

U.S. Nuclear Regulatory Commission**Written Examination****Applicant Information**

Name:

Date:

Facility/Unit:

Region: I ☐ II ☐ III ☐ IV ☐Reactor Type: W ☐ CE ☐ BW ☐ GE ☐

Start Time:

Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

Applicant Certification

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

Applicant's Signature**Results**Examination Value 75 Points

Applicant's Score _____ Points

Applicant's Grade _____ Percent

1. (A) (B) (C) (D)

2. (A) (B) (C) (D)

3. (A) (B) (C) (D)

4. (A) (B) (C) (D)

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6. (A) (B) (C) (D)

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Name: _____

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75. (A) (B) (C) (D)

Question 001

Given the following condition:

- Unit 1 experiences a loss of Non-Safeguards Bus 1A3 while operating at 700 MWe load.

Which of the following automatic actions will occur?

- A. Turbine Runback due to loss of power to Condensate Pump 1-01.
- B. Reactor Trip due to loss of Reactor Coolant Pump 1-03.
- C. Turbine Trip due to loss of Turbine Plant Cooling Water Pump 1-01.
- D. Reactor Trip due to loss of Rod Drive Motor Generator Set 1-01.

Question 002

Given the following conditions:

- Unit 1 is in MODE 1.
- Centrifugal Charging Pump 1-01 is providing Charging flow.
- An Instrument Air tubing break has occurred on 1-HCV-0182, RCP SEAL WTR PRESS CTRL valve.
- All other components supplied by Instrument Air are functioning properly.

Which of the following are the effects on the Reactor Coolant Pumps?

Seal Injection flow will...

- A. increase and LOW SEAL WTR BRG TEMPs (Pump Bearings) will decrease.
- B. increase and LOW SEAL WTR BRG TEMPs (Pump Bearings) will increase.
- C. decrease and LOW SEAL WTR BRG TEMPs (Pump Bearings) will decrease.
- D. decrease and LOW SEAL WTR BRG TEMPs (Pump Bearings) will increase.

Question 003

Given the following conditions:

- Unit 1 is in MODE 6.
- Residual Heat Removal (RHR) Train B is providing Shutdown Cooling.
- Charging and Letdown are in their normal MODE 6 alignment maintaining a steady level in the Reactor Vessel.
- RHR Train A is being aligned per SOP-102A, Residual Heat Removal System, for filling the Refueling Cavity.
- The following actions have been performed:
 - 1/1-APPRH1, RHRP 1 is in PULLOUT.
 - 1/1-8701A, RHRP 1 HL RECIRC ISOL VLV, is CLOSED.
 - 1/1-8812A, RWST TO RHRP 1 SUCT VLV, is OPEN.
 - 1/1-8809A, RHR TO CL 1 & 2 INJ ISOL VLV, is CLOSED.
 - 1/1-8716A, RHRP 1 XTIE VLV, is OPEN.
 - 1/1-8840, RHR TO HL 2 & 3 INJ ISOL VLV, is OPEN.
- 1/1-8702A, RHRP 1 HL RECIRC ISOL VLV, remains CLOSED.

The Refueling Cavity level is now RISING at a steady rate.

Which of the following is responsible for the level rise?

- A. Leakage past 1-8809A, RHR TO CL 1 & 2 INJ ISOL VLV, is occurring.
- B. 1-PK-131, LTDN HX OUT PRESS CTRL, has failed to 100% demand.
- C. Leakage past 1-HCV-0606, RHR HX 1-01 FLO CTRL VLV, is occurring.
- D. 1-FK-121, CCP CHRG FLO CTRL, has failed to 0% demand.

Question 004

Given the following conditions:

- A Small Break Loss of Coolant Accident (LOCA) has occurred on Unit 2.
- EOS-1.2B, Post LOCA Cooldown and Depressurization, is in progress.
- Reactor Coolant System (RCS) pressure is 1100 psig and slowly lowering.
- Containment pressure is 4 psig and slowly rising.
- All Reactor Coolant Pumps have been stopped.
- RCS cooldown to Cold Shutdown is in progress.
- RCS subcooling is 70°F and improving.
- Safety Injection (SI) and SI sequencers have been RESET.
- ECCS status is as follows:
 - Both Centrifugal Charging Pumps are running.
 - 1-FI-917, CCP SI FLO, is 400 GPM and stable.
 - 1-FI-121A, CHRG FLO, is 32 GPM and stable.
 - Both Safety Injection Pumps are running.
 - 1-FI-918, SIP 1 DISCH FLO, is 350 GPM and stable.
 - 1-FI-922, SIP 2 DISCH FLO, is 350 GPM and stable.
 - Both Residual Heat Removal (RHR) Pumps are in Standby.

The crew is preparing to depressurize the RCS when pressure rapidly lowers to 50 psig and Containment pressure rapidly raises to 25 psig.

Which of the following is required?

- A. Manually actuate Safety Injection.
- B. Manually actuate Containment Spray.
- C. Manually restart the RHR Pumps.
- D. Perform EOP-0.0B, Reactor Trip or Safety Injection, Attachment 2, Safety Injection Actuation Alignment.

Question 005

Given the following conditions:

- FRP-0.1B, Response to Imminent Pressurized Thermal Shock Condition, Step 7, (Check If ECCS Can Be Terminated), is in progress.
- NO Reactor Coolant Pumps (RCPs) are running.
- Adequate Reactor Coolant System (RCS) subcooling to terminate ECCS does NOT exist.
- Adequate RCS subcooling to restart an RCP does exist.

Why is a RCP started in this condition?

An RCP restart establishes ...

- A. forced flow in order to provide improved temperature control for the RCS Temperature Soak.
- B. improved mixing of the RCS with ECCS injection to reduce core ΔT and lessen the thermal stress across the Cold Leg nozzle.
- C. forced flow to lower the temperature at the core outlet and increase subcooling in order to terminate ECCS.
- D. improved mixing of the RCS with ECCS injection to raise the water temperature in the downcomer and lessen the thermal stress across the Vessel wall.

Question 006

Which of the following describes the valves that MUST be CLOSED in order to manually OPEN 1-8811A, CNTMT SUMP TO RHRP 1 SUCT ISOL VLV?

- A. 1-8812A, RWST TO RHRP 1 SUCT VLV, and BOTH 1-8701A, RHRP1 HL RECIRC ISOL VLV, AND 1-8702A, RHRP1 HL RECIRC ISOL VLV.
- B. 1-8812A, RWST TO RHRP 1 SUCT VLV, and EITHER 1-8701A, RHRP1 HL RECIRC ISOL VLV, OR 1-8702A, RHRP1 HL RECIRC ISOL VLV.
- C. 1-8804A, RHRP 1 TO CCP SUCT VLV, and BOTH 1-8701A, RHRP1 HL RECIRC ISOL VLV, AND 1-8702A, RHRP1 HL RECIRC ISOL VLV.
- D. 1-8804A, RHRP 1 TO CCP SUCT VLV, and EITHER 1-8701A, RHRP1 HL RECIRC ISOL VLV, OR 1-8702A, RHRP1 HL RECIRC ISOL VLV.

Question 007

Given the following conditions:

- A Unit 1 Reactor Trip has occurred.
- EOP-0.0A, Reactor Trip or Safety Injection, is in progress.
- One Pressurizer Safety Valve has stuck partially open.
- Pressurizer Relief Tank (PRT) pressure is 32 psig and rising rapidly.
- Containment pressure is 0.3 psig and stable

Which of the following describes the highest PRT pressure that will exist just prior to Containment pressure rising due to this event?

- A. 76.4 psig.
- B. 85.4 psig.
- C. 91.1 psig.
- D. 114.8 psig.

CPNPP 2012 NRC Written Examination
Reactor Operator

Question 008

Given the following conditions:

- Unit 1 is in MODE 1.
- Station Service Water (SSW) Pump 1-01 has tripped.
- Component Cooling Water (CCW) Pump 1-02 automatically started.
- CCW Heat Exchanger 1-01 outlet temperature is 123°F and rising.

Which of the following actions is required per ABN-501, Station Service Water System Malfunction?

- A. Isolate the Train A CCW Safeguards Loop.
- B. Secure Component Cooling Water Pump 1-01.
- C. Cross-tie Unit 1 SSW Trains to supply cooling to CCW Train A.
- D. Cross Tie Unit 1 and Unit 2 Train A SSW.

Question 009

Given the following conditions:

- Unit 2 has been tripped due to a Steam Generator Tube Rupture (SGTR) on Steam Generator 2-02.
- All Reactor Coolant Pumps are running.
- Steam Generator 2-02 has been isolated.
- EOP-3.0B, Steam Generator Tube Rupture, is in progress.
- Steps to verify normal Pressurizer Spray available, deenergize all Pressurizer Heaters and initiate maximum Pressurizer Spray are being performed.

Which of the following identifies why these actions are performed per EOP-3.0B, Steam Generator Tube Rupture?

The Reactor Coolant System is depressurized to ...

- A. minimize break flow and refill the Pressurizer.
- B. minimize break flow and improve RCS subcooling.
- C. prevent voiding the upper head region and improve RCS subcooling.
- D. prevent voiding the upper head region and refill the Pressurizer.

Question 010

Given the following conditions:

- Unit 1 is in MODE 1.
- Pressurizer Pressure Channel 1-PI-455A has failed LOW.
- 1/1-PS-455F, PRZR PRESS CTRL CHAN SELECT switch is in the 455/456 position.

Which of the following channel output signals passed through an optical isolation amplifier in the 7300 Process Racks?

Input to ...

1. Pressurizer Pressure Low Backup Heaters On Annunciator Signal.
2. 1-PT-455A, Pressurizer Master Pressure Control Signal.
3. Pressurizer Pressure Low Reactor Trip Bistable Input.
4. Pressurizer Pressure Low Safety Injection Bistable Input.

A. 1 and 2.

B. 1 and 4.

C. 2 and 3.

D. 3 and 4.

Question 011

Given the following conditions:

- All Unit 1 systems are in a normal MODE 1 alignment.
- A steam leak occurs on Steam Generator 1-02 outside Containment.
- Annunciator 1-ALB-6C, Window 3.7 – MSL PRESS LO SI ACT, is FLASHING red.
- Annunciator PCIP Window 1.8 – SI ACT, is ON and FLASHING.

Which of the following describes the status of the Engineered Safety Feature Actuation System?

At least _____ Main Steam Line Pressure Low Channel(s) has(have) actuated and _____ train(s) of Emergency Core Cooling System equipment is(are) operating.

- A. one one
- B. one two
- C. two one
- D. two two

Question 012

Given the following conditions:

- A Main Steam Line Break outside Containment occurs.
- The Reactor was tripped and Safety Injection was actuated.
- Subsequently, a single Containment Spray Actuation switch was placed in ACTUATE.
- Reactor Coolant System subcooling is 35°F.

Which of the following describes the effect on continued Reactor Coolant Pump (RCP) operation?

- A. There is NO Containment Spray flow and Component Cooling Water isolation has NOT occurred; the RCPs should immediately be tripped.
- B. There is Containment Spray flow and Component Cooling Water isolation has occurred; the RCPs may continue to run.
- C. There is Containment Spray flow and Component Cooling Water isolation has occurred; the RCPs should immediately be tripped.
- D. There is NO Containment Spray flow and Component Cooling Water isolation has NOT occurred; the RCPs may continue to run.

Question 013

Given the following conditions:

- Both Units are at 100% power.
- All systems are normally aligned when a Loss of Offsite Power occurs.

Which of the following describes the response of the Containment Air Cooling and Recirculation System Cooling Units and Fans?

- A. Cooling Units and Fans are load shed and must be manually reset.
- B. Cooling Units and Fans are load shed and CANNOT be restarted.
- C. Cooling Units and Fans are tripped and then sequenced onto the safety-related electrical buses.
- D. Two of the four Cooling Units and Fans are sequenced onto the safety-related electrical buses after all four have been tripped.

Question 014

Given the following conditions:

- Unit 2 was at 100% power with the Train A Safety Injection Sequencer deenergized for I&C troubleshooting.
- A Reactor Trip and Safety Injection occurred due to low Pressurizer pressure.
- Containment pressure is 20 psig and rising.
- All systems functioned as expected for the given plant conditions.

Which of the following describes the response of Train A Containment Spray System?

Train A Containment Spray Pumps will...

- A. start and the Heat Exchanger Outlet Valve will open.
- B. NOT start and the Heat Exchanger Outlet Valve will open.
- C. start and the Heat Exchanger Outlet Valve will NOT open.
- D. NOT start and the Heat Exchanger Outlet Valve will NOT open.

Question 015

Given the following conditions:

- Unit 2 is in MODE 3 after performing a normal shutdown.
- 43/1-SD, STM DMP MODE SELECT is in STM PRESS.
- 2-PK-507, STM DMP PRESS CTRL is in AUTO.
- 2-PK-507 POT is set to control Reactor Coolant System temperature at 500°F.
- Circulating Water Pumps 2-01 and 2-03 are in service.
- Condenser vacuum is 27" Hg.

What would be the Steam Dump System response to 2-PT-0507, Main Steam Header Pressure Transmitter, failing high?

- A. Bank 1 would open in response to the difference between the setpoint and measured pressure.
- B. Banks 1 and 2 would open in response to the difference between the setpoint and measured pressure.
- C. Bank 1 would open in response to the Hi-1 Bistable actuation.
- D. Banks 1 and 2 would open in response to the Hi-1 Bistable actuation.

Question 016

Given the following conditions following a Steam Line Break outside Containment:

- EOP-2.0A, Faulted Steam Generator Isolation, is in progress.
- 125 VDC Battery BT1D2 is verified aligned from either 125 VDC Battery Chargers BC1D2 or BC1D24.

Which of the following identifies the reason for ensuring an OPERABLE Battery Charger is aligned to Distribution Panel 1D2 per EOP-2.0A, Faulted Steam Generator Isolation?

- A. Prevent a potential loss of Unit Auxiliary Transformer 1UT.
- B. Prevent a potential loss of the Main Turbine DC Emergency Oil Pump.
- C. Prevent inadvertent opening of Main Steam Isolation Valves.
- D. Prevent inadvertent opening of Atmospheric Relief Valves #2 and #4.

Question 017

Given the following conditions:

- Unit 1 is in Mode 1 operating at 95% power.
- 1-PI-2042-1, Main Condenser Vacuum is 27.2 in Hg and slowly lowering.
- 1-PI-2042-2, Main Condenser Vacuum is 26.8 in Hg and slowly lowering.
- Feedwater Pump (FWP) A indications are:
 - 1-PI-2295, FWP A SUCT PRESS: 196 psig and stable
 - 1-PI-3305, FWPT A HYD OIL SPLY PRESS: 210 psig and stable
 - 1-PI-2206, AUX CNDSR A PRESS: 17 in Hg and slowly lowering
 - 1-SI-2111F, FWPT A SPD: 5100 rpm and stable
- Feedwater Pump (FWP) B indications are:
 - 1-PI-2297, FWP B SUCT PRESS: 193 psig and stable
 - 1-PI-3306, FWPT B HYD OIL SPLY PRESS: 210 psig and stable
 - 1-PI-2207, AUX CNDSR B PRESS: 24 in Hg and slowly lowering
 - 1-SI-2112F, FWPT A SPD: 5150 rpm and stable

Which of the following describes the operator actions that are required to be taken due to these conditions?

- A. Trip BOTH FWPs and Trip the Reactor.
- B. Trip FWP A and ensure the Main Turbine is runback to 700 MWe.
- C. Initiate a 50 MWe load reduction to restore Main Condenser vacuum.
- D. Trip the Reactor and ensure that the Main Turbine is tripped.

Question 018

Given the following conditions:

- Unit 1 is in MODE 3 following a Reactor Trip.
- Steam Generator (SG) narrow range levels are as follows:
 - SG 1-01 is 36%.
 - SG 1-02 is 45%.
 - SG 1-03 is 32%.
 - SG 1-04 is 43%.
- 1-LI-2217, CNDSR HOT WELL LVL, is 5.8 feet.

Which of the following lists the lineup of the Condensate System and the reason for the lineup?

- A. 1-HS-2211/12, CNDS REJECT VLV, is open to lower Condenser Hot Well level.
- B. 1-HS-2211/12, CNDS REJECT VLV, is closed to preserve Condenser Hot Well level
- C. 1-HS-2484, CST DISCH VLV and 1-HS-2485, CST DISCH VLV, are open to allow water in the Condenser Hot Well to be transferred to the Condensate Storage Tank.
- D. 1-HS-2484, CST DISCH VLV and 1-HS-2485, CST DISCH VLV, are closed to preserve level in the Condensate Storage Tank.

Question 019

Given the following condition:

- Inverter 1PC4 has been declared inoperable due to an internal failure.

Which of the following alignments would be acceptable to allow Unit 1 to continue to operate in MODE 1 for the next several weeks while parts are procured for repairs to Inverter 1PC4?

Align 118 VAC _____ to 118 VAC Vital Distribution Panel 1PC4.

- A. Distribution Panel 1EC6.
- B. Distribution Panel 1EC5.
- C. Inverter IV1EC2/4.
- D. Inverter IV1EC1/3.

Question 020

Given the following condition:

- Unit 1 was in MODE 1 with all systems in their NORMAL lineup.
- A Loss of Offsite and Onsite AC Power occurred 4 hours ago.
- ECA-0.0A, Loss of All AC Power, is in progress.
- INITIAL DC load shedding was performed 2 hours ago per ECA-0.0A, Loss of All AC Power, Attachment 2 (DC Load Shedding), Step 1.
- It will take approximately 24 hours to restore Offsite Power.
- Emergency Diesel Generator 1-02 will be available to energize Bus 1EA2 in approximately 1 hour.
- A fault occurred on Emergency Diesel Generator 1-01 and it will not be available for at least 36 hours.
- Battery parameters are as follows:
 - Battery BT1ED1 Voltage: 109 VDC
 - Battery BT1ED1 Current: 75 amps discharging
 - Battery BT1ED2 Voltage: 108 VDC
 - Battery BT1ED2 Current: 80 amps discharging
- Due to plant conditions, ADDITIONAL DC load shedding is required on Bus 1ED2 ONLY per ECA-0.0A, Loss of All AC Power, Attachment 2 (DC Load Shedding), Step 2.

Which of the following necessitates that additional load shedding be performed?

Additional load shedding is performed on Bus 1ED2 to...

- A. maintain Battery BT1ED2 voltage greater than 105 VDC to ensure all Post Accident Monitoring indications are maintained in the Control Room.
- B. restore Battery BT1ED2 voltage to greater than 110 VDC to ensure minimum system voltage for subsequent power restoration activities.
- C. restore Battery BT1ED2 voltage to greater than 110 VDC to ensure all Post Accident Monitoring indications are maintained in the Control Room.
- D. maintain Battery BT1ED2 voltage greater than 105 VDC to ensure minimum system voltage for subsequent power restoration activities.

Question 021

Which of the following describes the effect of allowing BOTH the Diesel Starting Air Receivers to drop to 145 psig?

