state operations, which of the following is correct?

- A. The downstream Safety Relief temperature detector will indicate $\sim T_{\text{sat}}$ for the current Pressurizer pressure.
- B. The downstream Safety Relief temperature detector will indicate $\sim T_{\text{sat}}$ for the current Quench Tank pressure.
- C. Quench Tank temperature will equal T_{sat} for the current Pressurizer pressure.
- D. Quench Tank pressure will equal the current Pressurizer pressure.

33.

Given the following:

- The plant is in Mode 1
- RC-3182 is closed to isolate inoperable PZR Vent valve RC-3184
- Annunciator, 'Quench Tank Pressure Hi' alarms
- Quench Tank pressure is 14 psig and rising slowly.
- RCS Vent Header Pressure indicator on CP-8 is reading 500 psia
- All RCS Vent valves indicate close
- A clamp-on LEFM, indicates flow passing through RC-3183, Pzr Vent to Quench Tank Solenoid Stop, and RC-1017, Rx/Pzr Vent to Quench Tank Isolation.

Based on this information, the crew should: (Take each action separately.)

- A. Isolate RC-3181.
- B. Isolate RC-1019.
- C. Ensure power removed from RC-3183 and RC-1017 and isolate RC-1019.
- D. Ensure power removed from RC-3183 and RC-1017 and isolate RC-3181.

34.

CCW Pump A has tripped with CCW Pump AB OOS. Which of the following actions is performed to protect CCW Pump B from runout conditions?

- A. Split out the A and B CCW headers.
- B. Close the NNS loop isolations
- C. Secure Train B Containment Fan Coolers
- D. Align Chiller B cooling to the Wet Tower

35.

The plant is at 5% power:

If the controlling pressurizer pressure channel (PT-100X/Y) failed high, the reactor would trip on: (Assume no operator actions)

- A. CPC RCS Pressure Aux Trip
- B. A calculated DNBR LO trip
- C. Pressurizer Pressure HI
- D. Pressurizer Pressure LO

36.

The reactor tripped from 100% power. Because of a malfunction of the PPS system the turbine is not tripped and the generator output breakers remain closed. If left unresolved this malfunction will cause:

- A. An increase in RCS temperature and pressure, resulting in lifting the pressurizer safeties.
- B. The main turbine will overspeed, resulting in damage to the main turbine blading and shaft.
- C. The main generator to motor, resulting in damage to the rotor or stator windings.
- D. An uncontrolled cool down of the RCS, resulting in a Main Steam Isolation Signal.

37.

A reactor trip occurred from 100% power on low SG 1 pressure due to a Main Steam Line Break inside containment. Currently conditions are at their most severe for each listed parameter:

- SG 1 Pressure is 750 psia, SG 2 Pressure is 850 psia
- SG 1 level is 17% NR, SG 2 level is 20% NR
- Containment Pressure is 16.5 psia
- RCS Pressure is 1750 psia
- No operator action has occurred

Which of the following components require action to place the component in the required condition?

- A. MS-401A, EFW Pump AB Turbine Steam Supply SG 1, is open
- B. EFW Pump A is not running
- C. MS-124B, Main Steam Line 2 MSIV SG 2, is closed
- D. MS-120A, MS Line 1 Upstream Drain Normal Isolation, is open

38.

Given the following conditions:

- Both LPSI Pumps are in service for Shutdown Cooling.
- PPS channel A is de-energized for maintenance.
- SUPS SMB faults and de-energizes.

Which of the following describes the impact on the LPSI Pumps?

- A. Both LPSI Pumps trip and are locked out until restoration of a PPS channel.
- B. Only LPSI pump A trips but can be restarted after a time delay.
- C. Only LPSI pump B trips and is locked out until restoration of a PPS Channel.
- D. Both LPSI pumps trip but can be restarted after a time delay.

39.

The plant is operating in MODE 1 with all system alignments normal when a Main Steam leak occurs inside Containment. The following conditions are noted:

- RCS pressure = 1750 psia
- Containment Pressure = 17.2 psia
- All Containment Fan Coolers (CFCs) are OPERABLE
- No manual operator actions have been taken

Determine the expected status of the Containment Cooling System at this point in time.

- A. 3 of 4 CFCs running in slow speed and discharging through the ring header.
- B. 4 of 4 CFCs running in slow speed and discharging through the safety dampers.
- C. 3 of 4 CFCs running in fast speed and discharging through the ring header.
- D. 4 of 4 CFCs running in fast speed and discharging through the safety dampers.

40.

All of the following will trip a CEDM Cooling Fan **EXCEPT**:

- A. Associated 31 Bus Undervoltage
- B. Safety Injection Actuation Signal
- C. Containment Isolation Actuation Signal
- D. Associated Fan inlet damper closes

41.

Given the following:

- Containment pressure is 17.9 psia
- The 31A feeder breaker trips on overcurrent and a Loss of Offsite Power occurs 1 minute later
- Both EDGs start and their output breakers close

After 205 seconds, which CS pump(s) are running? (assume no Operator action)

- A. CS Pump A and B
- B. Neither CS Pump
- C. CS Pump A
- D. CS Pump B

42.

The plant is operating at 50% with all systems aligned normally and primary and secondary heat removal are equal. The PNPO notes T_C starting to rise rapidly. Which of the following would cause this indication?

- A. Atmospheric Dump Valve 1 setpoint fails high.
- B. Main Turbine Governor Valve 3 indicates closed.
- C. MS-IPT-1010, MS crossover header pressure transmitter fails low.
- D. Main Turbine Throttle Valve 4 indicates closed.

43.

Plant conditions are as follow:

- Reactor power is 50% following a Reactor Power Cutback due to a loss of the Main Turbine
- Both Steam Generator Feed Pumps are running
- All 3 Condensate Pumps are running

What would be the expected configuration of the Feedwater Pumps if SUT B feeder breaker to bus B1 were to trip and what procedure would be applicable as a result of this malfunction?

- A. Both FWPTs would be operating; OP-902-000, Standard Post Trip Actions.
- B. Neither FWPT would be operating; OP-902-000, Standard Post Trip Actions.
- C. FWPT A would be operating; OP-901-101, Reactor Power Cutback.
- D. FWPT B would be operating; OP-901-101, Reactor Power Cutback.

44.

Which of the following will automatically close the Main Feedwater Regulating Valves and the S/U Feedwater Regulating Valves when their M/A stations are in manual?

- A. Reactor Trip Override
- B. High Level Override
- C. EFAS
- D. MSIS

45.

The output of the master controller for FWCS 1 became erratic and was taken to manual with an output of 60%. The level setpoint remains at 68% NR. Subsequently, a reactor trip occurs. Assuming no operator action occurs, what would be the response of the FW system?

- A. Level in SG 1 rises to the level setpoint, RTO clears, FW components go to program condition for 60% master controller output.
- B. Level in SG 1 rises to HLO setpoint of 81% NR; SUFRV 1 cycles between the HLO and RTO position around the HLO setpoint.
- C. Level in SG 1 rises, RTO does not clear, and MFIV 1 goes closed when SG 1 level reaches 96% WR.
- D. RTO is disabled, level rises rapidly in SG 1, and MFIV 1 goes closed when SG 1 level reaches 96% WR.

46.

Given the following:

- Containment pressure = 16.5 psia
- RCS pressure = 1650 psia
- S/G 1 pressure = 640 psia
- S/G 2 pressure = 750 psia
- S/G 1 NR level = 30 %
- S/G 2 NR level = 25%
- S/G 2 FW ISOL VLV AIR RSVR PRESS LO alarm is in solid

Which of the following valves are not in the correct position?

- A. MS-124A, Main Steam Line 1 MSIV SG 1 is open
- B. FW-184B , Main FW Isol Valve Stm Gen 2 is closed
- C. BD-103B, SG Blowdown Isol Stm Gen 2 (Out) is open
- D. SSL-8006A, Sampling Isolation SG 1 is closed

47.

The shift is implementing OP-902-006, Loss of Main Feedwater Recovery procedure, and secured all RCPs. When performing a cooldown between MODE 3 and MODE 5 the cooldown limit is changed from the Technical Specification limit of 100°F/hr to 50°F/hr to minimize the probability of:

- A. Impeding natural circulation due to excessive heat removal causing abnormal density changes.
- B. Forming a bubble in the head when depressurizing the RCS during the cooldown.
- C. A rapid depressurization of the Steam Generators due to lower heat transfer from primary.
- D. Excessive thermal stresses due to large differential temperatures from the bottom to the top of the vessel.

48.

The plant is ready to parallel the Main Generator to the grid. A manual synchronization across the first Generator Output Breaker is desired. Incoming voltage is slightly higher than running voltage. You have observed 2 complete revolutions of the Synchroscope. The Synchroscope is rotating in the SLOW direction at 4 rpm. Which of following actions would be appropriate for the given conditions?

- A. Close the first Generator Output Breaker on the next rotation when the Synchroscope is slightly before the 12 o'clock position.
- B. Adjust the speed of the turbine to change the rotation of the Synchroscope to the FAST direction.
- C. Adjust the voltage of the Main Generator to obtain an incoming voltage slightly lower than running voltage.
- D. Adjust the speed of the turbine to lower the Synchroscope rotation speed in the SLOW direction.

49.

Which of the following statements is correct concerning the safety related Battery Chargers?

- A. A high voltage shutdown alarm light energizes when charger output voltage exceeds 144 VDC and must be manually reset.
- B. A low voltage alarm light energizes when charger output voltage falls below 132 VDC and automatically resets.
- C. A no charge alarm light will energize when battery charger amps falls below 10 amps and must be manually reset.
- D. During a battery charger startup up a phase fail light is not expected to energize and must be manually reset.

50.