The Emergency Diesel Generator Engine Start Circuit will accept a...

- A. Local Emergency Start signal.
- B. Safety Injection Start signal.
- C. Bus Undervoltage Start signal.
- D. Manual Normal Start signal.

Question 022

Given the following conditions on Unit 1:

- EOP-0.0A, Reactor Trip or Safety Injection, is in progress following a manual Reactor Trip and Safety Injection due to a 25 GPM leak.
- A Main Steam Line N-16 Radiation Monitor had been in alarm with a reading of greater than 150 GPD.
- Ten minutes have passed since the Reactor was tripped and the Main Steam Line N-16 Radiation Monitor is now reading one GPD.

Which of the following explains this trend?

The trend is...

- A. unexpected because the PC-11, Digital Radiation Monitoring System, maintains the highest value until reset.
- B. expected because while the Reactor was critical, high energy gamma radiation was being produced and entering the Steam Generator through a tube leak. The high energy gamma production has reduced resulting in a lower reading.
- C. expected because the Main Steam Line N-16 Radiation Monitors are isolated on the Safety Injection signal resulting in the decreased reading.
- D. unexpected because the radiation monitor was in alarm, the trend should continue to rise as high energy gamma production will increase as the secondary isotopic concentration rises toward equilibrium until the leak is stopped.

Question 023

Given the following conditions:

- Unit 2 is in MODE 1 when a Loss of Offsite Power occurs.
- Both Station Service Water (SSW) Pumps were in operation prior to the Reactor Trip.
- Safeguards Bus 2EA2 has an 86-2 Lockout Relay actuated.
- Both Emergency Diesel Generators have responded per design.

Which of the following is the status of the SSW Pumps forty-five seconds later?

- A. NO SSW Pump is running.
- B. BOTH SSW Pumps are running.
- C. SSW Pump 2-01 is running and SSW Pump 2-02 is NOT running.
- D. SSW Pump 2-01 is NOT running and SSW Pump 2-02 is running.

Question 024

Given the following conditions:

- Unit 1 Station Service Water (SSW) was in an abnormal lineup with Station Service Water Pump (SSWP) 1-01 running and SSWP 1-02 in STANDBY.
- Component Cooling Water Pump (CCWP) 1-02 is out of service for preventative maintenance.
- Subsequently SSWP 1-01 trips and SSWP 1-02 automatically starts.

Which of the following describes the SSWP AUTO start feature and system alignment using ABN-501, Station Service Water System Malfunction?

SSWP 1-02 AUTO started when...

- A. the header pressure in Train A SSW dropped to 10 psig.
Cross connect Train A SSW Unit 1 with Train A SSW Unit 2.
- B. the return header flow in Train A SSW dropped to 16,456 GPM.
Cross connect Train A SSW Unit 1 with Train A SSW Unit 2.
- C. the return header flow in Train A SSW dropped to 16,456 GPM.
Ensure CCWP 1-01 running with both Train Safeguards Loop Isolation Valves open.
- D. the header pressure in Train A SSW dropped to 10 psig.
Ensure CCWP 1-01 running with both Train Safeguards Loop Isolation Valves open.

Question 025

Given the following conditions:

- Unit 1 is in MODE 1.
- Instrument Air (IA) Compressor 1-01 is operating as the LEAD Compressor.
- IA Compressor 1-02 is in an AUTO-START condition as the BACKUP Compressor.
- IA Compressor X-01 is in STANDBY and aligned to Unit 1 through Air Dryer X-01.
- The following sequence of events occur:
 - At 1415, 1-ALB-01, Window 2.4 – CNTMT INSTR AIR HDR PRESS LO, alarms as pressure drops to 84 psig.
 - At 1416, 1-ALB-01, Window 3.3 – INSTR AIR HDR PRESS LO, alarms as pressure drops to 85 psig.
 - All other Unit 1 Control Room alarms related to the IA System remain clear.
 - At 1420, a stuck-open relief valve on Air Dryer 1-01 reseats.
 - At 1422, both Instrument Air alarms (1-ALB-01-2.4 and 3.3) clear.
 - At 1423, Instrument Air header pressure is 93 psig and slowly rising.

At 1424, assuming NO additional operator actions and with IA Compressor 1-01 running and loaded, which of the following is the status of IA Compressors 1-02 and X-01?

IA Compressor 1-02 is _____ and IA Compressor X-01 is _____.

- | | |
|--------------------------|--------------------|
| A. running and loaded; | running and loaded |
| B. running and loaded; | shutdown |
| C. running and unloaded; | running and loaded |
| D. running and unloaded; | shutdown |

Question 026

Given the following conditions:

- Unit 1 is in MODE 1.
- 1/1-8149A, LTDN ORIFICE ISOL VLV (45 GPM) is CLOSED.
- 1/1-8149B, LTDN ORIFICE ISOL VLV (75 GPM) is CLOSED.
- 1/1-8149C, LTDN ORIFICE ISOL VLV (75 GPM) is CLOSED.
- 1/1-LCV-459, LTDN ISOL VLV indicates mid position.
- 1/1-LCV-460, LTDN ISOL VLV indicates mid position.
- 1-PI-3488, INSTR AIR AFTFILT OUT PRESS indicates 112 psig and stable.
- 1-PI-3490, CNTMT INSTR AIR HDR PRESS indicates 75 psig and lowering slowly.
- Instrument Air Compressor 1-01 is running.

Which of the following actions are required?

- A. Cross-Tie Unit 1 and Unit 2 instrument air headers.
- B. Start and align temporary air compressor.
- C. Start and align common instrument air compressor X-01.
- D. Open 1-HS-3487, CNTMT INSTR AIR ISOL VLV.

Question 027

Given the following condition:

- Unit 2 is operating at reduced inventory in accordance with IPO-010B, Reactor Coolant System Reduced Inventory Operations.

Under this condition Containment hatches must be closed prior to ...

- A. core boiling following a loss of Residual Heat Removal.
- B. commencing vacuum fill of the Reactor Coolant System.
- C. throttling the Residual Heat Removal Cold Leg Injection Valve.
- D. reducing inventory to less than or equal to 80 inches above Core Plate.

Question 028

Given the following conditions:

- Reactor Coolant System temperature is 540°F during a Unit 1 heatup.
- Three Containment Air Recirculation Fan Coolers are in service.
- Four Ventilation Chillers are in service.
- Containment air temperature is 122°F.
- Containment pressure is 0.9 psig.

Which of the following actions are taken to ensure Containment does not exceed design limits upon the occurrence of a Loss of Coolant Accident or a Steam Line Break inside Containment?

Reduce Containment...

- A. pressure by placing the Containment Pressure Relief System in service.
- B. pressure by placing the Containment Purge Supply and Exhaust System in service.
- C. temperature by placing an additional Ventilation Chiller in service.
- D. temperature by placing an additional Containment Air Recirculation Fan Cooler in service.

Question 029

Given the following conditions:

- Unit 2 has been at 100% power for three months.
- Unit 2 has been at 96% power for the past 5 days due to a secondary inefficiency.
- Control Bank D is at 190 steps.

Considering Power Defect, Rod Worth, and Boron Worth, which of the following is the amount of boron necessary to restore Unit 2 to 100% with Control Bank D at 215 steps?

- A. ~12 gallons.
- B. ~19 gallons.
- C. ~94 gallons.
- D. ~169 gallons.

Question 030

Given the following condition:

- While recording Unit 2 Critical Data at 10^{-8} amps, a fault causes a loss of 118 VAC Protection Bus 2PC3.

Which of the following is the expected Nuclear Instrument (NI) plant response?

- A. Reactor will trip due to Intermediate Range NI High Flux trip.
- B. Bistables for Power Range NI N-43 will trip, Reactor will NOT trip.
- C. Bistables for Power Range NI N-42 will trip, Reactor will NOT trip.
- D. Reactor will trip due to removal of P-6 block reenergizing the Source Range NIs.

Question 031

Given the following conditions:

- Unit 1 is at 55% power with a power ascension evolution in progress.
- Rod Control is in MANUAL.
- An instrument failure causes the following changes to plant parameters:

	<u>BEFORE FAILURE</u>	<u>AFTER FAILURE</u>
Loop 1 T _{AVE} (1-TI-412):	571°F	571°F
Loop 2 T _{AVE} (1-TI-422):	570°F	569°F
Loop 3 T _{AVE} (1-TI-432):	570°F	607°F
Loop 4 T _{AVE} (1-TI-442):	569°F	570°F

Which of the following describes the response of the plant?

Charging flow will initially...

- A. increase and actual Pressurizer level will stabilize at a higher level.
- B. increase and actual Pressurizer level will rise causing a Reactor Trip.
- C. decrease and actual Pressurizer level will stabilize at a lower level.
- D. decrease and actual Pressurizer level will lower until Letdown isolates.

Question 032

Given the following conditions:

- Unit 2 has experienced a Small Break Loss of Coolant Accident.
- Through various failures core cooling was lost for several minutes and transition to FRC-0.2B, Degraded Core Cooling, was required.
- Core cooling has now been restored and operation is continuing in EOS-1.2B, Post LOCA Cooldown and Depressurization.
- Containment Hydrogen concentration has just been determined as 2% in dry air.
- Containment pressure is currently 8 psig and stable which precludes use of the Hydrogen Purge System.

If Containment pressure cannot be lowered sufficiently to establish Hydrogen Purge, what are the potential effects on the Containment atmosphere?

During the coming months Hydrogen concentration will...

- A. continue to increase as a result of the zirconium/water reaction.
- B. continue to increase as a result of corrosion off gassing.
- C. slowly decrease from recombination of hydrogen and oxygen.
- D. slowly decrease as a result of Reactor Coolant System degassing.

Question 033

Given the following conditions:

- Unit 1 is in a Refueling outage, and fuel transfer activities are in progress.
- Refueling Cavity level begins lowering.
- Annunciator 1-ALB-2A, Window 2.7 – RX CAV SMP LVL HI-HI, is in alarm.
- All radiation levels are normal and there are NO Radiation Monitors in alarm.

Which of the following should be performed?

- A. Ensure the Fuel Transfer Cart is in the Containment Building.
Close the Transfer Tube Gate Valve.
- B. Ensure the Fuel Transfer Cart is in the Fuel Building.
Close the Transfer Tube Gate Valve.
- C. Ensure the Fuel Transfer Cart is in the Containment Building.
Open the Transfer Tube Gate Valve.
- D. Ensure the Fuel Transfer Cart is in the Fuel Building.
Open the Transfer Tube Gate Valve.

Question 034

Given the following conditions:

- Unit 2 is operating at 50% power.
- 2-FS-510C, SG 1 FW FLO CHAN SELECT, is in the 2-FY-510C position.
- 2-FS-512C, SG 1 STM FLO CHAN SELECT, is in the 2-FY-512B position.
- 2-LS-519C, SG 1 LVL CHAN SELECT, is in the 2-LQY-551 position.
- Steam Generator (SG) 2-01 level begins to raise.
- All other SG levels are stable at approximately 64%.

Which of the following is the cause of the raising level in Steam Generator 2-01?

- A. 2-LT-551, SG 1 LVL (NR) CHAN I, has failed low.
- B. 2-PT-514A, MSL 1 PRESS CHAN I, has failed low.
- C. 2-FT-512A, SG 1 STM FLO CHAN I, has failed low.
- D. 2-FT-510A, SG 1 FW FLO CHAN I, has failed high.

Question 035

Given the following condition on Unit 1:

- During a plant cooldown and depressurization, Reactor Coolant System (RCS) temperature is being stabilized at 508°F.

Assuming minimal ΔT between the Reactor Coolant System and Steam Generator, which of the following identifies the proper pot setting for PK-507, STM DUMP PRESS CTRL, to maintain RCS temperature with the Steam Dump System in AUTO?

- A. 2.37
- B. 3.97
- C. 4.09
- D. 4.20

Question 036

Which of the following is the reason T_{AVE} lowers less at end-of-life (EOL) conditions than at beginning-of-life (BOL) conditions when a 10% Main Turbine step increase in load occurs?

During EOL conditions, Moderator Temperature Coefficient is...

- A. less negative with a higher boron concentration.
- B. less negative with a lower boron concentration.
- C. more negative with a lower boron concentration.
- D. more negative with a higher boron concentration.

Question 037

Which of the following Radiation Monitors will cause HCV-014, Waste Gas Discharge Control Valve to automatically close?

1. X-RE-5701 (ABV089), Aux Building Vent Exhaust Monitor.
2. X-RE-5570A/B (PVG684/685), Plant Vent Stack Wide Range Gas Monitor.
3. X-RE-5567A/B (PVG384/385), Plant Vent Stack Noble Gas Monitor.
4. X-RE-5700 (FBV088), Fuel Building Vent Exhaust Monitor.

A. 1 and 2.

B. 1 and 3.

C. 2 and 4.

D. 3 and 4.

Question 038

Given the following conditions:

- Unit 1 has tripped.
- All Auxiliary Feedwater (AFW) flow has been lost due to low Condensate Storage Tank (CST) level.

Which of the following lists the priority for restoration of AFW per ABN-305, Auxiliary Feedwater System Malfunction?

1. Fill the CST from Main Condenser Hotwell.
 2. Fill the CST from Fire Protection Water.
 3. Align Station Service Water to AFW Pump suctions.
- A. 1, 2, 3.
- B. 2, 1, 3.
- C. 3, 2, 1.
- D. 1, 3, 2.

Question 039

Given the following conditions:

- A Main Steam Line Break outside Containment has occurred on Unit 2.
- The Reactor was tripped and Safety Injection actuated.
- EOP-0.0B, Reactor Trip or Safety Injection Step 7, Verify Containment Spray Not Required is being performed.
- Containment Spray was inadvertently actuated.

Which of the following describes the required actions and why?

- A. Trip all RCPs per EOP-0.0B, Reactor Trip or Safety Injection, due to water spray causing damage to RCPs.
- B. Trip all RCPs per EOP-0.0B, Reactor Trip or Safety Injection, due to a loss of CCW cooling to the RCPs.
- C. Reset the Containment Spray and Phase B signals and realign CCW to RCPs per Attachment 9 of EOP-0.0B, Reactor Trip or Safety Injection, due to a loss of CCW cooling to the RCPs.
- D. Reset the Containment Spray and Phase B signals and stop Containment Spray Pumps per Attachment 9 of EOP-0.0B, Reactor Trip or Safety Injection, due to water spray causing damage to RCPs.

Question 040

Given the following conditions:

- A Pressurizer Power Operated Relief Valve (PORV) has stuck open.
- Reactor Coolant System (RCS) pressure is 1500 psig.
- Containment pressure is 2 psig and rising.
- RCS break flow is approximately 140 GPM.

Subsequently, the PORV cannot be isolated.

- RCS pressure continues to lower and is currently 750 psig.
- Containment pressure is 4 psig and rising.

Which of the following is the approximate value for RCS break flow at this time?

Approximately...

- A. 35 GPM.
- B. 70 GPM.
- C. 100 GPM.
- D. 140 GPM.

Question 041

Given the following conditions:

- A Small Break Loss of Coolant Accident has occurred on Unit 1.
- EOP-1.0A, Loss of Reactor or Secondary Coolant, is in progress.
- Containment pressure is 3 psig and slowly rising.

Which of the following is the purpose for checking intact Steam Generator (SG) narrow range water levels greater than or equal to 43%?

To ensure ...

- A. SG water levels are sufficient to cover a ruptured SG tube.
- B. an excessive SG cooldown does not complicate the recovery procedure.
- C. sufficient SG water inventory is available to provide an adequate heat sink.
- D. SG shell to tube differential temperature limit is not exceeded during cooldown.

Question 042

Given the following conditions on Unit 2:

- A Safety Injection and Containment Spray Actuation occurred as a result of a Large Break Loss of Coolant Accident.
- Safety Injection has been RESET.
- EOS-1.3B, Transfer to Cold Leg Recirculation, was completed with Containment pressure still at 20 psig.
- A loss of power to both 1E Safeguards Buses occurs and the Emergency Diesels start and load.

Which of the following choices below indicates pumps that must be manually started?

1. Centrifugal Charging Pump
2. Safety Injection Pump
3. Residual Heat Removal Pump
4. Containment Spray Pump
5. Station Service Water Pump
6. Component Cooling Water Pump

A. 1, 2, 3

B. 2, 3, 4

C. 3, 4, 5

D. 4, 5, 6

Question 043

Given the following conditions:

- A Small Break Loss of Coolant Accident has occurred on Unit 1.
- Both Centrifugal Charging Pumps and both Safety Injection Pumps failed to start automatically or manually.
- FRC-0.2A, Response to Degraded Core Cooling, is in progress due to a Critical Safety Function Status Tree ORANGE path.
- Attempts to start the Positive Displacement Pump and restore Charging flow have been unsuccessful.
- Current plant parameters are as follows:
 - Reactor Coolant System pressure is 1300 psig and slowly lowering.
 - Core Exit Thermocouples are 765°F and slowly rising.
 - All Reactor Coolant Pumps (RCP) are running.
 - Seal Injection flow to all RCPs is 0 gpm.
 - Containment pressure is 6 psig and slowly rising.
 - Annunciator 1-ALB-5B, Window 3.5 – RCP 3 VIBR HI, is in ALARM.
 - RCP 1-03 shaft vibration is 17 mils and increasing at a rate of 3 mils/hr.

For the current plant conditions, which of the following is proper RCP operation?

Stop...

- A. RCP 1-03 due to high shaft vibration.
- B. all RCPs due to a loss of RCS subcooling.
- C. all RCPs to minimize heat addition to the RCS.
- D. RCP 1-04 to reserve the pump for future use.

Question 044

Given the following conditions:

- Unit 1 is operating at 95% power during a power ramp.
- 1-TI-412A, AVE $T_{AVE} T_{REF}$ DEV indicates minus (-) 2.0°F and lowering.
- SOP-104A, Reactor Make-up and Chemical Control System, is in progress to perform a 200 gallon dilution for temperature control.
- 43/1-MU, RCS MU MODE SELECT, was placed in DILUTE.
- When 1/1-MU, RCS MU MAN ACT, was placed in START, makeup flow did NOT commence.
- PROMPT Team reports that it will take approximately 2 hours to repair the 43/1-MU, RCS MU MODE SELECT, switch.
- Control Rods are in MANUAL with Control Bank D @ 220 steps.

Which of the following actions should be taken per ABN-105, Chemical and Volume Control System Malfunction?

- A. Manually align Reactor Makeup Water for Dilution.
- B. Raise Main Turbine Load to adjust Reactor Coolant System temperature.
- C. Place an unborated demineralizer in service to remove boron.
- D. Withdraw Control Rods to adjust Reactor Coolant System temperature.

Question 045

Given the following conditions:

- A Large Break Loss of Coolant Accident is in progress on Unit 1.
- A transition to EOS-1.3A, Transfer to Cold Leg Recirculation, is being initiated.
- Residual Heat Removal Pump 1-01 tripped just before the transition was made to EOS-1.3A, Transfer to Cold Leg Recirculation.

Which of the following actions should be taken?