The Power Supply for the Emergency Diesel Generator A Fuel Oil Storage Tank Transfer Pump is:

- A. 213A
- B. 213B
- C. 312A
- D. 312B

51.

The Monthly Channel Check of PRM-IRE-1900, Circulating Water Discharge Monitor is being performed IAW OP-004-001, Radiation Monitoring. Which of the following Status colors would indicate a failed Source Check?

- A. Purple (Magenta)
- B. Medium Blue
- C. Yellow
- D. White

52.

All of the following would require a full flow sweep of the Auxiliary Component Cooling Water system EXCEPT:

- A. ACCW Pump A running at less than 1000 gpm for greater than 1 hour
- B. ACC 126A failed open for 1 hour with ACCW Pump A OOS
- C. ACCW Jockey Pump A aligned to prevent runout condition.
- D. ACCW pump A OOS and Jockey Pump A trips

53.

Given the following:

- Plant is in Mode 3
- CW Pumps A, B, C and D are running
- TC Pump A running,
- TC pump B OOS

Which of the following would require alignment of alternate cooling to the instrument air compressors in order to maintain the compressors in operation?

- A. 86B1 actuation
- B. SUT 86STB actuation
- C. SUT 86STA actuation
- D. 86A1 actuation

54.

Given the following:

- Containment Pressure = 16.9 psia
- RCS Pressure = 1450 psia
- CS-125B, Containment Spray Header B Isolation Valve is closed
- CC-963A, CCW Shutdown Heat Exchanger A Outlet Valve is closed
- SI-228A, HPSI Cold Leg Injection 2B Flow Control Valve is open
- CAR-200B, Containment Pressure Exhaust Inlet Valve is open

Based on the given conditions which valve did not automatically reposition to its ESFAS actuation position?

- A. CS-125B
- B. CC-963A
- C. SI-228A
- D. CAR-200B

55.

A LOCA inside containment has occurred and OP-902-002 is being implemented. A leak develops between CC 808A, Containment Fan Cooler A CCW Inlet and CC 822A, Containment Fan Cooler A CCW Outlet. Which actions are required to isolate the leak in accordance with OP-902-009?

- A. Take Containment Fan Cooler A control switch to STOP.
- B. Manually gag CC-808A and CC-822A, Containment Fan Cooler A CCW Inlet and Outlet closed.
- C. Place the keyswitch for CC 808A and CC 822A on Aux Panel 1 to OVERRIDE
- D. Place the keyswitch on CP 18 to OVERRIDE .

56.

Which of the following components would result in a loss of CEA MG Set A, if an overcurrent condition for the component occurred and its load breaker failed to open?

- A. CEDM Fan Cooler C
- B. Polar Crane
- C. Back up Heater Bank 1
- D. Proportional Heater Bank 1

57.

The reactor is at 100% power when a turbine trip occurs. The PNPO notes that RCS pressure is 2775 psia and no reactor trip breakers opened. What action must be accomplished per TS 2.1.2, Safety Limit – RCS Pressure?

- A. Restore RCS pressure to < 2500 psia within 5 minutes.
- B. Be in Hot Standby with RCS pressure < 2750 psia within 1 hour.
- C. Be in Hot Standby with RCS pressure between 2025 and 2275 psia within 2 hours.
- D. Restore RCS pressure to < 2250 psia within 15 minutes; be in Cold Shutdown in the next 30 hrs.

58.

The plant is operating steady state at 55% power. Tavg is being maintained on the program. A Pressurizer Level Control system malfunction has occurred, requiring Pressurizer Level Control to be placed in Manual. The CRS wants Pzr level to be restored to program level prior to placing the pressurizer level controller back in Auto. What is your target level?

- A. 38.0%
- B. 43.0%
- C. 48.0%
- D. 53.0%

59.

Reg Group 6 stops while being withdrawn for ASI control. The NPO notes the following CEA position indication:

- CEA 20 – 145.5”
- CEA 21 – 147”
- CEA 22 – 147.75”
- CEA 23 – 148.5”

Which of the following stopped Reg Group 6?

- A. Upper Group Stop
- B. Upper Electrical Limit
- C. CEA Withdrawal Prohibit
- D. Upper Control Limit

60.

Given the following conditions:

- ENI Control Channel 1 failed low
- Reactor Power is currently 75%
- AMI Threshold controller potentiometer set at 50
- SBCS valve 6 permissive switch is in OFF
- CEDMCS Mode Select switch in Auto Sequential
- CPC pretrips present on at A and B channels
- Both RRS Channels have High Rate Insert lights illuminated
- Reactor Reg 1 is selected

Reg Group 6 CEA's will automatically insert if:

- A. The AMI threshold is lowered
- B. Place SBCS valve 6 Permissive switch to AUTO or MANUAL
- C. At least 1 CPC supplied pretrip is cleared
- D. RRS Select switch is placed to Channel 2

61.

Airborne Radioactivity Removal Unit A is running. The following PMC alarms and reports are received:

- ARR U A CHAR FLT TEMP – HI
- ARR U A CHAR FILTER TEMP – TROUBLE
- E-13 (3A) ARR U CHAR ABSD TEMP – HI HI
- ARR U A HEPA FLTR AIR DP – HI
- NAO reports indications of fire in Airborne Radioactivity Removal Unit A Charcoal Filter

Which of the following is true?

- A. Airborne Radioactivity Removal Unit A should be secured, and ARRS Deluge System should be manually initiated from the Control Room
- B. Airborne Radioactivity Removal Unit A will trip automatically, and ARRS Deluge System should be manually initiated from the Control Room
- C. Airborne Radioactivity Removal Unit A should be secured, the ARRS Deluge System will automatically initiate due to High Charcoal Bed Temperature.
- D. Airborne Radioactivity Removal Unit A will trip automatically, the ARRS Deluge System will automatically initiate due to High Charcoal Bed Temperature

62.

A discharge of BACT A is in progress when the NPO notes that Boron Management to Circulating Water Shutoff and Control Valves, BM-547 and BM-549, are closed. Any of the following could have caused these valves to close **EXCEPT**:

- A. Low sample flow through the radiation monitor.
- B. Low process flow from BACT A due to low level.
- C. Radiation monitor detector output fails high.
- D. Radiation monitor detector output fails low.

63.

Given the following:

- GDT A release in progress.
- Containment purge in progress under continuous release permit.
- Control Room Emergency Filtration Unit A running for surveillance.
- FHB Emergency Filtration unit B running due to handling spent fuel with FHB Emergency Filtration unit A inoperable.

Which of the following would require the GDT release to be manually secured?

- A. Switchgear Main Air Handling Unit A trips.
- B. Broad Range Gas Monitor in HIGH alarm.
- C. Control Room Emergency Filtration Unit A trips.
- D. FHB Emergency Filtration Unit B trips.

64.

Which one of the following actions will take place when high radiation is sensed in the Fuel Handling Building (FHB)?

- A. FHB Emergency Exhaust WRGM sample pump starts.
- B. The standby FHB Normal Exhaust Fan starts.
- C. A FHB Emergency Filtration Unit starts.
- D. FHB H&V Room Exhaust Fan stops.

65.

Given the following:

- The plant is at 100% power
- Excessive Instrument Air (IA) usage has been noted on the PMC AIR mimic
- Initial Instrument Air header pressure was 115 psig and is slowly dropping

As IA header pressure drops, which one of the following actions occur?

- A. The SA to IA Crossconnect valve starts to open at 105 psig to provide a backup source of air.
- B. The running IA compressor loads at 100 psig IA header pressure to raise air compressor output.
- C. The IA compressor selected for standby starts at 90 psig to double air compressor capacity.
- D. The Instrument Air Dryers are bypassed at 80 psig to ensure dessicant blockage is not a factor.

66.

Which of the following is prohibited by OP-100-001, Operations Standards and Expectations?

- A. A Turbine load reduction is performed by a non-licensed Level A NAO currently standing on the job training watches for Reactor Operator Class and supervised by the SNPO.
- B. A Shutdown Cooling Purification valve lineup verified by a Level B NAO who has successfully completed Level A NAO classroom training.
- C. The Outside Watch is assigned as Emergency Communicator and as a Fire Brigade member.
- D. Moving CEAs for ASI control performed by a Reactor Operator, whose license is inactive per the requirements of 10 CFR 55, under the supervision of an operator with an active license.

67.

Which of the following would require making a plant page announcement and repeating the announcement at least two more times?

- A. Starting HPSI Pump A with no Operator in attendance at the pump.
- B. Entry into the Control Room Evacuation Procedure.
- C. Entry into the Reactor Trip Recovery Procedure.
- D. The plant has declared an Unusual Event.

68.

A Reactor Startup is in progress. The PNPO withdraws CEA group 5 to 50 inches and stops all rod motion. The following indications are observed by the PNPO:

- Positive Startup rate
- Reactor Power steadily rising.

Which of the following actions would be correct?

- A. Manually drive all CEAs to lower electrical limit and commence direct boration.
- B. Trip the reactor and commence emergency boration.
- C. Manually drive all Reg Group CEAs to lower electrical limit and recalculate ECC.
- D. Commence emergency boration and recalculate ECC.

69.

Which of the following statements best describes a Temporary Alteration as defined in UNT-005-004, Temporary Alteration Control?

- A. Removing a failed circuit card from a Seismic Class I cabinet under an approved Work Authorization with the equipment declared out of service.
- B. Gagging Feedwater Pump Suction relief valve to prevent weepage while evaluating the need to change relief setpoint.
- C. Installing electrical jumpers in an approved maintenance procedure with independent verification signatures for installation and removal.
- D. Attaching hoses or tubing to system drain connections to facilitate draining within the boundaries of an approved clearance.

70.

A normal plant shutdown is in progress for refueling, the reactor is at 30 % power. The Regulating Groups CEAs are being used for ASI control. Regulating Group 6 CEAs are at 80 inches. Regulating Group 5 may not be inserted beyond _____ inches.