- A. Transition to ECA-1.1A, Loss of Emergency Coolant Recirculation, and secure the running Residual Heat Removal Pump while maintaining both Centrifugal Charging Pumps and both Safety Injection Pumps running.
- B. Continue with the transfer to Cold Leg Recirculation and remain in EOS-1.3A, Transfer to Cold Leg Recirculation, but only align one Centrifugal Charging Pump and one Safety Injection Pump for recirculation.
- C. Transition to ECA-1.1A, Loss of Emergency Coolant Recirculation, and reduce injection flow to one Residual Heat Removal Pump, one Centrifugal Charging Pump, and one Safety Injection Pump running.
- D. Continue with the transfer to Cold Leg Recirculation and remain in EOS-1.3A, Transfer to Cold Leg Recirculation, aligning both Centrifugal Charging Pumps and both Safety Injection Pumps for recirculation.

Question 046

Which of the following describes the basis for the Component Cooling Water (CCW) System valve realignment upon receipt of a Containment Isolation Phase B actuation?

- A. Reduces Diesel Generator loading requirements with Containment Spray in operation.
- B. Reduces heat load on CCW System by eliminating unnecessary cooling requirements.
- C. Ensures CCW System is not an additional potential radioactive release path from Containment.
- D. Ensures that CCW System meets design cooling function for loads within Containment during Design Basis Loss of Coolant Accident.

Question 047

Given the following conditions:

- Unit 1 is at 100% power.
- The controlling Pressurizer Pressure Channel has failed high.
- Initial Operator Actions have been performed per ABN-705, Pressurizer Pressure Control Malfunction.

Which of the following is the next appropriate action to take based on this failure?

- A. Declare the associated PORV INOPERABLE.
- B. Transfer control to an alternate controlling channel.
- C. Remove power to the associated PORV Block Valve.
- D. Verify PCIP 2.6, PRZR PRESS SI BLK PERM P-11 is LIT.

Question 048

Given the following conditions:

- An Anticipated Transient Without Trip (ATWT) event is in progress on Unit 1.
- FRS-0.1A, Response to Nuclear Power Generation/ATWT is in progress and the Reactor is still NOT tripped.
- Boration CANNOT be initiated because of blockage in the Boration flowpaths.
- All Power Range Channels indicate 6%.
- Startup rate is zero on both Intermediate Range Channels.
- Average Core Exit Thermocouple temperature is 580°F and slowly lowering.

Which of the following describes the operator actions under these conditions and the primary reason for taking these actions?

- A. Transition to FRS-0.2A, Response to Loss of Core Shutdown, Step 1, Verify Containment Pressure Less Than 5 psig, as it is now the procedure and step in effect.
- B. Remain in FRS-0.1A, Response to Nuclear Power Generation / ATWT, and allow RCS temperature to lower while continuing efforts to establish Emergency Boration. A lower temperature will maintain an appropriate DNBR margin.
- C. Transition to FRS-0.2A, Response to Loss of Core Shutdown. This is required by the Critical Safety Function SUBCRITICALITY Status Tree based on the current YELLOW path condition.
- D. Remain in FRS-0.1A, Response to Nuclear Power Generation / ATWT, and allow the RCS to heat up while continuing efforts to establish Emergency Boration. The heatup will insert negative reactivity.

Question 049

Given the following conditions:

- ECA-0.0A, Loss of All AC Power, has been directly entered on Unit 1.
- 1/1-RTBAL, RX TRIP BKR, red light is LIT and green light is DARK.
- 1/1-RTBBL, RX TRIP BKR, red light is DARK and green light is LIT.
- 1-NI-35B, IR CURRENT CHAN 1, indicates 2×10^{-6} amps and lowering.
- 1-NI-36B, IR CURRENT CHAN 2, indicates 2×10^{-6} amps and lowering.

Which of the following actions should be performed next per ECA-0.0A, Loss of All AC Power?

- A. Verify all Control Rod Position Bottom Lights - ON.
- B. Place 1/1-RTC, RX TRIP BKR, in TRIP.
- C. Verify all High Pressure Turbine Stop Valves - CLOSED.
- D. Dispatch an NEO to locally trip Reactor Trip Breaker A.

Question 050

Given the following conditions:

- Unit 2 has experienced a Loss of Offsite Power.
- EOS-0.2B, Natural Circulation Cooldown, is in progress.
- Normal Letdown cannot be established since 1/2-LCV-459, LTDN ISOL VLV, has failed closed.
- All other systems and components operated as required.

Which of the following actions must be performed to commence Reactor Coolant System (RCS) depressurization following a Loss of Offsite Power per EOS-0.2B, Natural Circulation Cooldown?

Commence depressurization ...

- A. by opening 1/2-PCV-455A, PRZR PORV or 1/2-PCV-456, PRZR PORV.
- B. by raising demand on 2-PK-455C, RC LOOP 4 PRZR SPRY VLV CTRL, to establish Normal Spray flow.
- C. by opening 1/2-8145, PRZ AUX SPR VLV, to establish Auxiliary Spray flow.
- D. by raising demand on 2-PK-507, STM DMP PRESS CTRL, to establish an RCS cooldown.

Question 051

Given the following conditions:

- Unit 1 is operating at 100% power with all systems in normal alignment.
- 1ED1/1-1/DSW, 125 VDC STATION BATTERY BT1ED1 DISCONNECT SWITCH, was placed in OFF.

Which of the following would provide the Control Room with indication of this condition?

- A. Low Bus Voltage indicated on DC Bus 1ED1 voltmeter on CB-11.
- B. SSII Train A alarms for SSW, ECCS, CS, MDAFW, DG PWR, SFTY CH WTR, CR HVAC, CCW and RHR.
- C. High amperage on Battery BT1ED1 ammeter on CB-11.
- D. SSII Train B alarms for SSW, ECCS, CS, MDAFW, DG PWR, SFTY CH WTR, CR HVAC, CCW and RHR.

Question 052

Given the following conditions:

- Unit 2 has experienced a Station Blackout.
- The Unit Supervisor directs that Steam Generator levels be maintained between 40% and 50% per ECA-0.0B, Loss of All AC Power.

Which of the following describes the status of the Auxiliary Feedwater System per ECA-0.0B, Loss of All AC Power?

The Turbine Driven Auxiliary Feedwater Pump will be running at _____ speed, and the Auxiliary Feedwater Flow Control Valves will require local control in _____.

- A. minimum; 30 minutes
- B. minimum; 4 hours
- C. maximum; 30 minutes
- D. maximum; 4 hours

Question 053

Given the following conditions:

- A Steam Line Break inside Containment occurred on Unit 1.
- ECA-2.1A, Uncontrolled Depressurization of All Steam Generators, is in progress.
- Current plant conditions are as follows:
 - Reactor Coolant System (RCS) pressure is 1200 psig and slowly lowering.
 - Steam Generators 1-01, 1-03, and 1-04 narrow range levels are 3% and stable.
 - Steam Generator 1-02 narrow range level is 25% and slowly lowering.
 - All Steam Generator pressures are 175 psig and lowering.
 - RCS cooldown rate is 127°F/hr.
 - Containment pressure is 12 psig and slowly rising.

Which of the following is required and a reason for that action?

- A. REDUCE Auxiliary Feedwater flow to Steam Generators 1-01, 1-03, and 1-04 to NOT LESS THAN 100 GPM. STOP feeding Steam Generator 1-02 to minimize RCS cooldown.
- B. STOP feeding Steam Generator 1-02 until Narrow Range Level is less than 10%. ESTABLISH Auxiliary Feedwater Flow to all Steam Generators at 100 GPM to minimize steam line break flow.
- C. MAINTAIN total Auxiliary Feedwater flow greater than 460 GPM until all Steam Generator narrow range levels are greater than 50% to ensure a proper heat sink.
- D. REDUCE Auxiliary Feedwater flow to all Steam Generators to 100 GPM to prevent Steam Generator tube dry out.

Question 054

Given the following conditions:

- Unit 2 experienced a Loss of Coolant Accident 30 minutes ago.
- Neither 2-8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV, nor 2-8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV, can be opened.
- As a result of these valve failures, ECA-1.1B, Loss of Emergency Coolant Recirculation, is in progress.
- Only the Train A Centrifugal Charging Pump (CCP), Safety Injection Pump (SIP), and Residual Heat Removal Pump (RHRP) are running.
- Reactor Coolant System (RCS) pressure is 340 psig and stable.
- 2-FI-917, CCP SI FLO, is indicating 250 GPM.
- 2-FI-918, SIP 1 DISCH FLO, is indicating 400 GPM.
- Emergency Core Cooling System (ECCS) CANNOT be terminated due to inadequate subcooling.
- Actions to establish minimum ECCS flow are in progress.

Per ECA-1.1B, Loss of Emergency Coolant Recirculation, Attachment 5, Minimum Required ECCS Flow, which of the following describes the method for establishing the required flow?

Secure...

- A. CCP 2-01 and RHRP 2-01, allowing only SIP 2-01 to inject into the RCS.
- B. CCP 2-01 and SIP 2-01, allowing only RHRP 2-01 to inject into the RCS.
- C. RHRP 2-01, allowing both CCP 2-01 and SIP 2-01 to inject into the RCS.
- D. SIP 2-01, allowing both CCP 2-01 and RHRP 2-01 to inject into the RCS.

Question 055

Given the following:

- Unit 2 is at 100% power.
- All systems are in their normal alignments.
- Annunciator 2-ALB-10B, Window 1.16 – 118V CHAN 1 INV TRBL, is in alarm.
- It has been determined that Protection Bus, 2PC1 is deenergized.
- ABN-603, Loss of Protection or Instrument Bus is in progress

At Step 2.3.6.b of ABN-603 the operator is directed to perform the following:

- Select the failed channel on 2-TS-412T, T_{AVE} CHAN DEFEAT switch.

Which of the following provides a basis for selecting the failed channel on 2-TS-412T, T_{AVE} CHAN DEFEAT switch prior to reenergizing 2PC1 from its alternate power supply?

- A. Preclude potential opening of steam dump valves.
- B. Preclude potential opening of a Pressurizer PORV.
- C. Allow restoration of the control rod drive system to automatic.
- D. Allow restoration of steam generator water level control to automatic.

Question 056

Given the following conditions:

- Unit 2 is in MODE 1, Reactor power is 90%.
- Main Generator load is 1140 MWe.
- Main Generator reactive load is 270 MVAR.
- ABN-601, Response to a 138/345 KV System Malfunction, Section 9.0, Grid Frequency Fluctuations/Loss of QSE Generation Controller Communications, is in progress.
- Grid frequency has lowered from 60 Hz to 59.5 Hz.

Which of the following identifies main generator response to the lowering frequency?

Main Generator reactive load will _____ due to generator _____.

- A. increase over-excitation
- B. decrease over-excitation
- C. increase under-excitation
- D. decrease under-excitation

Question 057

Given the following conditions:

- A Reactor Startup is in progress on Unit 1.
- Reactor Power has been leveled at 1×10^{-8} amps in the Intermediate Range per Step 5.2.23 of IPO-002A, Plant Startup from Hot Standby.
- 1-PI-507, MS HDR PRESS, is being maintained at approximately 1092 psig using Steam Dumps in AUTO.
- The following indications are observed:
 - Control Rod CBD M-12 Rod Bottom Light is LIT.
 - 1-ALB-06D, Window 3.5 – DRPI ROD DEV, is in alarm.
 - 1-ALB-06D, Window 3.7 – ANY ROD AT BOTTOM, is in alarm.

For the given conditions, how will Reactor Power respond and what actions are required by ABN-712, Rod Control System Malfunction?

Reactor Power will make a step change lower, then...

- A. slowly lower into the Source Range while T_{AVE} remains constant.
Immediately TRIP the Reactor and go to EOP-0.0A, Reactor Trip or Safety Injection.
- B. slowly lower into the Source Range while T_{AVE} remains constant.
Within 1 hour, INSERT all Control Banks to the Control Bank Offset Position.
- C. return to 1×10^{-8} amps while T_{AVE} decreases.
Immediately TRIP the Reactor and go to EOP-0.0A, Reactor Trip or Safety Injection.
- D. return to 1×10^{-8} amps while T_{AVE} decreases.
Within 1 hour, INSERT all Control Banks to the Control Bank Offset Position.

Question 058

Given the following conditions:

- A Reactor Startup is in progress.
- Intermediate Range power indicates 5×10^{-11} amps on both Channels.
- Source Range High Flux trip has NOT been blocked.

For the two switch positions shown below, which of the following describes the Reactor Protection System response to a blown INSTRUMENT POWER fuse on Source Range Channel N-31 per ABN-701, Source Range Instrument Malfunction?

<u>SR Level Trip Switch: NORMAL</u>	<u>SR Level Trip Switch: BYPASS</u>
A. NO Reactor Trip	NO Reactor Trip
B. Reactor Trip	NO Reactor Trip
C. NO Reactor Trip	Reactor Trip
D. Reactor Trip	Reactor Trip

Question 059

Given the following conditions:

- Unit 1 is in MODE 6 with core reload in progress.
- Both Source Range instruments indicate 50 counts and stable.
- The Parker 345KV feeder breaker cycles three times and trips open.
- A Unit 1 Containment evacuation alarm is automatically actuated.

Which of the following states the input to the automatic Containment Evacuation alarm and the most likely reason for receiving the alarm?

- A. Source Range High Flux at Shutdown due to spiking on the Source Range nuclear instrumentation.
- B. Containment Air Gas Monitor due to spiking on the Source Range nuclear instrumentation.
- C. Source Range High Flux at Shutdown due to an inadvertent change in shutdown reactivity.
- D. Containment Air Gas Monitor due to an inadvertent change in shutdown reactivity.

Question 060

Given the following conditions:

- During a plant startup, Unit 1 is operating at 23% power following synchronization of the Main Generator to the grid.
- Three Circulating Water Pumps are in service.
- All three Condenser Vacuum Pumps are in operation.
- Main Condenser vacuum is 20.5" Hg in both Condensers and slowly degrading.

Which of the following actions should be taken in accordance with ABN-304, Main Condenser and Circulating Water System Malfunction?

- A. Start an additional Circulating Water Pump.
- B. Reduce Turbine Load to restore Main Condenser vacuum.
- C. Trip the Main Turbine and enter ABN-403, Turbine Trip Response.
- D. Trip the Reactor and enter EOP-0.0A, Reactor Trip or Safety Injection.

Question 061

Given the following conditions:

- Both Units are operating at power.
- Train A Control Room Ventilation is in service.
- Following a report of a fire outside of the Control Building, Air Intake Smoke Alarms are actuated on BOTH Control Room Ventilation air intakes.

Which of the following is the appropriate action to be taken per SOP-802, Control Room Ventilation System?

- A. Manually initiate Emergency Recirculation.
Manually shift to single train operation and shift operating train to Isolation Mode.
- B. Manually initiate Emergency Recirculation.
Manually shift both trains to Isolation Mode.
- C. Verify automatic actuation of Emergency Recirculation.
Manually shift both trains to Isolation Mode.
- D. Verify automatic actuation of Emergency Recirculation.
Manually shift to single train operation and shift operating train to Isolation Mode.

Question 062

Which of the following identifies the process point that causes FFL-160, Gross Failed Fuel Monitor, to alarm?

High activity in the ...

- A. Steam Generator Blowdown flow.
- B. Main Steam Line Steam flow.
- C. Reactor Coolant System Letdown flow.
- D. Containment Purge (or Ventilation) System flow.

Question 063

Given the following conditions:

- EOS-1.1A, Safety Injection Termination, is in progress on Unit 1.
- Centrifugal Charging Pump (CCP) 1-01 is operating with injection aligned through the Normal Charging line.
- CCP 1-02 is in Standby.
- Containment pressure is 3 psig and stable.
- All SG Pressures are 950 psig and stable.
- The step to determine if Safety Injection Pumps can be stopped is being performed.

Which of the following conditions would indicate that a transition to EOS-1.2A, Post LOCA Cooldown and Depressurization, is required?

- A. Reactor Coolant System pressure is 1900 psig and slowly rising.
- B. Pressurizer level is 15% and slowly rising.
- C. Reactor Coolant System pressure is 1400 psig and slowly lowering.
- D. 1-FI-121A, CHRG FLO, indicates 32 GPM and stable.

Question 064

Given the following conditions:

- A Unit 1 Reactor Trip and Loss of Offsite Power have occurred.
- EOS-0.3A, Natural Circulation Cooldown with Steam Void in Vessel (With RVLIS), is in progress.
- Reactor Coolant System (RCS) cooldown is in progress.
- 1/1-8145, PRZR AUX SPR VLV, was opened to depressurize the RCS.
- Charging and Letdown are in service.
- During the cooldown and depressurization, the following indications are observed:
 - RVLIS 61 IN ABOVE CORE PLATE light is DARK.
 - Pressurizer level is 75% and rising.
 - RCS pressure is 925 psig and slowly lowering.
 - RCS cooldown rate is 60°F/hr.
 - RCS subcooling is 50°F.
- Due to current plant conditions, 1/1-8147, RCS LOOP 1 CHRG VLV, was OPENED to raise RCS pressure.

What condition will allow 1/1-8147, RCS LOOP 1 CHRG VLV, to be closed to continue RCS depressurization per EOS-0.3A, Natural Circulation Cooldown with Steam Void in Vessel (with RVLIS)?

CLOSE 1/1-8147, RCS LOOP 1 CHRG VLV, when...

- A. the RVLIS 61 IN ABOVE CORE PLATE light is LIT.
- B. Pressurizer level is less than 40%.
- C. RCS pressure is greater than 1075 psig.
- D. RCS subcooling is greater than 75°F.

Question 065

Given the following conditions:

- Unit 1 is in MODE 1 at 7% power and stable.
- Rod Control is in MANUAL.
- 1/1-FLRM, CONTROL ROD MOTION CTRL, is CAUTION tagged for repair of a broken wire.
- Xenon concentration is stable.

Fifteen minutes later the following indications are observed:

- Volume Control Tank (VCT) level is 70% and rising.
- Annunciator 1-ALB-6A, Window 2.6 – VCT LVL HI, is in alarm.
- $T_{AVE} - T_{REF}$ is plus (+) 4°F.

Which of the following is required per ABN-105, Chemical and Volume Control System Malfunctions?

- A. Commence an Emergency Boration because an inadvertent dilution is occurring.
- B. Remove CAUTION tag and manually insert Control Rods to restore $T_{AVE} - T_{REF}$.
- C. Place Rod Control in AUTO to allow automatic Control Rod insertion.
- D. Place 1/1-TCV-129, LTDN DIVERT VLV, in VCT position to remove the demineralizers from Letdown.

Question 066

Given the following conditions:

- You are on watch in the Control Room as the BOP with both Units at 100% power.
- Shifts are 12 hours long and all shifts are manned to the minimum composition of ODA-102, Conduct of Operations.
- Your relief is NOT on site for Shift Turnover.

Which of the following describes the procedural guidance in this situation?

Shift composition may...