- A. 75
- B. 80
- C. 90
- D. 95

71.

Which of the following is TRUE about Containment Purge during Mode 6 with the Containment Equipment Hatch open?

- A. The Airborne Radioactivity Removal System is prohibited from running during Containment Purge.
- B. If Containment Purge continues for more than 10 hours, the release will be covered by the Plant Stack Continuous Permit.
- C. Containment Purge must be secured if ambient barometric pressure is 29.8 INHG.
- D. Containment Purge may be interrupted due to high differential pressure if CAP 102, Containment Purge Make-up valve is stuck closed.

72.

A valve must be worked in the RCA. The dose rate in the area is 40 mrem/hr. Two options exist to complete the work.

Option 1: Operator X can perform the assignment in seventy five (75) minutes alone.

Option 2: Operators Y and Z, can perform the assignment in forty five (45) minutes together.

Which of the following options is preferable and consistent with the ALARA program?

- A. Option 1 since Operator X exposure is 50 mrem.
- B. Option 1 since Operator X exposure is 60 mrem.
- C. Option 2 since the exposure per person is 15.0 mrem.
- D. Option 2 since the exposure per person is 30.0 mrem.

73.

The following plant conditions exist:

- A feed line break has occurred inside containment.
- Containment pressure is 17.4 psia.
- Containment radiation levels are normal.
- PZR pressure is 1825 psia.
- RWSP level is 90%.
- S/G #1 is at 925 psia and 50% WR.
- S/G #2 is at 580 psia and 20% WR.

Which of the following groups of actuation signals are present?

- A. SIAS, MSIS, CIAS, EFAS-1
- B. SIAS, MSIS, CIAS, EFAS-2
- C. SIAS, CIAS, CSAS, EFAS-1
- D. MSIS, CSAS, CIAS, EFAS-2

74.

Safety Functions are checked during EOP implementation by each of the following methods with the exception of:

- A. Safety Function Status Checklists of each Optimal Recovery Procedure.
- B. The performance of OP-902-000, Standard Post Trip Actions.
- C. Safety Function prioritization in the Functional Recovery Procedure.
- D. The performance of the OP-902-009 Att. 1, Diagnostic Flowchart.

75.

Plant conditions are as follow:

- 100% power, steady-state operations
- No major equipment out of service
- Subgroups 5 and 11 are selected
- The following annunciators are received on CP-1
 - FWPT A TRIP LUBE OIL PRESS LO
 - FWPT A FLOW LO
- The SNPO reports that Feed Water Pump A has tripped

What are the PNPO's immediate actions as a result of this condition?

- A. Place CEDM Mode Select Switch to AS, verify selected Subgroups dropped
- B. Place CEDM Mode Select Switch to MS, verify selected Subgroups dropped
- C. Place CEDM Mode Select Switch to AS, verify Main Turbine load < 576 MW
- D. Place CEDM Mode Select Switch to MS, verify Main Turbine load < 576 MW

76.

Which of the following situations require entry into OP-902-008, Functional Recovery Procedure? (Assume all other equipment is operating as designed unless specified otherwise)

- A. SGTR in progress combined with a loss of offsite power and EDG B trips.
- B. Large Break LOCA in progress and reactor trip using DRTS was required.
- C. 3 CEA's fail to insert into the core and a Station Blackout is in progress.
- D. SG 1 Main Steam Line Break with Charging Pumps A/B and B unavailable.

77.

A Steam Generator Tube Rupture has occurred in S/G 2 and the following conditions exist:

- Highest $T_{\text{cold}} = 490^{\circ}\text{F}$
- Highest $T_{\text{hot}} = 500^{\circ}\text{F}$
- S/G 2 is isolated and pressure = 800 psia
- RCPs 1B and 2B are running to enhance the cooldown

Determine the minimum RCS pressure that you should order the PNPO to maintain at this time:

- A. 850 psia
- B. 870 psia
- C. 900 psia
- D. 950 psia

78.

Which of the following would require steam generator tube inspections to be performed during the next shutdown after the event? (assume no other malfunctions occurred)

- A. A line break upstream of the letdown flow control valves that was manually isolated by the PNPO prior to auto isolation.
- B. A rupture occurs on the suction line to FWPT A.
- C. The EFW pump AB supply line ruptures upstream of MS-401B.
- D. A seismic event is felt in the Control Room, the amber and red lights are OFF on the Seismic Monitoring panel.

79.

A trip of the 1B 6.9 KV Bus occurs followed by, a complete loss of condenser vacuum. Shortly thereafter the Condensate Storage Pool (CSP) develops an unisolable leak. Which of the following procedures should be implemented and what action should be taken when CSP level lowers less than 25%?