- A. NOT drop below the minimum unless an operator exceeds 12 hours on watch. Turnover your watch station to the on-coming RO and depart.
- B. be one less than the minimum for two hours while attempting to find a replacement. Turnover your watch station to the on-coming RO and attempt to contact a replacement.
- C. NOT drop below the minimum as a result of an on-coming watchstander being absent. Remain on watch.
- D. be one less than the minimum for two hours. Turnover your watchstation to the on-coming RO but remain on site in standby until a replacement is found.

Question 067

Per ODA-106, Review of Documents and Operational Experience Feedback, who provides the approval authority for a Lessons Learned which is of immediate "need to know" importance?

- A. Director Operations
- B. Shift Operations Manager
- C. Shift Manager
- D. Field Support Supervisor

Question 068

Given the following:

- A Reactor Operator is performing a procedure.
- Only ONE Senior Reactor Operator is available.

Which of the following is a condition that will allow a step in the procedure to be marked "N/A" by the Reactor Operator?

- A. A clearance is installed on the component to be operated.
- B. The step does not apply to the conditions under which the activity is being performed.
- C. Performance of the step will prevent proper performance or result in a personnel hazard.
- D. Performance of the step will cause a violation of administrative controls or other plant commitments.

Question 069

Given the following conditions:

- Unit 2 is in MODE 3.
- A LOCKED OPEN valve is requested by Engineering to be UNLOCKED and CLOSED, WITHOUT an approved procedure, to gather information for a proposed design modification.
- A status review has concluded that the system impact is acceptable at this time.
- This valve will be repositioned to OPEN and verified LOCKED OPEN per IPO-002B, Plant Startup from Hot Standby.

Is procedure OWI-103-3, Locked Component Deviation Log, required to be completed?

- A. No, as long as the valve will be closed by a Shift Manager's clearance.
- B. Yes, unless the Shift Manager suspends the Locked Component Deviation Log.
- C. No, as long as the valve is opened and verified locked open per an approved procedure.
- D. Yes, even though the valve is opened and verified locked open per an approved procedure, completion of the Locked Component Deviation Log is still required.

Question 070

Which of the following is an example or definition of Limiting Condition for Operation (LCO) Initiation Time?

- A. Time the LCO was discovered NOT satisfied.
- B. Time that the NOT satisfied LCO was entered in the Unit Log.
- C. Amount of time necessary to complete the LCO REQUIRED ACTION.
- D. Time that the Shift Manager was notified that a Quick Turnaround Technical Evaluation had been initiated.

Question 071

Which of the following is required if a liquid radioactive release is terminated due to a high radiation alarm on the associated release monitor?

- A. Document the alarm in the unit logs. Once the high radiation alarm clears the release may be recommenced with the current permit.
- B. When the cause of the high radiation alarm is determined, the release may be recommenced once a new permit is issued.
- C. Initiate a Condition Report to determine the cause of the high radiation alarm, obtain Shift Manager approval to recommence the release with a new permit.
- D. Raise the high radiation alarm setpoint with Chemistry Manager's approval and obtain Shift Manager's concurrence to recommence release with the current permit.

Question 072

An individual is attempting to exit the Radiologically Controlled Area (RCA) following work involving grinding in the vicinity of the Refueling Cavity and enters the Personnel Contamination Monitor (PCM), when the following occurs:

- The PCM alarms indicating contamination of the lower left leg.
- The count is repeated with the same alarm.
- Three other Radiological Workers pass through the same PCM successfully.
- Two more attempts by the individual at passing through the PCM are unsuccessful.

Which of the following should be performed per STA-653, Contamination Control Program?

Perform a...

- A. whole body count to check for internal contamination.
- B. whole body frisk to check for a discrete radioactive particle.
- C. bio-assay examination to check for medical radioisotope usage.
- D. calibration check of the PCM to check for setpoint drift.

Question 073

Which of the following actions would be INAPPROPRIATE to perform prior to direction in an Emergency Response Guideline?

- A. Isolating Auxiliary Feedwater flow to a single faulted Steam Generator.
- B. Throttling Auxiliary Feedwater flow to control a ruptured Steam Generator level within the required band.
- C. Securing a Centrifugal Charging Pump to prevent overfilling the Pressurizer following an inadvertent Safety Injection.
- D. Closing the Main Steam Isolation Valves to isolate a steam line break which has not resulted in a Safety Injection.

Question 074

Which of the following must occur in order for annunciator 1-ALB-6B, Window 4.5 – LPMS TRBL, to go into alarm per ABN-910, Loose Part Monitoring Alarms?

- A. At least two events exceeding the alarm threshold by 50% must occur greater than one minute apart.
- B. At least two events exceeding the alarm threshold must occur greater than one minute apart.
- C. At least two events exceeding the alarm threshold by 50% must occur within one minute.
- D. At least two events exceeding the alarm threshold must occur within one minute.

Question 075

Given the following conditions:

- ABN-905, Loss of Control Room Habitability, actions are in progress.
- Pressurizer Heater control has been transferred from the Control Room to the Remote Shutdown Panel.

Which of the following identifies the response of the Pressurizer Heaters as Pressurizer level lowers to 10%?

Pressurizer Heaters...

- A. will NOT automatically deenergize.
- B. will automatically deenergize.
- C. Control Group C will NOT automatically deenergize; Backup Groups A, B, and D will deenergize.
- D. Backup Groups A, B, and D will NOT automatically deenergize; Control Group C will deenergize.

CPNPP 2012 NRC Written Examination
Reactor Operator
Answer Key

- | | | |
|-------|-------|------------------|
| 1. B | 26. D | 51. B |
| 2. D | 27. A | 52. C |
| 3. C | 28. D | 53. D |
| 4. C | 29. B | 54. C |
| 5. D | 30. B | 55. A |
| 6. B | 31. A | 56. A |
| 7. C | 32. B | 57. B |
| 8. B | 33. B | 58. B |
| 9. A | 34. A | 59. A |
| 10. A | 35. B | 60. D |
| 11. C | 36. C | 61. A |
| 12. D | 37. A | 62. C |
| 13. C | 38. D | 63. C |
| 14. A | 39. B | 64. A |
| 15. A | 40. C | 65. A |
| 16. C | 41. C | 66. C |
| 17. B | 42. B | 67. C |
| 18. D | 43. D | 68. B |
| 19. C | 44. A | 69. D |
| 20. D | 45. D | 70. A |
| 21. D | 46. C | 71. B |
| 22. B | 47. B | 72. B |
| 23. B | 48. D | 73. C |
| 24. D | 49. C | 74. D |
| 25. A | 50. A | 75. A |

~~71. B~~ B+C ACCEPTED 1292 7/19/12

CPNPP NRC 2012 RO Written Exam Reference List

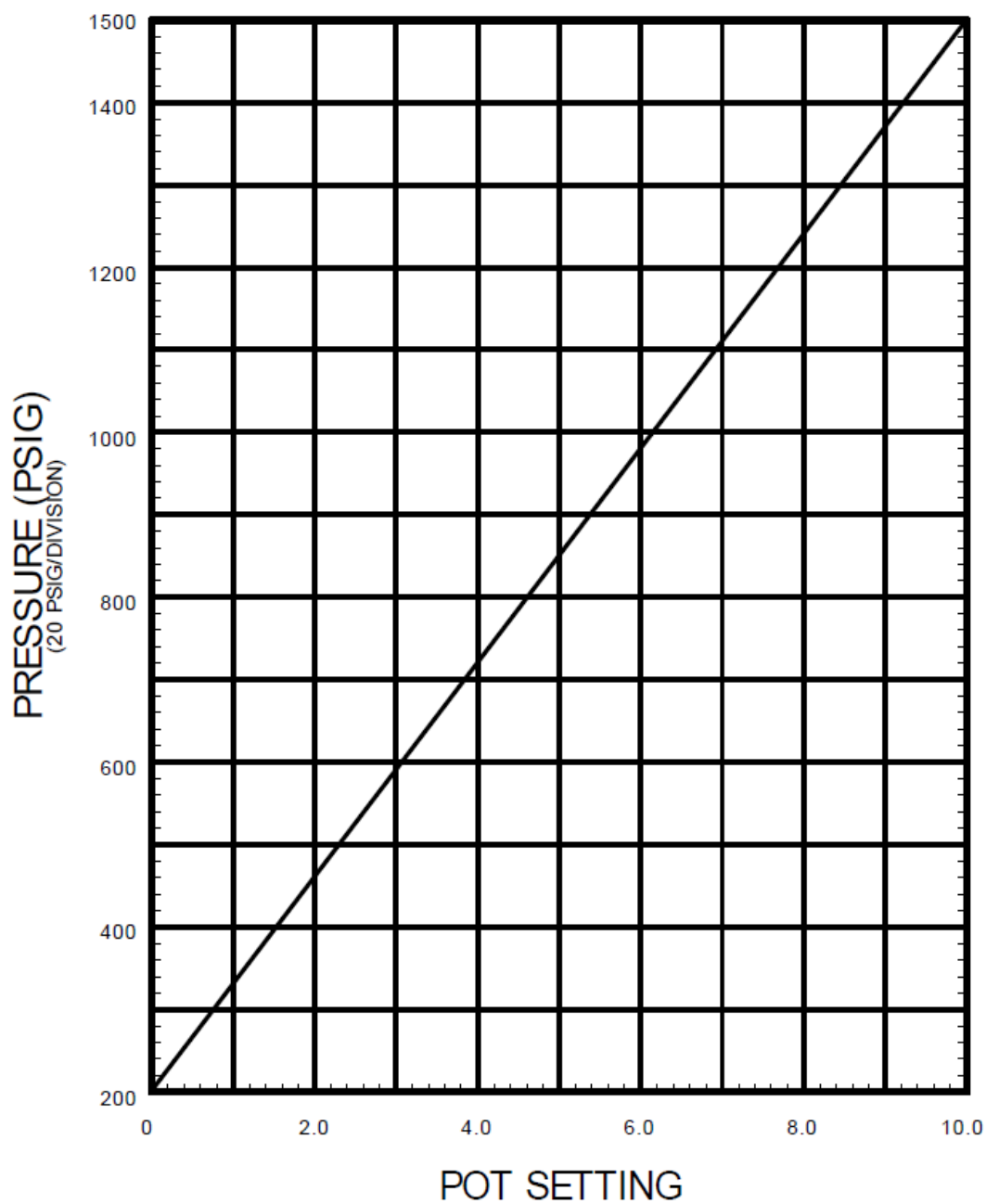
1. IPO-003B, Power Operations, Power Change Thumb Rules
2. TDM-501A, Steam Generator Feedwater Controller Data
3. ECA-1.1B, Loss of Emergency Coolant Recirculation, Attachment 5, Minimum Required ECCS Flow
4. NRC Generic Fundamentals Equation Sheet
5. Steam Tables

IPO-003B, Power Operations, Power Change Thumb Rules

4.2.10 Power Change Thumb rules (should NOT be used in place of an actual calculation, but may be used as a check to ensure calculations are reasonable).

- Power Defect 15 pcm/%
- Rod Worth 3 pcm/step
- Boron Worth 8 pcm/ppm
- Boration 10 gallons/ppm

TDM-501A, Steam Generator Feedwater Controller Data



Parameter Indicator: 1-PI-507, MS HDR PRESS
Indicator Range: 200-1500 psig

REMARKS

ECA-1.1B, Loss of Emergency Coolant Recirculation
Attachment 5, Minimum Required ECCS Flow

ATTACHMENT 5

PAGE 1 OF 1

MINIMUM REQUIRED ECCS FLOW

TIME AFTER REACTOR TRIP (MINUTES)	MINIMUM REQUIRED ECCS FLOW (GPM)
10	620
20	525
30	470
60	380
90	340
120 (2 HOURS)	315
240 (4 HOURS)	255
360 (6 HOURS)	230
480 (8 HOURS)	210
720 (12 HOURS)	190
1440 (1 DAY)	155
2160 (1 DAY 12 HOURS)	140
2880 (2 DAYS)	130
4320 (3 DAYS)	115
10080 (7 DAYS)	90

GENERIC FUNDAMENTALS EXAMINATION
EQUATIONS AND CONVERSIONS HANDOUT SHEET

EQUATIONS

$$\dot{Q} = \dot{m} c_p \Delta T$$

$$\dot{Q} = \dot{m} \Delta h$$

$$\dot{Q} = U A \Delta T$$

$$\dot{Q} \propto \dot{m}_{\text{Nat Circ}}^3$$

$$\Delta T \propto \dot{m}_{\text{Nat Circ}}^2$$

$$K_{\text{eff}} = 1/(1 - \rho)$$

$$\rho = (K_{\text{eff}} - 1)/K_{\text{eff}}$$

$$\text{SUR} = 26.06/\tau$$

$$\tau = \frac{\bar{\beta}_{\text{eff}} - \rho}{\lambda_{\text{eff}} \rho}$$

$$\rho = \frac{\ell^*}{\tau} + \frac{\bar{\beta}_{\text{eff}}}{1 + \lambda_{\text{eff}} \tau}$$

$$\ell^* = 1 \times 10^{-4} \text{ sec}$$

$$\lambda_{\text{eff}} = 0.1 \text{ sec}^{-1} \text{ (for small positive } \rho \text{)}$$

$$\text{DRW} \propto \phi_{\text{tip}}^2 / \phi_{\text{avg}}^2$$

$$P = P_o 10^{\text{SUR}(\tau)}$$

$$P = P_o e^{(t/\tau)}$$

$$A = A_o e^{-\lambda t}$$

$$\text{CR}_{\text{S/D}} = S/(1 - K_{\text{eff}})$$

$$\text{CR}_1(1 - K_{\text{eff}1}) = \text{CR}_2(1 - K_{\text{eff}2})$$

$$1/M = \text{CR}_1/\text{CR}_X$$

$$A = \pi r^2$$

$$F = PA$$

$$\dot{m} = \rho A \bar{v}$$

$$\dot{W}_{\text{pump}} = \dot{m} \Delta P v$$

$$E = IR$$

$$\text{Thermal Efficiency} = \text{Net Work Out/Energy In}$$

$$\frac{g(z_2 - z_1)}{g_c} + \frac{(\bar{v}_2^2 - \bar{v}_1^2)}{2g_c} + v(P_2 - P_1) + (u_2 - u_1) + (q - w) = 0$$

$$g_c = 32.2 \text{ lbm-ft/lbf-sec}^2$$

CONVERSIONS

$$1 \text{ Mw} = 3.41 \times 10^6 \text{ Btu/hr}$$

$$1 \text{ hp} = 2.54 \times 10^3 \text{ Btu/hr}$$

$$1 \text{ Btu} = 778 \text{ ft-lbf}$$

$$^{\circ}\text{C} = (5/9)(^{\circ}\text{F} - 32)$$

$$^{\circ}\text{F} = (9/5)(^{\circ}\text{C}) + 32$$

$$1 \text{ Curie} = 3.7 \times 10^{10} \text{ dps}$$

$$1 \text{ kg} = 2.21 \text{ lbm}$$

$$1 \text{ gal}_{\text{water}} = 8.35 \text{ lbm}$$

$$1 \text{ ft}^3_{\text{water}} = 7.48 \text{ gal}$$

U.S. Nuclear Regulatory Commission**Written Examination****Applicant Information**

Name:

Date:

Facility/Unit:

Region: I ☐ II ☐ III ☐ IV ☐Reactor Type: W ☐ CE ☐ BW ☐ GE ☐

Start Time:

Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 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/Total Examination Values 75 / 25 / 100 Points

Applicant's Scores _____ / _____ / _____ Points

Applicant's Grade _____ / _____ / _____ Percent

CPNPP 2012 NRC Written Examination
Senior Reactor Operator

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|---------------------|---------------------|---------------------|
| 1. (A) (B) (C) (D) | 18. (A) (B) (C) (D) | 35. (A) (B) (C) (D) |
| 2. (A) (B) (C) (D) | 19. (A) (B) (C) (D) | 36. (A) (B) (C) (D) |
| 3. (A) (B) (C) (D) | 20. (A) (B) (C) (D) | 37. (A) (B) (C) (D) |
| 4. (A) (B) (C) (D) | 21. (A) (B) (C) (D) | 38. (A) (B) (C) (D) |
| 5. (A) (B) (C) (D) | 22. (A) (B) (C) (D) | 39. (A) (B) (C) (D) |
| 6. (A) (B) (C) (D) | 23. (A) (B) (C) (D) | 40. (A) (B) (C) (D) |
| 7. (A) (B) (C) (D) | 24. (A) (B) (C) (D) | 41. (A) (B) (C) (D) |
| 8. (A) (B) (C) (D) | 25. (A) (B) (C) (D) | 42. (A) (B) (C) (D) |
| 9. (A) (B) (C) (D) | 26. (A) (B) (C) (D) | 43. (A) (B) (C) (D) |
| 10. (A) (B) (C) (D) | 27. (A) (B) (C) (D) | 44. (A) (B) (C) (D) |
| 11. (A) (B) (C) (D) | 28. (A) (B) (C) (D) | 45. (A) (B) (C) (D) |
| 12. (A) (B) (C) (D) | 29. (A) (B) (C) (D) | 46. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 30. (A) (B) (C) (D) | 47. (A) (B) (C) (D) |
| 14. (A) (B) (C) (D) | 31. (A) (B) (C) (D) | 48. (A) (B) (C) (D) |
| 15. (A) (B) (C) (D) | 32. (A) (B) (C) (D) | 49. (A) (B) (C) (D) |
| 16. (A) (B) (C) (D) | 33. (A) (B) (C) (D) | 50. (A) (B) (C) (D) |
| 17. (A) (B) (C) (D) | 34. (A) (B) (C) (D) | 51. (A) (B) (C) (D) |

Name: _____

Date: _____

CPNPP 2012 NRC Written Examination
Senior Reactor Operator

52. (A) (B) (C) (D)

53. (A) (B) (C) (D)

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89. (A) (B) (C) (D)

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92. (A) (B) (C) (D)

93. (A) (B) (C) (D)

94. (A) (B) (C) (D)

95. (A) (B) (C) (D)

96. (A) (B) (C) (D)

97. (A) (B) (C) (D)

98. (A) (B) (C) (D)

99. (A) (B) (C) (D)

100. (A) (B) (C) (D)

Name: _____

Date: _____

Question 001

Given the following condition:

- Unit 1 experiences a loss of Non-Safeguards Bus 1A3 while operating at 700 MWe load.

Which of the following automatic actions will occur?

- A. Turbine Runback due to loss of power to Condensate Pump 1-01.
- B. Reactor Trip due to loss of Reactor Coolant Pump 1-03.
- C. Turbine Trip due to loss of Turbine Plant Cooling Water Pump 1-01.
- D. Reactor Trip due to loss of Rod Drive Motor Generator Set 1-01.

Question 002

Given the following conditions:

- Unit 1 is in MODE 1.
- Centrifugal Charging Pump 1-01 is providing Charging flow.
- An Instrument Air tubing break has occurred on 1-HCV-0182, RCP SEAL WTR PRESS CTRL valve.
- All other components supplied by Instrument Air are functioning properly.

Which of the following are the effects on the Reactor Coolant Pumps?

Seal Injection flow will...

- A. increase and LOW SEAL WTR BRG TEMPs (Pump Bearings) will decrease.
- B. increase and LOW SEAL WTR BRG TEMPs (Pump Bearings) will increase.
- C. decrease and LOW SEAL WTR BRG TEMPs (Pump Bearings) will decrease.
- D. decrease and LOW SEAL WTR BRG TEMPs (Pump Bearings) will increase.

Question 003

Given the following conditions:

- Unit 1 is in MODE 6.
- Residual Heat Removal (RHR) Train B is providing Shutdown Cooling.
- Charging and Letdown are in their normal MODE 6 alignment maintaining a steady level in the Reactor Vessel.
- RHR Train A is being aligned per SOP-102A, Residual Heat Removal System, for filling the Refueling Cavity.
- The following actions have been performed:
 - 1/1-APPRH1, RHRP 1 is in PULLOUT.
 - 1/1-8701A, RHRP 1 HL RECIRC ISOL VLV, is CLOSED.
 - 1/1-8812A, RWST TO RHRP 1 SUCT VLV, is OPEN.
 - 1/1-8809A, RHR TO CL 1 & 2 INJ ISOL VLV, is CLOSED.
 - 1/1-8716A, RHRP 1 XTIE VLV, is OPEN.
 - 1/1-8840, RHR TO HL 2 & 3 INJ ISOL VLV, is OPEN.
- 1/1-8702A, RHRP 1 HL RECIRC ISOL VLV, remains CLOSED.

The Refueling Cavity level is now RISING at a steady rate.

Which of the following is responsible for the level rise?

- A. Leakage past 1-8809A, RHR TO CL 1 & 2 INJ ISOL VLV, is occurring.
- B. 1-PK-131, LTDN HX OUT PRESS CTRL, has failed to 100% demand.
- C. Leakage past 1-HCV-0606, RHR HX 1-01 FLO CTRL VLV, is occurring.
- D. 1-FK-121, CCP CHRG FLO CTRL, has failed to 0% demand.

Question 004

Given the following conditions:

- A Small Break Loss of Coolant Accident (LOCA) has occurred on Unit 2.
- EOS-1.2B, Post LOCA Cooldown and Depressurization, is in progress.
- Reactor Coolant System (RCS) pressure is 1100 psig and slowly lowering.
- Containment pressure is 4 psig and slowly rising.
- All Reactor Coolant Pumps have been stopped.
- RCS cooldown to Cold Shutdown is in progress.
- RCS subcooling is 70°F and improving.
- Safety Injection (SI) and SI sequencers have been RESET.
- ECCS status is as follows:
 - Both Centrifugal Charging Pumps are running.
 - 1-FI-917, CCP SI FLO, is 400 GPM and stable.
 - 1-FI-121A, CHRG FLO, is 32 GPM and stable.
 - Both Safety Injection Pumps are running.
 - 1-FI-918, SIP 1 DISCH FLO, is 350 GPM and stable.
 - 1-FI-922, SIP 2 DISCH FLO, is 350 GPM and stable.
 - Both Residual Heat Removal (RHR) Pumps are in Standby.

The crew is preparing to depressurize the RCS when pressure rapidly lowers to 50 psig and Containment pressure rapidly raises to 25 psig.

Which of the following is required?

- A. Manually actuate Safety Injection.
- B. Manually actuate Containment Spray.
- C. Manually restart the RHR Pumps.
- D. Perform EOP-0.0B, Reactor Trip or Safety Injection, Attachment 2, Safety Injection Actuation Alignment.

Question 005

Given the following conditions:

- FRP-0.1B, Response to Imminent Pressurized Thermal Shock Condition, Step 7, (Check If ECCS Can Be Terminated), is in progress.
- NO Reactor Coolant Pumps (RCPs) are running.
- Adequate Reactor Coolant System (RCS) subcooling to terminate ECCS does NOT exist.
- Adequate RCS subcooling to restart an RCP does exist.

Why is a RCP started in this condition?

An RCP restart establishes ...

- A. forced flow in order to provide improved temperature control for the RCS Temperature Soak.
- B. improved mixing of the RCS with ECCS injection to reduce core ΔT and lessen the thermal stress across the Cold Leg nozzle.
- C. forced flow to lower the temperature at the core outlet and increase subcooling in order to terminate ECCS.
- D. improved mixing of the RCS with ECCS injection to raise the water temperature in the downcomer and lessen the thermal stress across the Vessel wall.

CPNPP 2012 NRC Written Examination
Senior Reactor Operator

Question 006

Which of the following describes the valves that **MUST** be **CLOSED** in order to manually **OPEN** 1-8811A, CNTMT SUMP TO RHRP 1 SUCT ISOL VLV?

- A. 1-8812A, RWST TO RHRP 1 SUCT VLV, and BOTH 1-8701A, RHRP1 HL RECIRC ISOL VLV, AND 1-8702A, RHRP1 HL RECIRC ISOL VLV.
- B. 1-8812A, RWST TO RHRP 1 SUCT VLV, and EITHER 1-8701A, RHRP1 HL RECIRC ISOL VLV, OR 1-8702A, RHRP1 HL RECIRC ISOL VLV.
- C. 1-8804A, RHRP 1 TO CCP SUCT VLV, and BOTH 1-8701A, RHRP1 HL RECIRC ISOL VLV, AND 1-8702A, RHRP1 HL RECIRC ISOL VLV.
- D. 1-8804A, RHRP 1 TO CCP SUCT VLV, and EITHER 1-8701A, RHRP1 HL RECIRC ISOL VLV, OR 1-8702A, RHRP1 HL RECIRC ISOL VLV.

Question 007

Given the following conditions:

- A Unit 1 Reactor Trip has occurred.
- EOP-0.0A, Reactor Trip or Safety Injection, is in progress.
- One Pressurizer Safety Valve has stuck partially open.
- Pressurizer Relief Tank (PRT) pressure is 32 psig and rising rapidly.
- Containment pressure is 0.3 psig and stable

Which of the following describes the highest PRT pressure that will exist just prior to Containment pressure rising due to this event?

- A. 76.4 psig.
- B. 85.4 psig.
- C. 91.1 psig.
- D. 114.8 psig.

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Question 008

Given the following conditions:

- Unit 1 is in MODE 1.
- Station Service Water (SSW) Pump 1-01 has tripped.
- Component Cooling Water (CCW) Pump 1-02 automatically started.
- CCW Heat Exchanger 1-01 outlet temperature is 123°F and rising.

Which of the following actions is required per ABN-501, Station Service Water System Malfunction?

- A. Isolate the Train A CCW Safeguards Loop.
- B. Secure Component Cooling Water Pump 1-01.
- C. Cross-tie Unit 1 SSW Trains to supply cooling to CCW Train A.
- D. Cross Tie Unit 1 and Unit 2 Train A SSW.

Question 009

Given the following conditions:

- Unit 2 has been tripped due to a Steam Generator Tube Rupture (SGTR) on Steam Generator 2-02.
- All Reactor Coolant Pumps are running.
- Steam Generator 2-02 has been isolated.
- EOP-3.0B, Steam Generator Tube Rupture, is in progress.
- Steps to verify normal Pressurizer Spray available, deenergize all Pressurizer Heaters and initiate maximum Pressurizer Spray are being performed.

Which of the following identifies why these actions are performed per EOP-3.0B, Steam Generator Tube Rupture?

The Reactor Coolant System is depressurized to ...

- A. minimize break flow and refill the Pressurizer.
- B. minimize break flow and improve RCS subcooling.
- C. prevent voiding the upper head region and improve RCS subcooling.
- D. prevent voiding the upper head region and refill the Pressurizer.

Question 010

Given the following conditions:

- Unit 1 is in MODE 1.
- Pressurizer Pressure Channel 1-PI-455A has failed LOW.
- 1/1-PS-455F, PRZR PRESS CTRL CHAN SELECT switch is in the 455/456 position.

Which of the following channel output signals passed through an optical isolation amplifier in the 7300 Process Racks?

Input to ...

1. Pressurizer Pressure Low Backup Heaters On Annunciator Signal.
2. 1-PT-455A, Pressurizer Master Pressure Control Signal.
3. Pressurizer Pressure Low Reactor Trip Bistable Input.
4. Pressurizer Pressure Low Safety Injection Bistable Input.

A. 1 and 2.

B. 1 and 4.

C. 2 and 3.

D. 3 and 4.

Question 011

Given the following conditions:

- All Unit 1 systems are in a normal MODE 1 alignment.
- A steam leak occurs on Steam Generator 1-02 outside Containment.
- Annunciator 1-ALB-6C, Window 3.7 – MSL PRESS LO SI ACT, is FLASHING red.
- Annunciator PCIP Window 1.8 – SI ACT, is ON and FLASHING.

Which of the following describes the status of the Engineered Safety Feature Actuation System?

At least _____ Main Steam Line Pressure Low Channel(s) has(have) actuated and _____ train(s) of Emergency Core Cooling System equipment is(are) operating.

- A. one one
- B. one two
- C. two one
- D. two two

Question 012

Given the following conditions:

- A Main Steam Line Break outside Containment occurs.
- The Reactor was tripped and Safety Injection was actuated.
- Subsequently, a single Containment Spray Actuation switch was placed in ACTUATE.
- Reactor Coolant System subcooling is 35°F.

Which of the following describes the effect on continued Reactor Coolant Pump (RCP) operation?

- A. There is NO Containment Spray flow and Component Cooling Water isolation has NOT occurred; the RCPs should immediately be tripped.
- B. There is Containment Spray flow and Component Cooling Water isolation has occurred; the RCPs may continue to run.
- C. There is Containment Spray flow and Component Cooling Water isolation has occurred; the RCPs should immediately be tripped.
- D. There is NO Containment Spray flow and Component Cooling Water isolation has NOT occurred; the RCPs may continue to run.

Question 013

Given the following conditions:

- Both Units are at 100% power.
- All systems are normally aligned when a Loss of Offsite Power occurs.

Which of the following describes the response of the Containment Air Cooling and Recirculation System Cooling Units and Fans?

- A. Cooling Units and Fans are load shed and must be manually reset.
- B. Cooling Units and Fans are load shed and CANNOT be restarted.
- C. Cooling Units and Fans are tripped and then sequenced onto the safety-related electrical buses.
- D. Two of the four Cooling Units and Fans are sequenced onto the safety-related electrical buses after all four have been tripped.

Question 014

Given the following conditions:

- Unit 2 was at 100% power with the Train A Safety Injection Sequencer deenergized for I&C troubleshooting.
- A Reactor Trip and Safety Injection occurred due to low Pressurizer pressure.
- Containment pressure is 20 psig and rising.
- All systems functioned as expected for the given plant conditions.

Which of the following describes the response of Train A Containment Spray System?

Train A Containment Spray Pumps will...

- A. start and the Heat Exchanger Outlet Valve will open.
- B. NOT start and the Heat Exchanger Outlet Valve will open.
- C. start and the Heat Exchanger Outlet Valve will NOT open.
- D. NOT start and the Heat Exchanger Outlet Valve will NOT open.

Question 015

Given the following conditions:

- Unit 2 is in MODE 3 after performing a normal shutdown.
- 43/1-SD, STM DMP MODE SELECT is in STM PRESS.
- 2-PK-507, STM DMP PRESS CTRL is in AUTO.
- 2-PK-507 POT is set to control Reactor Coolant System temperature at 500°F.
- Circulating Water Pumps 2-01 and 2-03 are in service.
- Condenser vacuum is 27" Hg.

What would be the Steam Dump System response to 2-PT-0507, Main Steam Header Pressure Transmitter, failing high?

- A. Bank 1 would open in response to the difference between the setpoint and measured pressure.
- B. Banks 1 and 2 would open in response to the difference between the setpoint and measured pressure.
- C. Bank 1 would open in response to the Hi-1 Bistable actuation.
- D. Banks 1 and 2 would open in response to the Hi-1 Bistable actuation.

Question 016

Given the following conditions following a Steam Line Break outside Containment:

- EOP-2.0A, Faulted Steam Generator Isolation, is in progress.
- 125 VDC Battery BT1D2 is verified aligned from either 125 VDC Battery Chargers BC1D2 or BC1D24.

Which of the following identifies the reason for ensuring an OPERABLE Battery Charger is aligned to Distribution Panel 1D2 per EOP-2.0A, Faulted Steam Generator Isolation?

- A. Prevent a potential loss of Unit Auxiliary Transformer 1UT.
- B. Prevent a potential loss of the Main Turbine DC Emergency Oil Pump.
- C. Prevent inadvertent opening of Main Steam Isolation Valves.
- D. Prevent inadvertent opening of Atmospheric Relief Valves #2 and #4.

Question 017

Given the following conditions:

- Unit 1 is in Mode 1 operating at 95% power.
- 1-PI-2042-1, Main Condenser Vacuum is 27.2 in Hg and slowly lowering.
- 1-PI-2042-2, Main Condenser Vacuum is 26.8 in Hg and slowly lowering.
- Feedwater Pump (FWP) A indications are:
 - 1-PI-2295, FWP A SUCT PRESS: 196 psig and stable
 - 1-PI-3305, FWPT A HYD OIL SPLY PRESS: 210 psig and stable
 - 1-PI-2206, AUX CNDSR A PRESS: 17 in Hg and slowly lowering
 - 1-SI-2111F, FWPT A SPD: 5100 rpm and stable
- Feedwater Pump (FWP) B indications are:
 - 1-PI-2297, FWP B SUCT PRESS: 193 psig and stable
 - 1-PI-3306, FWPT B HYD OIL SPLY PRESS: 210 psig and stable
 - 1-PI-2207, AUX CNDSR B PRESS: 24 in Hg and slowly lowering
 - 1-SI-2112F, FWPT A SPD: 5150 rpm and stable

Which of the following describes the operator actions that are required to be taken due to these conditions?

- A. Trip BOTH FWPs and Trip the Reactor.
- B. Trip FWP A and ensure the Main Turbine is runback to 700 MWe.
- C. Initiate a 50 MWe load reduction to restore Main Condenser vacuum.
- D. Trip the Reactor and ensure that the Main Turbine is tripped.

Question 018

Given the following conditions:

- Unit 1 is in MODE 3 following a Reactor Trip.
- Steam Generator (SG) narrow range levels are as follows:
 - SG 1-01 is 36%.
 - SG 1-02 is 45%.
 - SG 1-03 is 32%.
 - SG 1-04 is 43%.
- 1-LI-2217, CNDSR HOT WELL LVL, is 5.8 feet.

Which of the following lists the lineup of the Condensate System and the reason for the lineup?

- A. 1-HS-2211/12, CNDS REJECT VLV, is open to lower Condenser Hot Well level.
- B. 1-HS-2211/12, CNDS REJECT VLV, is closed to preserve Condenser Hot Well level
- C. 1-HS-2484, CST DISCH VLV and 1-HS-2485, CST DISCH VLV, are open to allow water in the Condenser Hot Well to be transferred to the Condensate Storage Tank.
- D. 1-HS-2484, CST DISCH VLV and 1-HS-2485, CST DISCH VLV, are closed to preserve level in the Condensate Storage Tank.

Question 019

Given the following condition:

- Inverter 1PC4 has been declared inoperable due to an internal failure.

Which of the following alignments would be acceptable to allow Unit 1 to continue to operate in MODE 1 for the next several weeks while parts are procured for repairs to Inverter 1PC4?

Align 118 VAC _____ to 118 VAC Vital Distribution Panel 1PC4.

- A. Distribution Panel 1EC6.
- B. Distribution Panel 1EC5.
- C. Inverter IV1EC2/4.
- D. Inverter IV1EC1/3.

Question 020

Given the following condition:

- Unit 1 was in MODE 1 with all systems in their NORMAL lineup.
- A Loss of Offsite and Onsite AC Power occurred 4 hours ago.
- ECA-0.0A, Loss of All AC Power, is in progress.
- INITIAL DC load shedding was performed 2 hours ago per ECA-0.0A, Loss of All AC Power, Attachment 2 (DC Load Shedding), Step 1.
- It will take approximately 24 hours to restore Offsite Power.
- Emergency Diesel Generator 1-02 will be available to energize Bus 1EA2 in approximately 1 hour.
- A fault occurred on Emergency Diesel Generator 1-01 and it will not be available for at least 36 hours.
- Battery parameters are as follows:
 - Battery BT1ED1 Voltage: 109 VDC
 - Battery BT1ED1 Current: 75 amps discharging
 - Battery BT1ED2 Voltage: 108 VDC
 - Battery BT1ED2 Current: 80 amps discharging
- Due to plant conditions, ADDITIONAL DC load shedding is required on Bus 1ED2 ONLY per ECA-0.0A, Loss of All AC Power, Attachment 2 (DC Load Shedding), Step 2.

Which of the following necessitates that additional load shedding be performed?

Additional load shedding is performed on Bus 1ED2 to...

- A. maintain Battery BT1ED2 voltage greater than 105 VDC to ensure all Post Accident Monitoring indications are maintained in the Control Room.
- B. restore Battery BT1ED2 voltage to greater than 110 VDC to ensure minimum system voltage for subsequent power restoration activities.
- C. restore Battery BT1ED2 voltage to greater than 110 VDC to ensure all Post Accident Monitoring indications are maintained in the Control Room.
- D. maintain Battery BT1ED2 voltage greater than 105 VDC to ensure minimum system voltage for subsequent power restoration activities.

Question 021

Which of the following describes the effect of allowing BOTH the Diesel Starting Air Receivers to drop to 145 psig?

The Emergency Diesel Generator Engine Start Circuit will accept a...

- A. Local Emergency Start signal.
- B. Safety Injection Start signal.
- C. Bus Undervoltage Start signal.
- D. Manual Normal Start signal.

Question 022

Given the following conditions on Unit 1:

- EOP-0.0A, Reactor Trip or Safety Injection, is in progress following a manual Reactor Trip and Safety Injection due to a 25 GPM leak.
- A Main Steam Line N-16 Radiation Monitor had been in alarm with a reading of greater than 150 GPD.
- Ten minutes have passed since the Reactor was tripped and the Main Steam Line N-16 Radiation Monitor is now reading one GPD.

Which of the following explains this trend?

The trend is...

- A. unexpected because the PC-11, Digital Radiation Monitoring System, maintains the highest value until reset.
- B. expected because while the Reactor was critical, high energy gamma radiation was being produced and entering the Steam Generator through a tube leak. The high energy gamma production has reduced resulting in a lower reading.
- C. expected because the Main Steam Line N-16 Radiation Monitors are isolated on the Safety Injection signal resulting in the decreased reading.
- D. unexpected because the radiation monitor was in alarm, the trend should continue to rise as high energy gamma production will increase as the secondary isotopic concentration rises toward equilibrium until the leak is stopped.

Question 023

Given the following conditions:

- Unit 2 is in MODE 1 when a Loss of Offsite Power occurs.
- Both Station Service Water (SSW) Pumps were in operation prior to the Reactor Trip.
- Safeguards Bus 2EA2 has an 86-2 Lockout Relay actuated.
- Both Emergency Diesel Generators have responded per design.