- A. OP-901-220, Loss of Condenser Vacuum, open CMU-141, CSP Level Control Valve Bypass.
- B. OP-902-001, Reactor Trip Recovery, start the Auxiliary Feedwater Pump and establish flow.
- C. OP-902-003, Loss of Offsite Power/Loss of Forced Circulation, transfer EFW pump suction to both Wet Cooling Tower basins.
- D. OP-902-006, Loss of Main Feedwater and transfer EFW pump suction to one Wet Cooling Tower basin.

80.

The initial availability verification of a Temporary Emergency Diesel has been performed for an Emergency Diesel Generator outage. Per the TS Bases, all of following are required for the subsequent availability verification except:

- A. Verify a 24 hr on-site fuel supply is available.
- B. Ensure TEDG aligned to supply through the non-safety bus to the safety bus.
- C. Start the TEDG and verify proper operation.
- D. Verify the TEDG is mechanically and electrically ready for manual operation.

81.

Given the following:

- Jockey Pump B is running
- ACC Pump B Secured
- ACC-126B, ACC B Temp Cntrl Vlv is closed
- ACC-110B, ACC Pump B Disch Isol is closed
- Component Cooling Water Pump A is OOS
- Component Cooling Water Pump B is Operable

Wet Cooling Tower (WCT) B Level starts lowering and ACC Pump B starts and ACC-126B remains closed. WCT B level is 95% and slowly lowering. What is the location of the leak and what is the maximum time frame to be in Mode 3 if no equipment is returned to service?

- A. Between ACC-108B, ACC Pump B Outlet Check Valve and ACC-110B, ACC Pump B Disch Isol. Mode 3 must be reached within the next 7 hours.
- B. Between ACC-108B, ACC Pump B Outlet Check Valve and ACC-110B, ACC Pump B Disch Isol. Mode 3 must be reached within the next 78 hours.
- C. Between ACC-110B, ACC Pump B Disch Isol, and ACC-126B, ACC B Temp Cntrl Vlv. Mode 3 must be reached within the next 7 hours.
- D. Between ACC-110B, ACC Pump B Disch Isol, and ACC-126B, ACC B Temp Cntrl Vlv. Mode 3 must be reached within the next 78 hours.

82.

An instrument air leak has resulted in IA header pressure lowering to 80 psig. The PMC is unavailable and OP-901-501, PMC or COLSS Inoperable. The Control Room staff has implemented OP-901-511, Att. 4, Safety related Valve Accumulator checks. The RCA operator calls in the following readings:

- CC-710, Cntmt CCW Return Hdr Inside Cntmt Isol 92 psig
- CC-641, CCW to Containment Cntmt Outside Isol 95 psig
- CC-713, Cntmt CCW Return Hdr Outside Cntmt Isol 89 psig

Which of the following is correct?

- A. Declare CC-641 inoperable. Enter TS 3.0.3, restore to operable status within 1 hour or be in Hot Standby with the following 6 hours.
- B. Declare CC-710 inoperable. Enter TS 3.6.3, restore to operable status within 4 hours or be in Hot Standby with the following 6 hours.
- C. Declare CC-713 inoperable. Enter TS 3.6.3, restore to operable status within 4 hours or be in Hot Standby with the following 6 hours.
- D. Declare CC-710 and CC-713 inoperable. Enter TS 3.0.3, restore to operable status within 1 hour or be in Hot Standby with the following 6 hours.

83.

Given the following:

- Reactor power is 99.5%
- Group P is inserted to 115 inches.
- The PNPO pulls Group P out 3 steps in MANUAL GROUP and returns the CEA Mode Selector Switch to the OFF position.
- Reg Group P CEAs continue stepping out.

As the CRS, which of the following orders to the NPO is warranted?

- A. Initiate emergency boration.
- B. Manually insert Group P.
- C. Manually trip the reactor.
- D. Open the 32A(B) bus feeder bkrs.

84.

Given the following:

- Reactor Power = 100% steady
- PZR Level indicators RC-IPI-0110X and Y = 54%, slowly lowering
- RCS pressure indicators = 2245 psia, slowly lowering
- RRS1 and RRS 2 Tave recorders show a step drop on both Tavg pens from 574°F to 555°F
- Letdown Flow = 126 gpm
- Charging flow = 44 gpm

Determine the correct procedure and subsection to implement.

- A. OP-901-110, Pressurizer Level Control Malfunction, Subsection E1, Pressurizer Level Control Channel Malfunction
- B. OP-901-110, Pressurizer Level Control Malfunction, Subsection E2, Pressurizer Level Setpoint Malfunction
- C. OP-901-110, Pressurizer Level Control Malfunction, Subsection E3, Pressurizer Level Controller Malfunction
- D. OP-901-112, Charging/Letdown Malfunction, Subsection E2, Letdown Malfunction

85.

Given the following:

- The plant is in Mode 6
- Startup Channel 1 reads 150 cps
- Startup Channel 2 reads 0 cps
- Startup Channel 2 Offnormal annunciator is alarming
- Startup Channel 1 and 2 HV Select switches are in On per RF-001-001
- Refueling personnel are installing the reactor head
- RF-004-001, Att. 9.1, Dilution Flowpath Isolation Verification has been completed.
- Mode 6 minimum required boron concentration is 2400 ppm
- Charging Pump A breaker is racked in, the pump is not running
- Charging Pump AB and B breakers are racked out

What actions must be done?