Which of the following is the status of the SSW Pumps forty-five seconds later?

- A. NO SSW Pump is running.
- B. BOTH SSW Pumps are running.
- C. SSW Pump 2-01 is running and SSW Pump 2-02 is NOT running.
- D. SSW Pump 2-01 is NOT running and SSW Pump 2-02 is running.

Question 024

Given the following conditions:

- Unit 1 Station Service Water (SSW) was in an abnormal lineup with Station Service Water Pump (SSWP) 1-01 running and SSWP 1-02 in STANDBY.
- Component Cooling Water Pump (CCWP) 1-02 is out of service for preventative maintenance.
- Subsequently SSWP 1-01 trips and SSWP 1-02 automatically starts.

Which of the following describes the SSWP AUTO start feature and system alignment using ABN-501, Station Service Water System Malfunction?

SSWP 1-02 AUTO started when...

- A. the header pressure in Train A SSW dropped to 10 psig.
Cross connect Train A SSW Unit 1 with Train A SSW Unit 2.
- B. the return header flow in Train A SSW dropped to 16,456 GPM.
Cross connect Train A SSW Unit 1 with Train A SSW Unit 2.
- C. the return header flow in Train A SSW dropped to 16,456 GPM.
Ensure CCWP 1-01 running with both Train Safeguards Loop Isolation Valves open.
- D. the header pressure in Train A SSW dropped to 10 psig.
Ensure CCWP 1-01 running with both Train Safeguards Loop Isolation Valves open.

Question 025

Given the following conditions:

- Unit 1 is in MODE 1.
- Instrument Air (IA) Compressor 1-01 is operating as the LEAD Compressor.
- IA Compressor 1-02 is in an AUTO-START condition as the BACKUP Compressor.
- IA Compressor X-01 is in STANDBY and aligned to Unit 1 through Air Dryer X-01.
- The following sequence of events occur:
 - At 1415, 1-ALB-01, Window 2.4 – CNTMT INSTR AIR HDR PRESS LO, alarms as pressure drops to 84 psig.
 - At 1416, 1-ALB-01, Window 3.3 – INSTR AIR HDR PRESS LO, alarms as pressure drops to 85 psig.
 - All other Unit 1 Control Room alarms related to the IA System remain clear.
 - At 1420, a stuck-open relief valve on Air Dryer 1-01 reseats.
 - At 1422, both Instrument Air alarms (1-ALB-01-2.4 and 3.3) clear.
 - At 1423, Instrument Air header pressure is 93 psig and slowly rising.

At 1424, assuming NO additional operator actions and with IA Compressor 1-01 running and loaded, which of the following is the status of IA Compressors 1-02 and X-01?

IA Compressor 1-02 is _____ and IA Compressor X-01 is _____.

- | | |
|--------------------------|--------------------|
| A. running and loaded; | running and loaded |
| B. running and loaded; | shutdown |
| C. running and unloaded; | running and loaded |
| D. running and unloaded; | shutdown |

Question 026

Given the following conditions:

- Unit 1 is in MODE 1.
- 1/1-8149A, LTDN ORIFICE ISOL VLV (45 GPM) is CLOSED.
- 1/1-8149B, LTDN ORIFICE ISOL VLV (75 GPM) is CLOSED.
- 1/1-8149C, LTDN ORIFICE ISOL VLV (75 GPM) is CLOSED.
- 1/1-LCV-459, LTDN ISOL VLV indicates mid position.
- 1/1-LCV-460, LTDN ISOL VLV indicates mid position.
- 1-PI-3488, INSTR AIR AFTFILTR OUT PRESS indicates 112 psig and stable.
- 1-PI-3490, CNTMT INSTR AIR HDR PRESS indicates 75 psig and lowering slowly.
- Instrument Air Compressor 1-01 is running.

Which of the following actions are required?

- A. Cross-Tie Unit 1 and Unit 2 instrument air headers.
- B. Start and align temporary air compressor.
- C. Start and align common instrument air compressor X-01.
- D. Open 1-HS-3487, CNTMT INSTR AIR ISOL VLV.

Question 027

Given the following condition:

- Unit 2 is operating at reduced inventory in accordance with IPO-010B, Reactor Coolant System Reduced Inventory Operations.

Under this condition Containment hatches must be closed prior to ...

- A. core boiling following a loss of Residual Heat Removal.
- B. commencing vacuum fill of the Reactor Coolant System.
- C. throttling the Residual Heat Removal Cold Leg Injection Valve.
- D. reducing inventory to less than or equal to 80 inches above Core Plate.

Question 028

Given the following conditions:

- Reactor Coolant System temperature is 540°F during a Unit 1 heatup.
- Three Containment Air Recirculation Fan Coolers are in service.
- Four Ventilation Chillers are in service.
- Containment air temperature is 122°F.
- Containment pressure is 0.9 psig.

Which of the following actions are taken to ensure Containment does not exceed design limits upon the occurrence of a Loss of Coolant Accident or a Steam Line Break inside Containment?

Reduce Containment...

- A. pressure by placing the Containment Pressure Relief System in service.
- B. pressure by placing the Containment Purge Supply and Exhaust System in service.
- C. temperature by placing an additional Ventilation Chiller in service.
- D. temperature by placing an additional Containment Air Recirculation Fan Cooler in service.

Question 029

Given the following conditions:

- Unit 2 has been at 100% power for three months.
- Unit 2 has been at 96% power for the past 5 days due to a secondary inefficiency.
- Control Bank D is at 190 steps.

Considering Power Defect, Rod Worth, and Boron Worth, which of the following is the amount of boron necessary to restore Unit 2 to 100% with Control Bank D at 215 steps?

- A. ~12 gallons.
- B. ~19 gallons.
- C. ~94 gallons.
- D. ~169 gallons.

Question 030

Given the following condition:

- While recording Unit 2 Critical Data at 10^{-8} amps, a fault causes a loss of 118 VAC Protection Bus 2PC3.

Which of the following is the expected Nuclear Instrument (NI) plant response?

- A. Reactor will trip due to Intermediate Range NI High Flux trip.
- B. Bistables for Power Range NI N-43 will trip, Reactor will NOT trip.
- C. Bistables for Power Range NI N-42 will trip, Reactor will NOT trip.
- D. Reactor will trip due to removal of P-6 block reenergizing the Source Range NIs.

Question 031

Given the following conditions:

- Unit 1 is at 55% power with a power ascension evolution in progress.
- Rod Control is in MANUAL.
- An instrument failure causes the following changes to plant parameters:

	<u>BEFORE FAILURE</u>	<u>AFTER FAILURE</u>
Loop 1 T _{AVE} (1-TI-412):	571°F	571°F
Loop 2 T _{AVE} (1-TI-422):	570°F	569°F
Loop 3 T _{AVE} (1-TI-432):	570°F	607°F
Loop 4 T _{AVE} (1-TI-442):	569°F	570°F

Which of the following describes the response of the plant?

Charging flow will initially...

- A. increase and actual Pressurizer level will stabilize at a higher level.
- B. increase and actual Pressurizer level will rise causing a Reactor Trip.
- C. decrease and actual Pressurizer level will stabilize at a lower level.
- D. decrease and actual Pressurizer level will lower until Letdown isolates.

Question 032

Given the following conditions:

- Unit 2 has experienced a Small Break Loss of Coolant Accident.
- Through various failures core cooling was lost for several minutes and transition to FRC-0.2B, Degraded Core Cooling, was required.
- Core cooling has now been restored and operation is continuing in EOS-1.2B, Post LOCA Cooldown and Depressurization.
- Containment Hydrogen concentration has just been determined as 2% in dry air.
- Containment pressure is currently 8 psig and stable which precludes use of the Hydrogen Purge System.

If Containment pressure cannot be lowered sufficiently to establish Hydrogen Purge, what are the potential effects on the Containment atmosphere?

During the coming months Hydrogen concentration will...

- A. continue to increase as a result of the zirconium/water reaction.
- B. continue to increase as a result of corrosion off gassing.
- C. slowly decrease from recombination of hydrogen and oxygen.
- D. slowly decrease as a result of Reactor Coolant System degassing.

Question 033

Given the following conditions:

- Unit 1 is in a Refueling outage, and fuel transfer activities are in progress.
- Refueling Cavity level begins lowering.
- Annunciator 1-ALB-2A, Window 2.7 – RX CAV SMP LVL HI-HI, is in alarm.
- All radiation levels are normal and there are NO Radiation Monitors in alarm.

Which of the following should be performed?

- A. Ensure the Fuel Transfer Cart is in the Containment Building.
Close the Transfer Tube Gate Valve.
- B. Ensure the Fuel Transfer Cart is in the Fuel Building.
Close the Transfer Tube Gate Valve.
- C. Ensure the Fuel Transfer Cart is in the Containment Building.
Open the Transfer Tube Gate Valve.
- D. Ensure the Fuel Transfer Cart is in the Fuel Building.
Open the Transfer Tube Gate Valve.

Question 034

Given the following conditions:

- Unit 2 is operating at 50% power.
- 2-FS-510C, SG 1 FW FLO CHAN SELECT, is in the 2-FY-510C position.
- 2-FS-512C, SG 1 STM FLO CHAN SELECT, is in the 2-FY-512B position.
- 2-LS-519C, SG 1 LVL CHAN SELECT, is in the 2-LQY-551 position.
- Steam Generator (SG) 2-01 level begins to raise.
- All other SG levels are stable at approximately 64%.

Which of the following is the cause of the lowering level in Steam Generator 2-01?

- A. 2-LT-551, SG 1 LVL (NR) CHAN I, has failed low.
- B. 2-PT-514A, MSL 1 PRESS CHAN I, has failed low.
- C. 2-FT-512A, SG 1 STM FLO CHAN I, has failed low.
- D. 2-FT-510A, SG 1 FW FLO CHAN I, has failed high.

Question 035

Given the following condition on Unit 1:

- During a plant cooldown and depressurization, Reactor Coolant System (RCS) temperature is being stabilized at 508°F.

Assuming minimal ΔT between the Reactor Coolant System and Steam Generator, which of the following identifies the proper pot setting for PK-507, STM DUMP PRESS CTRL, to maintain RCS temperature with the Steam Dump System in AUTO?

- A. 2.37
- B. 3.97
- C. 4.09
- D. 4.20

Question 036

Which of the following is the reason T_{AVE} lowers less at end-of-life (EOL) conditions than at beginning-of-life (BOL) conditions when a 10% Main Turbine step increase in load occurs?

During EOL conditions, Moderator Temperature Coefficient is...

- A. less negative with a higher boron concentration.
- B. less negative with a lower boron concentration.
- C. more negative with a lower boron concentration.
- D. more negative with a higher boron concentration.

Question 037

Which of the following Radiation Monitors will cause HCV-014, Waste Gas Discharge Control Valve to automatically close?

1. X-RE-5701 (ABV089), Aux Building Vent Exhaust Monitor.
2. X-RE-5570A/B (PVG684/685), Plant Vent Stack Wide Range Gas Monitor.
3. X-RE-5567A/B (PVG384/385), Plant Vent Stack Noble Gas Monitor.
4. X-RE-5700 (FBV088), Fuel Building Vent Exhaust Monitor.

A. 1 and 2.

B. 1 and 3.

C. 2 and 4.

D. 3 and 4.

Question 038

Given the following conditions:

- Unit 1 has tripped.
- All Auxiliary Feedwater (AFW) flow has been lost due to low Condensate Storage Tank (CST) level.

Which of the following lists the priority for restoration of AFW per ABN-305, Auxiliary Feedwater System Malfunction?

1. Fill the CST from Main Condenser Hotwell.
 2. Fill the CST from Fire Protection Water.
 3. Align Station Service Water to AFW Pump suctions.
- A. 1, 2, 3.
- B. 2, 1, 3.
- C. 3, 2, 1.
- D. 1, 3, 2.

Question 039

Given the following conditions:

- A Main Steam Line Break outside Containment has occurred on Unit 2.
- The Reactor was tripped and Safety Injection actuated.
- EOP-0.0B, Reactor Trip or Safety Injection Step 7, Verify Containment Spray Not Required is being performed.
- Containment Spray was inadvertently actuated.

Which of the following describes the required actions and why?

- A. Trip all RCPs per EOP-0.0B, Reactor Trip or Safety Injection, due to water spray causing damage to RCPs.
- B. Trip all RCPs per EOP-0.0B, Reactor Trip or Safety Injection, due to a loss of CCW cooling to the RCPs.
- C. Reset the Containment Spray and Phase B signals and realign CCW to RCPs per Attachment 9 of EOP-0.0B, Reactor Trip or Safety Injection, due to a loss of CCW cooling to the RCPs.
- D. Reset the Containment Spray and Phase B signals and stop Containment Spray Pumps per Attachment 9 of EOP-0.0B, Reactor Trip or Safety Injection, due to water spray causing damage to RCPs.

Question 040

Given the following conditions:

- A Pressurizer Power Operated Relief Valve (PORV) has stuck open.
- Reactor Coolant System (RCS) pressure is 1500 psig.
- Containment pressure is 2 psig and rising.
- RCS break flow is approximately 140 GPM.

Subsequently, the PORV cannot be isolated.

- RCS pressure continues to lower and is currently 750 psig.
- Containment pressure is 4 psig and rising.

Which of the following is the approximate value for RCS break flow at this time?

Approximately...

- A. 35 GPM.
- B. 70 GPM.
- C. 100 GPM.
- D. 140 GPM.

Question 041

Given the following conditions:

- A Small Break Loss of Coolant Accident has occurred on Unit 1.
- EOP-1.0A, Loss of Reactor or Secondary Coolant, is in progress.
- Containment pressure is 3 psig and slowly rising.

Which of the following is the purpose for checking intact Steam Generator (SG) narrow range water levels greater than or equal to 43%?

To ensure ...

- A. SG water levels are sufficient to cover a ruptured SG tube.
- B. an excessive SG cooldown does not complicate the recovery procedure.
- C. sufficient SG water inventory is available to provide an adequate heat sink.
- D. SG shell to tube differential temperature limit is not exceeded during cooldown.

Question 042

Given the following conditions on Unit 2:

- A Safety Injection and Containment Spray Actuation occurred as a result of a Large Break Loss of Coolant Accident.
- Safety Injection has been RESET.
- EOS-1.3B, Transfer to Cold Leg Recirculation, was completed with Containment pressure still at 20 psig.
- A loss of power to both 1E Safeguards Buses occurs and the Emergency Diesels start and load.

Which of the following choices below indicates pumps that must be manually started?

1. Centrifugal Charging Pump
2. Safety Injection Pump
3. Residual Heat Removal Pump
4. Containment Spray Pump
5. Station Service Water Pump
6. Component Cooling Water Pump

A. 1, 2, 3

B. 2, 3, 4

C. 3, 4, 5

D. 4, 5, 6

Question 043

Given the following conditions:

- A Small Break Loss of Coolant Accident has occurred on Unit 1.
- Both Centrifugal Charging Pumps and both Safety Injection Pumps failed to start automatically or manually.
- FRC-0.2A, Response to Degraded Core Cooling, is in progress due to a Critical Safety Function Status Tree ORANGE path.
- Attempts to start the Positive Displacement Pump and restore Charging flow have been unsuccessful.
- Current plant parameters are as follows:
 - Reactor Coolant System pressure is 1300 psig and slowly lowering.
 - Core Exit Thermocouples are 765°F and slowly rising.
 - All Reactor Coolant Pumps (RCP) are running.
 - Seal Injection flow to all RCPs is 0 gpm.
 - Containment pressure is 6 psig and slowly rising.
 - Annunciator 1-ALB-5B, Window 3.5 – RCP 3 VIBR HI, is in ALARM.
 - RCP 1-03 shaft vibration is 17 mils and increasing at a rate of 3 mils/hr.

For the current plant conditions, which of the following is proper RCP operation?

Stop...

- A. RCP 1-03 due to high shaft vibration.
- B. all RCPs due to a loss of RCS subcooling.
- C. all RCPs to minimize heat addition to the RCS.
- D. RCP 1-04 to reserve the pump for future use.

Question 044

Given the following conditions:

- Unit 1 is operating at 95% power during a power ramp.
- 1-TI-412A, AVE $T_{AVE} T_{REF}$ DEV indicates minus (-) 2.0°F and lowering.
- SOP-104A, Reactor Make-up and Chemical Control System, is in progress to perform a 200 gallon dilution for temperature control.
- 43/1-MU, RCS MU MODE SELECT, was placed in DILUTE.
- When 1/1-MU, RCS MU MAN ACT, was placed in START, makeup flow did NOT commence.
- PROMPT Team reports that it will take approximately 2 hours to repair the 43/1-MU, RCS MU MODE SELECT, switch.
- Control Rods are in MANUAL with Control Bank D @ 220 steps.

Which of the following actions should be taken per ABN-105, Chemical and Volume Control System Malfunction?

- A. Manually align Reactor Makeup Water for Dilution.
- B. Raise Main Turbine Load to adjust Reactor Coolant System temperature.
- C. Place an unborated demineralizer in service to remove boron.
- D. Withdraw Control Rods to adjust Reactor Coolant System temperature.

Question 045

Given the following conditions:

- A Large Break Loss of Coolant Accident is in progress on Unit 1.
- A transition to EOS-1.3A, Transfer to Cold Leg Recirculation, is being initiated.
- Residual Heat Removal Pump 1-01 tripped just before the transition was made to EOS-1.3A, Transfer to Cold Leg Recirculation.

Which of the following actions should be taken?

- A. Transition to ECA-1.1A, Loss of Emergency Coolant Recirculation, and secure the running Residual Heat Removal Pump while maintaining both Centrifugal Charging Pumps and both Safety Injection Pumps running.
- B. Continue with the transfer to Cold Leg Recirculation and remain in EOS-1.3A, Transfer to Cold Leg Recirculation, but only align one Centrifugal Charging Pump and one Safety Injection Pump for recirculation.
- C. Transition to ECA-1.1A, Loss of Emergency Coolant Recirculation, and reduce injection flow to one Residual Heat Removal Pump, one Centrifugal Charging Pump, and one Safety Injection Pump running.
- D. Continue with the transfer to Cold Leg Recirculation and remain in EOS-1.3A, Transfer to Cold Leg Recirculation, aligning both Centrifugal Charging Pumps and both Safety Injection Pumps for recirculation.

Question 046

Which of the following describes the basis for the Component Cooling Water (CCW) System valve realignment upon receipt of a Containment Isolation Phase B actuation?

- A. Reduces Diesel Generator loading requirements with Containment Spray in operation.
- B. Reduces heat load on CCW System by eliminating unnecessary cooling requirements.
- C. Ensures CCW System is not an additional potential radioactive release path from Containment.
- D. Ensures that CCW System meets design cooling function for loads within Containment during Design Basis Loss of Coolant Accident.

Question 047

Given the following conditions:

- Unit 1 is at 100% power.
- The controlling Pressurizer Pressure Channel has failed high.
- Initial Operator Actions have been performed per ABN-705, Pressurizer Pressure Control Malfunction.

Which of the following is the next appropriate action to take based on this failure?

- A. Declare the associated PORV INOPERABLE.
- B. Transfer control to an alternate controlling channel.
- C. Remove power to the associated PORV Block Valve.
- D. Verify PCIP 2.6, PRZR PRESS SI BLK PERM P-11 is LIT.

Question 048

Given the following conditions:

- An Anticipated Transient Without Trip (ATWT) event is in progress on Unit 1.
- FRS-0.1A, Response to Nuclear Power Generation/ATWT is in progress and the Reactor is still NOT tripped.
- Boration CANNOT be initiated because of blockage in the Boration flowpaths.
- All Power Range Channels indicate 6%.
- Startup rate is zero on both Intermediate Range Channels.
- Average Core Exit Thermocouple temperature is 580°F and slowly lowering.

Which of the following describes the operator actions under these conditions and the primary reason for taking these actions?

- A. Transition to FRS-0.2A, Response to Loss of Core Shutdown, Step 1, Verify Containment Pressure Less Than 5 psig, as it is now the procedure and step in effect.
- B. Remain in FRS-0.1A, Response to Nuclear Power Generation / ATWT, and allow RCS temperature to lower while continuing efforts to establish Emergency Boration. A lower temperature will maintain an appropriate DNBR margin.
- C. Transition to FRS-0.2A, Response to Loss of Core Shutdown. This is required by the Critical Safety Function SUBCRITICALITY Status Tree based on the current YELLOW path condition.
- D. Remain in FRS-0.1A, Response to Nuclear Power Generation / ATWT, and allow the RCS to heat up while continuing efforts to establish Emergency Boration. The heatup will insert negative reactivity.

Question 049

Given the following conditions:

- ECA-0.0A, Loss of All AC Power, has been directly entered on Unit 1.
- 1/1-RTBAL, RX TRIP BKR, red light is LIT and green light is DARK.
- 1/1-RTBBL, RX TRIP BKR, red light is DARK and green light is LIT.
- 1-NI-35B, IR CURRENT CHAN 1, indicates 2×10^{-6} amps and lowering.
- 1-NI-36B, IR CURRENT CHAN 2, indicates 2×10^{-6} amps and lowering.

Which of the following actions should be performed next per ECA-0.0A, Loss of All AC Power?

- A. Verify all Control Rod Position Bottom Lights - ON.
- B. Place 1/1-RTC, RX TRIP BKR, in TRIP.
- C. Verify all High Pressure Turbine Stop Valves - CLOSED.
- D. Dispatch an NEO to locally trip Reactor Trip Breaker A.

Question 050

Given the following conditions:

- Unit 2 has experienced a Loss of Offsite Power.
- EOS-0.2B, Natural Circulation Cooldown, is in progress.
- Normal Letdown cannot be established since 1/2-LCV-459, LTDN ISOL VLV, has failed closed.
- All other systems and components operated as required.

Which of the following actions must be performed to commence Reactor Coolant System (RCS) depressurization following a Loss of Offsite Power per EOS-0.2B, Natural Circulation Cooldown?

Commence depressurization ...

- A. by opening 1/2-PCV-455A, PRZR PORV or 1/2-PCV-456, PRZR PORV.
- B. by raising demand on 2-PK-455C, RC LOOP 4 PRZR SPRY VLV CTRL, to establish Normal Spray flow.
- C. by opening 1/2-8145, PRZ AUX SPR VLV, to establish Auxiliary Spray flow.
- D. by raising demand on 2-PK-507, STM DMP PRESS CTRL, to establish an RCS cooldown.

Question 051

Given the following conditions:

- Unit 1 is operating at 100% power with all systems in normal alignment.
- 1ED1/1-1/DSW, 125 VDC STATION BATTERY BT1ED1 DISCONNECT SWITCH, was placed in OFF.

Which of the following would provide the Control Room with indication of this condition?

- A. Low Bus Voltage indicated on DC Bus 1ED1 voltmeter on CB-11.
- B. SSII Train A alarms for SSW, ECCS, CS, MDAFW, DG PWR, SFTY CH WTR, CR HVAC, CCW and RHR.
- C. High amperage on Battery BT1ED1 ammeter on CB-11.
- D. SSII Train B alarms for SSW, ECCS, CS, MDAFW, DG PWR, SFTY CH WTR, CR HVAC, CCW and RHR.

Question 052

Given the following conditions:

- Unit 2 has experienced a Station Blackout.
- The Unit Supervisor directs that Steam Generator levels be maintained between 40% and 50% per ECA-0.0B, Loss of All AC Power.

Which of the following describes the status of the Auxiliary Feedwater System per ECA-0.0B, Loss of All AC Power?

The Turbine Driven Auxiliary Feedwater Pump will be running at _____ speed, and the Auxiliary Feedwater Flow Control Valves will require local control in _____.

- A. minimum; 30 minutes
- B. minimum; 4 hours
- C. maximum; 30 minutes
- D. maximum; 4 hours

Question 053

Given the following conditions:

- A Steam Line Break inside Containment occurred on Unit 1.
- ECA-2.1A, Uncontrolled Depressurization of All Steam Generators, is in progress.
- Current plant conditions are as follows:
 - Reactor Coolant System (RCS) pressure is 1200 psig and slowly lowering.
 - Steam Generators 1-01, 1-03, and 1-04 narrow range levels are 3% and stable.
 - Steam Generator 1-02 narrow range level is 25% and slowly lowering.
 - All Steam Generator pressures are 175 psig and lowering.
 - RCS cooldown rate is 127°F/hr.
 - Containment pressure is 12 psig and slowly rising.

Which of the following is required and a reason for that action?

- A. REDUCE Auxiliary Feedwater flow to Steam Generators 1-01, 1-03, and 1-04 to NOT LESS THAN 100 GPM. STOP feeding Steam Generator 1-02 to minimize RCS cooldown.
- B. STOP feeding Steam Generator 1-02 until Narrow Range Level is less than 10%. ESTABLISH Auxiliary Feedwater Flow to all Steam Generators at 100 GPM to minimize steam line break flow.
- C. MAINTAIN total Auxiliary Feedwater flow greater than 460 GPM until all Steam Generator narrow range levels are greater than 50% to ensure a proper heat sink.
- D. REDUCE Auxiliary Feedwater flow to all Steam Generators to 100 GPM to prevent Steam Generator tube dry out.

Question 054

Given the following conditions:

- Unit 2 experienced a Loss of Coolant Accident 30 minutes ago.
- Neither 2-8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV, nor 2-8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV, can be opened.
- As a result of these valve failures, ECA-1.1B, Loss of Emergency Coolant Recirculation, is in progress.
- Only the Train A Centrifugal Charging Pump (CCP), Safety Injection Pump (SIP), and Residual Heat Removal Pump (RHRP) are running.
- Reactor Coolant System (RCS) pressure is 340 psig and stable.
- 2-FI-917, CCP SI FLO, is indicating 250 GPM.
- 2-FI-918, SIP 1 DISCH FLO, is indicating 400 GPM.
- Emergency Core Cooling System (ECCS) CANNOT be terminated due to inadequate subcooling.
- Actions to establish minimum ECCS flow are in progress.

Per ECA-1.1B, Loss of Emergency Coolant Recirculation, Attachment 5, Minimum Required ECCS Flow, which of the following describes the method for establishing the required flow?

Secure...

- A. CCP 2-01 and RHRP 2-01, allowing only SIP 2-01 to inject into the RCS.
- B. CCP 2-01 and SIP 2-01, allowing only RHRP 2-01 to inject into the RCS.
- C. RHRP 2-01, allowing both CCP 2-01 and SIP 2-01 to inject into the RCS.
- D. SIP 2-01, allowing both CCP 2-01 and RHRP 2-01 to inject into the RCS.

Question 055

Given the following:

- Unit 2 is at 100% power.
- All systems are in their normal alignments.
- Annunciator 2-ALB-10B, Window 1.16 – 118V CHAN 1 INV TRBL, is in alarm.
- It has been determined that Protection Bus, 2PC1 is deenergized.
- ABN-603, Loss of Protection or Instrument Bus is in progress

At Step 2.3.6.b of ABN-603 the operator is directed to perform the following:

- Select the failed channel on 2-TS-412T, T_{AVE} CHAN DEFEAT switch.

Which of the following provides a basis for selecting the failed channel on 2-TS-412T, T_{AVE} CHAN DEFEAT switch prior to reenergizing 2PC1 from its alternate power supply?

- A. Preclude potential opening of steam dump valves.
- B. Preclude potential opening of a Pressurizer PORV.
- C. Allow restoration of the control rod drive system to automatic.
- D. Allow restoration of steam generator water level control to automatic.

Question 056

Given the following conditions:

- Unit 2 is in MODE 1, Reactor power is 90%.
- Main Generator load is 1140 MWe.
- Main Generator reactive load is 270 MVAR.
- ABN-601, Response to a 138/345 KV System Malfunction, Section 9.0, Grid Frequency Fluctuations/Loss of QSE Generation Controller Communications, is in progress.
- Grid frequency has lowered from 60 Hz to 59.5 Hz.

Which of the following identifies main generator response to the lowering frequency?

Main Generator reactive load will _____ due to generator _____.

- A. increase over-excitation
- B. decrease over-excitation
- C. increase under-excitation
- D. decrease under-excitation

Question 057

Given the following conditions:

- A Reactor Startup is in progress on Unit 1.
- Reactor Power has been leveled at 1×10^{-8} amps in the Intermediate Range per Step 5.2.23 of IPO-002A, Plant Startup from Hot Standby.
- 1-PI-507, MS HDR PRESS, is being maintained at approximately 1092 psig using Steam Dumps in AUTO.
- The following indications are observed:
 - Control Rod CBD M-12 Rod Bottom Light is LIT.
 - 1-ALB-06D, Window 3.5 – DRPI ROD DEV, is in alarm.
 - 1-ALB-06D, Window 3.7 – ANY ROD AT BOTTOM, is in alarm.

For the given conditions, how will Reactor Power respond and what actions are required by ABN-712, Rod Control System Malfunction?

Reactor Power will make a step change lower, then...

- A. slowly lower into the Source Range while T_{AVE} remains constant.
Immediately TRIP the Reactor and go to EOP-0.0A, Reactor Trip or Safety Injection.
- B. slowly lower into the Source Range while T_{AVE} remains constant.
Within 1 hour, INSERT all Control Banks to the Control Bank Offset Position.
- C. return to 1×10^{-8} amps while T_{AVE} decreases.
Immediately TRIP the Reactor and go to EOP-0.0A, Reactor Trip or Safety Injection.
- D. return to 1×10^{-8} amps while T_{AVE} decreases.
Within 1 hour, INSERT all Control Banks to the Control Bank Offset Position.

Question 058

Given the following conditions:

- A Reactor Startup is in progress.
- Intermediate Range power indicates 5×10^{-11} amps on both Channels.
- Source Range High Flux trip has NOT been blocked.

For the two switch positions shown below, which of the following describes the Reactor Protection System response to a blown INSTRUMENT POWER fuse on Source Range Channel N-31 per ABN-701, Source Range Instrument Malfunction?

<u>SR Level Trip Switch: NORMAL</u>	<u>SR Level Trip Switch: BYPASS</u>
A. NO Reactor Trip	NO Reactor Trip
B. Reactor Trip	NO Reactor Trip
C. NO Reactor Trip	Reactor Trip
D. Reactor Trip	Reactor Trip

Question 059

Given the following conditions:

- Unit 1 is in MODE 6 with core reload in progress.
- Both Source Range instruments indicate 50 counts and stable.
- The Parker 345KV feeder breaker cycles three times and trips open.
- A Unit 1 Containment evacuation alarm is automatically actuated.

Which of the following states the input to the automatic Containment Evacuation alarm and the most likely reason for receiving the alarm?

- A. Source Range High Flux at Shutdown due to spiking on the Source Range nuclear instrumentation.
- B. Containment Air Gas Monitor due to spiking on the Source Range nuclear instrumentation.
- C. Source Range High Flux at Shutdown due to an inadvertent change in shutdown reactivity.
- D. Containment Air Gas Monitor due to an inadvertent change in shutdown reactivity.

Question 060

Given the following conditions:

- During a plant startup, Unit 1 is operating at 23% power following synchronization of the Main Generator to the grid.
- Three Circulating Water Pumps are in service.
- All three Condenser Vacuum Pumps are in operation.
- Main Condenser vacuum is 20.5" Hg in both Condensers and slowly degrading.

Which of the following actions should be taken in accordance with ABN-304, Main Condenser and Circulating Water System Malfunction?

- A. Start an additional Circulating Water Pump.
- B. Reduce Turbine Load to restore Main Condenser vacuum.
- C. Trip the Main Turbine and enter ABN-403, Turbine Trip Response.
- D. Trip the Reactor and enter EOP-0.0A, Reactor Trip or Safety Injection.

Question 061

Given the following conditions:

- Both Units are operating at power.
- Train A Control Room Ventilation is in service.
- Following a report of a fire outside of the Control Building, Air Intake Smoke Alarms are actuated on BOTH Control Room Ventilation air intakes.

Which of the following is the appropriate action to be taken per SOP-802, Control Room Ventilation System?

- A. Manually initiate Emergency Recirculation.
Manually shift to single train operation and shift operating train to Isolation Mode.
- B. Manually initiate Emergency Recirculation.
Manually shift both trains to Isolation Mode.
- C. Verify automatic actuation of Emergency Recirculation.
Manually shift both trains to Isolation Mode.
- D. Verify automatic actuation of Emergency Recirculation.
Manually shift to single train operation and shift operating train to Isolation Mode.

Question 062

Which of the following identifies the process point that causes FFL-160, Gross Failed Fuel Monitor, to alarm?

High activity in the ...

- A. Steam Generator Blowdown flow.
- B. Main Steam Line Steam flow.
- C. Reactor Coolant System Letdown flow.
- D. Containment Purge (or Ventilation) System flow.

Question 063

Given the following conditions:

- EOS-1.1A, Safety Injection Termination, is in progress on Unit 1.
- Centrifugal Charging Pump (CCP) 1-01 is operating with injection aligned through the Normal Charging line.
- CCP 1-02 is in Standby.
- Containment pressure is 3 psig and stable.
- All SG Pressures are 950 psig and stable.
- The step to determine if Safety Injection Pumps can be stopped is being performed.

Which of the following conditions would indicate that a transition to EOS-1.2A, Post LOCA Cooldown and Depressurization, is required?

- A. Reactor Coolant System pressure is 1900 psig and slowly rising.
- B. Pressurizer level is 15% and slowly rising.
- C. Reactor Coolant System pressure is 1400 psig and slowly lowering.
- D. 1-FI-121A, CHRG FLO, indicates 32 GPM and stable.

Question 064

Given the following conditions:

- A Unit 1 Reactor Trip and Loss of Offsite Power have occurred.
- EOS-0.3A, Natural Circulation Cooldown with Steam Void in Vessel (With RVLIS), is in progress.
- Reactor Coolant System (RCS) cooldown is in progress.
- 1/1-8145, PRZR AUX SPR VLV, was opened to depressurize the RCS.
- Charging and Letdown are in service.
- During the cooldown and depressurization, the following indications are observed:
 - RVLIS 61 IN ABOVE CORE PLATE light is DARK.
 - Pressurizer level is 75% and rising.
 - RCS pressure is 925 psig and slowly lowering.
 - RCS cooldown rate is 60°F/hr.
 - RCS subcooling is 50°F.
- Due to current plant conditions, 1/1-8147, RCS LOOP 1 CHRG VLV, was OPENED to raise RCS pressure.

What condition will allow 1/1-8147, RCS LOOP 1 CHRG VLV, to be closed to continue RCS depressurization per EOS-0.3A, Natural Circulation Cooldown with Steam Void in Vessel (with RVLIS)?

CLOSE 1/1-8147, RCS LOOP 1 CHRG VLV, when...

- A. the RVLIS 61 IN ABOVE CORE PLATE light is LIT.
- B. Pressurizer level is less than 40%.
- C. RCS pressure is greater than 1075 psig.
- D. RCS subcooling is greater than 75°F.

Question 065

Given the following conditions:

- Unit 1 is in MODE 1 at 7% power and stable.
- Rod Control is in MANUAL.
- 1/1-FLRM, CONTROL ROD MOTION CTRL, is CAUTION tagged for repair of a broken wire.
- Xenon concentration is stable.

Fifteen minutes later the following indications are observed:

- Volume Control Tank (VCT) level is 70% and rising.
- Annunciator 1-ALB-6A, Window 2.6 – VCT LVL HI, is in alarm.
- $T_{AVE} - T_{REF}$ is plus (+) 4°F.

Which of the following is required per ABN-105, Chemical and Volume Control System Malfunctions?

- A. Commence an Emergency Boration because an inadvertent dilution is occurring.
- B. Remove CAUTION tag and manually insert Control Rods to restore $T_{AVE} - T_{REF}$.
- C. Place Rod Control in AUTO to allow automatic Control Rod insertion.
- D. Place 1/1-TCV-129, LTDN DIVERT VLV, in VCT position to remove the demineralizers from Letdown.

Question 066

Given the following conditions:

- You are on watch in the Control Room as the BOP with both Units at 100% power.
- Shifts are 12 hours long and all shifts are manned to the minimum composition of ODA-102, Conduct of Operations.
- Your relief is NOT on site for Shift Turnover.

Which of the following describes the procedural guidance in this situation?

Shift composition may...

- A. NOT drop below the minimum unless an operator exceeds 12 hours on watch. Turnover your watch station to the on-coming RO and depart.
- B. be one less than the minimum for two hours while attempting to find a replacement. Turnover your watch station to the on-coming RO and attempt to contact a replacement.
- C. NOT drop below the minimum as a result of an on-coming watchstander being absent. Remain on watch.
- D. be one less than the minimum for two hours. Turnover your watchstation to the on-coming RO but remain on site in standby until a replacement is found.

Question 067

Per ODA-106, Review of Documents and Operational Experience Feedback, who provides the approval authority for a Lessons Learned which is of immediate "need to know" importance?

- A. Director Operations
- B. Shift Operations Manager
- C. Shift Manager
- D. Field Support Supervisor

Question 068

Given the following:

- A Reactor Operator is performing a procedure.
- Only ONE Senior Reactor Operator is available.

Which of the following is a condition that will allow a step in the procedure to be marked "N/A" by the Reactor Operator?

- A. A clearance is installed on the component to be operated.
- B. The step does not apply to the conditions under which the activity is being performed.
- C. Performance of the step will prevent proper performance or result in a personnel hazard.
- D. Performance of the step will cause a violation of administrative controls or other plant commitments.

Question 069

Given the following conditions:

- Unit 2 is in MODE 3.
- A LOCKED OPEN valve is requested by Engineering to be UNLOCKED and CLOSED, WITHOUT an approved procedure, to gather information for a proposed design modification.
- A status review has concluded that the system impact is acceptable at this time.
- This valve will be repositioned to OPEN and verified LOCKED OPEN per IPO-002B, Plant Startup from Hot Standby.