- A. Enter TS 3.9.2.a, immediately suspend installation of reactor head
- B. Enter TS 3.9.2.a, & 3.1.2.9.b, sample RCS boron within an hour
- C. Enter TS 3.1.2.9.b, sample RCS boron every 2.25 hours
- D. Enter TS 3.9.2.a, stop work that could add water < 2400 ppm to the RCS

86.

Given the following:

- CARS Train B is in service for containment pressure reduction
- CS Pump A is tagged out with CS-117A, SDCHX A Outlet Stop Check and CS-118A, SDCHX A Outlet Isolation to RWSP are tagged closed
- CFC A, B, and C are in service, CFC D is in standby

A LOCA occurs and Containment Pressure is 18.0 psia and rising. Which of the following would constitute a loss of the containment integrity safety function and requires manual actions to regain integrity? (Assume no other malfunctions occurred)

- A. CAR-202B, CARS Exhaust Header B Upstream Isolation fails to close on CIAS.
- B. CFC A trips on overload due to fan flooding from ruptured CCW cooling coils.
- C. CS-125A, CS Header A Isolation Valve opens on CSAS.
- D. CVC-101, Letdown Stop Valve fails to close on its associated ESFAS actuation.

87.

Given the following:

- A maintenance outage requiring an RCS draindown is in progress
- SI-406A, LTOP Relief Valve A was declared out of service 1 hour ago due to setpoint calibration errors which would result in the valve not lifting until 450 psia. The RCS cooldown is stopped until the valve setpoint can be recalibrated.
- An overcooling event occurs that lowers RCS average temperature from 235° to 195°F over a 5 minute period. RCS cold leg temperatures are 190°F.

Operator action stops the cooldown but SI-405B failed closed due to a DC bkr failure. How much time remains to have the RCS depressurized and vented?

- A. 8 Hrs
- B. 24 Hrs
- C. 32 Hrs
- D. 175 Hrs

88.

Wet reference leg level transmitter CVC-ILT-0227 equalizing valve is leaking by its seat and the reference and variable legs have equalized. Determine the effect on the operation of the CVC system and the correct procedure to implement?

- A. Auto Makeup to the VCT would stop if in service. Implement OP-901-112, Letdown or Charging Malfunction.
- B. The VCT inlet valve diverts to the Holdup Tanks if the C/S is in the AUTO position. Implement OP-901-113, VCT Makeup Malfunction.
- C. Charging pump suction automatically realigns to the Refueling Water Storage Pool. Implement OP-901-113, VCT Makeup Malfunction.
- D. Annunciators actuate for VCT Level Lo and VCT Level Lo-Lo on Panel CP-4. Implement OP-901-112, Letdown or Charging Malfunction.

89.

Given the following initial conditions:

- The plant is in MODE 5 with both SDC trains in service.
- PZR level is 50% Cold Cal with a bubble in the pressurizer.
- RCS Pressure is 370 psia.
- RCP 1A is running.
- Letdown and charging are currently in service.

While performing PPS surveillances, a SIAS signal is generated and all auto actions occur. Which procedure should you enter and what action needs to be performed expeditiously?

- A. OP-901-131, Shutdown Cooling Malfunction, secure both LPSI pumps
- B. OP-901-504, Inadvertent ESFAS Actuation, secure both HPSI pumps
- C. OP-902-000, Standard Post Trip Actions; secure all charging pumps
- D. OP-902-008, Functional Recovery, secure RCP 1A.

90.

Given the following:

- The plant operated for 120 days at 100% power
- An automatic reactor trip occurred on SG 1 level lo due to a FWCS valve failure
- The reactor has been shutdown for 5 hours
- No PPS surveillances have been performed since the trip
- It is desired to close the reactor trip breakers to support maintenance testing

Which of the following sections of OP-903-107, PPS Channel Functional Test must be performed for all four channels of PPS to allow reclosing the reactor trip breakers with the CEA disconnects closed and the CEA MG sets operating?

- A. DNBR Low
- B. High Linear Power
- C. High Logarithmic Power
- D. Low Steam Generator 1 Level

91.

The plant is in Mode 3. Emergency Diesel Generator B tripped on overspeed during a surveillance run. No other equipment is out of service. OP-903-066, Electrical Breaker Alignment Check was performed by an NPO and the following conditions were noted:

• Grid Line Voltage	A – 236 KV	B – 230 KV
• SUT Disconnect Status	A - Closed	B - Closed
• SUT Feeder Bkr to 2 Bus Control Power Status	A – On	B – On
• 2 Bus to 3 Bus Tie Bkr Status	A – Closed	B – Closed
• 3 Bus to 2 Bus Tie Bkr Status	A – Closed	B – Closed
• 31 Bus Fdr Bkr Status	A- Closed	B - Closed
• 2 Bus Volts	A – 4200 V	B – 4030 V
• 3 Bus Volts	A- 4150 V	B – 3990 V
• 31 Bus Volts	A – 475 V	B – 430 V
• Switchyard OCB Status	7176 – Closed	7186 - Closed
• Switchyard OCB Status	7172 – Open	7182 - Closed

Which of the following action statements need to be entered?

- A. 3.8.1.1.a & d
- B. 3.8.1.1.b & d
- C. 3.8.1.1.c & d
- D. 3.0.3

92.

A batch gaseous release is in progress from containment through the Containment Purge and RAB Ventilation system. The release has been in progress for 1 hour when the NPO reports that 10 meter wind speed is 1.2 meters/sec and the 199 – 33' delta T is 0.8°C. Determine the direction you need to give the NPO to comply with the release permit requirements

- A. Secure Containment Purge immediately.
- B. Secure Containment Purge if 10 meter wind direction is $\geq 68^\circ$ but $\leq 339^\circ$.
- C. Secure Containment Purge if 10 meter wind direction is $> 339^\circ$ but $< 68^\circ$.
- D. Continue Containment Purge with no restrictions.

93.

Given the following conditions:

- The plant is at 100% power
- All systems are aligned normally
- A spurious 86G1 actuation trips the Main Generator and Turbine
- Plant systems respond normally to the event

Which of the following procedures needs to be implemented immediately for this event?

- A. OP-901-211, Generator Malfunction
- B. OP-901-210, Turbine Trip
- C. OP-901-101, Reactor Power Cutback
- D. OP-902-000, Standard Post Trip Actions

94.

Given the following conditions:

- An ECC has been calculated for Group P at 75”
- RCS boron concentration is at ECC boron concentration
- A reactor startup is in progress

MODE 2 will be entered when commencing withdrawal of:

- A. Shutdown Group A
- B. Shutdown Group B
- C. Reg Group 1
- D. Group P

95.

Refer to Control Room envelope figures 1 through 4. The plant is in Mode 3. Which figure shows a Control Room staff configuration in violation of OP-100-001, Operations Standards and Management Expectations? (Assume that each watchstander is qualified no higher than the minimum requirements to stand the position)

- A. Fig 1
- B. Fig 2
- C. Fig 3
- D. Fig 4

96.

During core unload, the Refueling Machine is positioned over a spent fuel assembly in an upender basket. When the fuel assembly is grappled in the upender, a S/G nozzle dam fails. The Fuel Handling Supervisor notes that reactor cavity level is lowering at approximately one foot per minute. In addition to closing the transfer tube gate valve, the Fuel Handling Supervisor should order the crew to:

- A. Ungrangle the fuel assembly, move the refueling machine out of the upender zone, and lower the upender to the horizontal position.
- B. Raise the fuel hoist to the up limit, move the Refueling Machine to a temporary storage rack, and lower the assembly into the temporary storage rack.
- C. Raise the the fuel hoist to the up limit, move the Refueling Machine to the designated core location, and lower the assembly into the core.
- D. Raise the fuel hoist to the up limit, move the Refueling Machine to the deep end of the refueling cavity, and lower the assembly to the hoist down stop.

97.

Which of the following would require a Priority 1 Work Request be initiated in Mode 1? (assume associated A and B pumps are operable)

- A. Charging Pump AB trips on overload during In-service testing.
- B. Essential Chillwater Pump AB vibration in the alert range during In-service Testing.
- C. CCW Pump AB does not generate acceptable differential pressure during In-Service Testing.
- D. EFW Pump AB trips on overspeed during In-service testing and cannot be reset.

98.

An accident with significant core damage has occurred. An entry into the -35' Wing Areas is needed to retrieve an injured person. The dose for this task has been estimated at 19 Rem TEDE. Which of the following is correct?

- A. The entry can **NOT** be allowed because it exceeds the federal exposure limits of 10 CFR 20.
- B. The entry can be allowed under the Planned Special Exposure limits per RP-207, Planned Special Exposures.
- C. The entry can **NOT** be allowed since the estimated exposure exceeds the associated emergency exposure limit.
- D. The entry can be allowed since the expected exposure is less than the associated emergency exposure limit.

99.

The plant is at 24% power and Main Feedwater Isolation Valve 1 goes closed. The crew manually trips the reactor at 23% NR in SG 1. During SPTAs the A3 to A2 bus breaker opens and EDG A trips on overspeed. Which of the following is correct concerning E-Plan classification? (Assume no equipment OOS initially)

- A. No classification criteria are met
- B. Unusual Event should be declared
- C. Alert should be declared
- D. Site Area Emergency should be declared

100.

Which of the following conditions would indicate a need to exit the Station Blackout procedure and perform diagnostics?

- A. AB-DC Voltage is 0 Volts
- B. T_C is 550°F and stable
- C. Cntnmt Temp is 170°F, rising 5 °F/min
- D. Pzr level is 35% and lowering slowly

End of Test