Is procedure OWI-103-3, Locked Component Deviation Log, required to be completed?

- A. No, as long as the valve will be closed by a Shift Manager's clearance.
- B. Yes, unless the Shift Manager suspends the Locked Component Deviation Log.
- C. No, as long as the valve is opened and verified locked open per an approved procedure.
- D. Yes, even though the valve is opened and verified locked open per an approved procedure, completion of the Locked Component Deviation Log is still required.

Question 070

Which of the following is an example or definition of Limiting Condition for Operation (LCO) Initiation Time?

- A. Time the LCO was discovered NOT satisfied.
- B. Time that the NOT satisfied LCO was entered in the Unit Log.
- C. Amount of time necessary to complete the LCO REQUIRED ACTION.
- D. Time that the Shift Manager was notified that a Quick Turnaround Technical Evaluation had been initiated.

Question 071

Which of the following is required if a liquid radioactive release is terminated due to a high radiation alarm on the associated release monitor?

- A. Document the alarm in the unit logs. Once the high radiation alarm clears the release may be recommenced with the current permit.
- B. When the cause of the high radiation alarm is determined, the release may be recommenced once a new permit is issued.
- C. Initiate a Condition Report to determine the cause of the high radiation alarm, obtain Shift Manager approval to recommence the release with a new permit.
- D. Raise the high radiation alarm setpoint with Chemistry Manager's approval and obtain Shift Manager's concurrence to recommence release with the current permit.

Question 072

An individual is attempting to exit the Radiologically Controlled Area (RCA) following work involving grinding in the vicinity of the Refueling Cavity and enters the Personnel Contamination Monitor (PCM), when the following occurs:

- The PCM alarms indicating contamination of the lower left leg.
- The count is repeated with the same alarm.
- Three other Radiological Workers pass through the same PCM successfully.
- Two more attempts by the individual at passing through the PCM are unsuccessful.

Which of the following should be performed per STA-653, Contamination Control Program?

Perform a...

- A. whole body count to check for internal contamination.
- B. whole body frisk to check for a discrete radioactive particle.
- C. bio-assay examination to check for medical radioisotope usage.
- D. calibration check of the PCM to check for setpoint drift.

Question 073

Which of the following actions would be INAPPROPRIATE to perform prior to direction in an Emergency Response Guideline?

- A. Isolating Auxiliary Feedwater flow to a single faulted Steam Generator.
- B. Throttling Auxiliary Feedwater flow to control a ruptured Steam Generator level within the required band.
- C. Securing a Centrifugal Charging Pump to prevent overfilling the Pressurizer following an inadvertent Safety Injection.
- D. Closing the Main Steam Isolation Valves to isolate a steam line break which has not resulted in a Safety Injection.

Question 074

Which of the following must occur in order for annunciator 1-ALB-6B, Window 4.5 – LPMS TRBL, to go into alarm per ABN-910, Loose Part Monitoring Alarms?

- A. At least two events exceeding the alarm threshold by 50% must occur greater than one minute apart.
- B. At least two events exceeding the alarm threshold must occur greater than one minute apart.
- C. At least two events exceeding the alarm threshold by 50% must occur within one minute.
- D. At least two events exceeding the alarm threshold must occur within one minute.

Question 075

Given the following conditions:

- ABN-905, Loss of Control Room Habitability, actions are in progress.
- Pressurizer Heater control has been transferred from the Control Room to the Remote Shutdown Panel.

Which of the following identifies the response of the Pressurizer Heaters as Pressurizer level lowers to 10%?

Pressurizer Heaters...

- A. will NOT automatically deenergize.
- B. will automatically deenergize.
- C. Control Group C will NOT automatically deenergize; Backup Groups A, B, and D will deenergize.
- D. Backup Groups A, B, and D will NOT automatically deenergize; Control Group C will deenergize.

Question 076

Given the following conditions:

- Unit 1 was at 100% power when a Reactor Trip occurred due to a Loss of Main Feedwater.
- EOP-0.0A, Reactor Trip or Safety Injection, was exited at Step 4 and the crew transitioned to EOS-0.1A, Reactor Trip Response.
- While in EOS-0.1A, a RED path developed on the Heat Sink Critical Safety Function Status Tree due to a loss of all Auxiliary Feedwater flow.
- The crew transitioned to FRH-0.1A, Response to Loss of Secondary Heat Sink.
- Both Centrifugal Charging Pumps are available.
- Pressurizer pressure is 2000 psig and slowly rising.
- The Reactor Coolant Pumps have been stopped.
- Steam Generator (SG) narrow range levels are as follows:
 - SG 1-01 is 5%.
 - SG 1-02 is 7%.
 - SG 1-03 is 6%.
 - SG 1-04 is 8%.

Which of the following actions must be performed per FRH-0.1A, Response to Loss of Secondary Heat Sink?

FRH-0.1A, Response to Loss of Secondary Heat Sink, can be exited as soon as narrow range level in any Steam Generator exceeds...

- A. 10%. A transition back to EOS-0.1A, Reactor Trip Response, is performed and continues at the step in effect.
- B. 43%. A transition back to EOS-0.1A, Reactor Trip Response, is performed and continues at the step in effect.
- C. 10%. A transition to EOP-0.0A, Reactor Trip or Safety Injection, is performed and proper Safety Injection actuation and alignment is verified.
- D. 43%. A transition to EOP-0.0A, Reactor Trip or Safety Injection, is performed and proper Safety Injection actuation and alignment is verified.

Question 077

Given the following conditions:

- Unit 1 is responding to a Steam Generator Tube Rupture (SGTR).
- EOP-3.0A, Steam Generator Tube Rupture, has been completed and a transition to EOS-3.1A, Post-SGTR Cooldown Using Backfill, was made.
- Prior to commencing a Reactor Coolant System (RCS) cooldown, it was determined that 1-PCIP, Window 1.4 – CNDSR AVAIL STM DMP ARMED C-9, was DARK.

Which of the following actions should be taken to cooldown the RCS?

- A. Transition to EOS-3.2A, Post-SGTR Cooldown Using Blowdown, and dump steam using the intact Steam Generator Atmospheric Relief Valves.
- B. Remain in EOS-3.1A, Post-SGTR Cooldown Using Backfill, and dump steam using the intact Steam Generator Atmospheric Relief Valves.
- C. Remain in EOS-3.1A, Post-SGTR Cooldown Using Backfill, and cooldown using the Turbine Driven Auxiliary Feedwater Pump.
- D. Transition to EOS-3.3A, Post-SGTR Cooldown Using Steam Dumps, and dump steam using the Steam Dump Valves.

Question 078

Given the following condition:

- Unit 1 has experienced a Main Steam Line Break inside Containment.

Which of the following actions is required and the reason for the action in accordance with OWI-214, Control of Time Critical Actions?

Isolate Auxiliary Feedwater to the faulted Steam Generator within...

- A. 10 minutes to preclude exceeding 10CFR100 dose limits.
- B. 30 minutes to preclude exceeding 10CFR100 dose limits.
- C. 10 minutes to preclude exceeding Containment design pressure and temperature.
- D. 30 minutes to preclude exceeding Containment design pressure and temperature.

Question 079

Given the following conditions:

- Unit 1 is performing OPT-214A, Diesel Generator Operability Test.
- Diesel Generator (DG) 1-01 is currently running in parallel on Bus 1EA1 and loaded to 6 MWe.
- Annunciator 1-ALB-1, Window 3.11 – DG 1/2 SSW RET FLO LO, alarms during testing.
- 1-FI-4391, DG1 CLR SSW RET FLO, indicates 0 GPM.
- 1-FI-4258A, SSWP 1 DISCH FLO indicates 17,000 GPM.

How long can DG 1-01 continue to operate without affecting diesel performance and what procedure should be used to address the issue?

- A. 1 minute; ALM-0011A, 1-ALB-1, Window 3.11 – DG 1/2 SSW RET FLO LO.
- B. 15 minutes; ALM-0011A, 1-ALB-1, Window 3.11 – DG 1/2 SSW RET FLO LO.
- C. 1 minute; ABN-501, Station Service Water System Malfunction.
- D. 15 minutes; ABN-501, Station Service Water System Malfunction.

Question 080

Given the following conditions:

- Unit 1 is in MODE 5 with preparations to defuel the Reactor in progress.
 - 1-LI-462, PRZR LVL COLD CAL, is being maintained at 20% to 25%.
 - 1-PI-403, HL 4 PRESS (WR), indicates 20 psig and stable.
 - 1-PI-405, HL 1 PRESS (WR), indicates 19 psig and stable.
 - 1-TI-413A, HL 1 TEMP (WR), indicates 110°F and stable.
 - 1-TI-423A, HL 2 TEMP (WR), indicates 110°F and stable.
 - Both Residual Heat Removal (RHR) Trains are OPERABLE with Train B in operation.
 - All four Steam Generator narrow range water levels are approximately 10%.
 - 1/1-PCV-455A PRZR PORV and 1/1-PCV-456 PRZR PORV are both inoperable.
 - A Hot Leg vent path has NOT been established.
-
- A significant Reactor Coolant System (RCS) leak is identified at the suction of the Train A RHR Pump.
 - Per ABN-104, Residual Heat Removal System Malfunction, Attachment 20, RHR Train Leak Isolation the 1/1-8701A, RHRP 1 HOT LEG RECIRC ISOL VLV, is CLOSED stopping the RCS leak.
 - 1-LI-462, PRZR LVL COLD CAL, lowered to 12% and is being restored to between 20% and 25%.

Which of the following are the REQUIRED ACTIONS in accordance with Technical Specifications?

Immediately initiate action to restore BOTH Trains of RHR to OPERABLE status per Limiting Condition for Operation (LCO)...

- A. 3.4.7, RCS Loops - MODE 5, Loops Filled, and restore one required RCS Relief to OPERABLE status per LCO 3.4.12, LTOP System, within 24 hours.
- B. 3.4.8, RCS Loops - MODE 5, Loops Not Filled, and restore one required RCS Relief to OPERABLE status per LCO 3.4.12, LTOP System, within 24 hours.
- C. 3.4.7, RCS Loops - MODE 5, Loops Filled, and restore one required RCS Relief to OPERABLE status per LCO 3.4.11, Pressurizer PORVs, within 1 hour.
- D. 3.4.8, RCS Loops - MODE 5, Loops Not Filled, and restore one required RCS Relief to OPERABLE status per LCO 3.4.11, Pressurizer PORVs, within 1 hour.

Question 081

Given the following conditions:

- Adverse Containment conditions exist on Unit 1 and all Steam Generator narrow range levels are less than 50%.
- Total Auxiliary Feedwater flow to the Steam Generators has been throttled to less than 460 GPM.
- FRH-0.1A, Response to Loss of Secondary Heat Sink, is about to be entered.

In accordance with the ERG rules of usage, which of the following sets of procedures are exceptions for entry into FRH-0.1A, Response to Loss of Secondary Heat Sink, if Auxiliary Feedwater flow was previously throttled and what is the reasoning behind each?

- A. FRS-0.1A, Response to Nuclear Power Generation / ATWT, in order to insert negative reactivity into the Reactor core.
ECA-2.1A, Uncontrolled Depressurization of All Steam Generators, in order to minimize thermal stresses on Steam Generator components.
- B. FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition, in order to minimize effects of Reactor Coolant System cooldown.
FRZ-0.2A, Response to Containment Flooding, in order to minimize water input to the Containment Building Sumps.
- C. FRZ-0.1A, Response to High Containment Pressure, in order to minimize thermal stresses on Steam Generator components.
ECA-0.1A, Loss of All AC Power Recovery Without SI Required, in order to avoid initiation of Safety Injection while cooling down.
- D. ECA-2.1A, Uncontrolled Depressurization of All Steam Generators, in order to minimize thermal stresses on Steam Generator components.
FRH-0.3A, Response to Steam Generator High Level, in order to restore the Steam Generator levels to the normal control band.

Question 082

Given the following conditions:

- Unit 2 is in MODE 1.
- ABN-706, Pressurizer Level Instrumentation Malfunction, was entered due to controlling level channel, 2-LT-0459, PRESSURIZER 2-01 LEVEL PROT CHANNEL I failing low.
- While performing Attachment 6, Reestablishing Normal Letdown Following Letdown Isolation, the following annunciator alarmed:
 - 2-ALB-5A, Window 1.6 – ANY RCP SEAL INJ FLO LO.
- Centrifugal Charging Pump 2-01 is in service.
- All Reactor Coolant Pumps (RCP) seal injection flows indicate approximately 5.5 GPM.

Which of the following actions are required?

- A. Enter ABN-105, Chemical and Volume Control System Malfunction, and manually control 2-FK-121, CCP CHRG FLO CTRL and 2-HC-182 RCP SEAL WTR PRESS CTRL.
- B. Trip the Reactor, enter EOP-0.0B, Reactor Trip or Safety Injection, then stop all Reactor Coolant Pumps.
- C. Enter ABN-101, Reactor Coolant Pump Malfunction, and verify Component Cooling Water flow to the RCP Thermal Barrier Coolers greater than or equal to 35 GPM.
- D. Remain in ABN-706, Pressurizer Level Instrumentation Malfunction, and adjust Charging flow while maintaining seal injection flows between 6 and 13 GPM.

Question 083

Given the following conditions:

- Unit 1 is at full power.
- A Steam Generator (SG) sample taken at 1130 indicated total SG tube leakage at 25 GPD.
- A subsequent Steam Generator sample taken at 1200 indicated 130 GPD tube leakage in SG 1-01.
- 1-RE-2325A, (N16-174) MAIN STEAM LINE 1-01 LEAK RATE, is in RED alarm and has shown a steady increase.
- 1-RE-2959, (COG-182) CONDENSER OFF GAS, is trending up.

Which of the following action(s) are required per ABN-106, High Secondary Activity?

- A. Place the Unit in MODE 3 by 1800 today per Technical Specification LCO 3.4.13, RCS Operational LEAKAGE.
- B. Place the Unit in MODE 3 by 1200 tomorrow per IPO-003A, Power Operation.
- C. Trip the Reactor and respond per EOP-0.0A, Reactor Trip or Safety Injection and EOP-3.0A, Steam Generator Tube Rupture.
- D. Reduce power to less than 50% by 1300 today and place the Unit in MODE 3 by 1500 per IPO-003A, Power Operation.

Question 084

Given the following conditions:

- A Large Break Loss of Coolant Accident has occurred on Unit 2.
- EOP-1.0B, Loss of Reactor or Secondary Coolant, is in progress.
- The initial scan of Critical Safety Function Status Tree parameters indicate the following:
 - Pressurizer level is 0%.
 - Containment water level indicates 817 feet and slowly rising.
 - Containment Spray has automatically actuated and was verified in EOP-0.0B, Reactor Trip or Safety Injection.
 - Containment pressure is 14 psig and slowly lowering.
 - Containment Radiation Monitors are in ALARM at 25 REM/hr.
 - Reactor Vessel Level Indication System has NO lights LIT.
 - Core Exit Thermocouples are 292°F.

Which procedure has entry priority to address the above conditions?

- A. FRZ-0.2B, Response to Containment Flooding.
- B. FRZ-0.1B, Response to High Containment Pressure.
- C. FRI-0.2B, Response to Low Pressurizer Level.
- D. FRZ-0.3B, Response to High Containment Radiation Level.

Question 085

Given the following conditions:

- A Reactor Trip from 100% power occurred 35 minutes ago on Unit 1.
- Reactor Coolant System T_{COLD} is 240°F and slowly lowering slowly.
- Reactor Coolant System pressure is 30 psig and slowly lowering.
- Containment pressure is 30 psig and slowly lowering.
- Pressurizer level indicates 0%.
- Reactor Vessel Level Indication System - 11 inches above the Core Plate is LIT.
- Reactor Coolant System (RCS) subcooling is 0°F.
- Emergency Core Cooling System (ECCS) flow is occurring.
- All Engineered Safety Feature Actuations were as expected.

Which of the following addresses Pressurized Thermal Shock and the required actions?

- A. ECCS flow has caused RCS cooldown to exceed the entry criteria for FRP-0.2A, Response to Anticipated Pressurized Thermal Shock Condition.
Enter FRP-0.2A and reduce Reactor Coolant System cooldown by throttling ECCS flow.
- B. RCS cooldown has exceeded the entry criteria for FRP-0.1A, Response to Imminent Pressurized Thermal Shock Condition.
Enter FRP-0.1A and verify RCS pressure is less than Residual Heat Removal Pump shutoff head.
- C. RCS cooldown has exceeded the entry criteria for FRP-0.2A, Response to Anticipated Pressurized Thermal Shock Condition.
Enter FRP-0.2A and place Low Temperature Overpressure Protection System in service.
- D. RCS pressure and temperature are to the right of the Limit A curve so no challenge exists to Pressurized Thermal Shock.
Enter FRI-0.3A, Response to Voids in the Reactor Vessel, to perform Reactor Head venting.

Question 086

Given the following conditions:

- Unit 1 is in MODE 3 following a Reactor Trip.
- EOS-0.2A, Natural Circulation Cooldown, has been entered.
- Starting a Reactor Coolant Pump (RCP) is desired.

Which of the following is proper procedural direction to give the Nuclear Equipment Operator starting the RCP?

Place the RCP Overcurrent Trip Selector Switch in the ...

- A. HOT LOOP position in accordance with SOP-108A, Reactor Coolant Pump, to ensure locked rotor protection is properly defeated.
- B. COLD LOOP position in accordance with SOP-108A, Reactor Coolant Pump, to restore the locked rotor and failure to accelerate automatic trips.
- C. HOT LOOP position in accordance with EOS-0.2A, Natural Circulation Cooldown, Attachment 3, Starting an RCP, to ensure locked rotor protection is properly defeated.
- D. COLD LOOP position in accordance with EOS-0.2A, Natural Circulation Cooldown, Attachment 3, Starting an RCP, to restore the locked rotor and failure to accelerate automatic trips.

Question 087

Given the following conditions:

- Unit 2 is in MODE 4.
- Train A Residual Heat Removal (RHR) System is in standby readiness alignment.
- Train B RHR System is operating in the Shutdown Cooling Mode.
- 1/2-PCV-455A, PRZR PORV and 1/2-PCV-456, PRZR PORV are both OPERABLE.
- All four Reactor Coolant System (RCS) Cold Leg temperatures are 330°F and stable.
- Pressurizer level is 50% and stable.
- IPO-001B, Plant Heatup from Cold Shutdown to Hot Standby, is in progress.
- IPO-001B, Plant Heatup from Cold Shutdown to Hot Standby, Attachment 6, Elevated Pressure for ECCS Check Valve Testing, is being implemented.

Which of the following configurations, identified in IPO-001B, Plant Heatup from Cold Shutdown to Hot Standby, Attachment 6, Elevated Pressure for ECCS Check Valve Testing, would allow exiting the Technical Specification 3.4.12, Low Temperature Overpressure Protection (LTOP) System LCO and allow raising Reactor Coolant System pressure to 1800 psig?

Train B RHR in...

- A. standby readiness, two Reactor Coolant Pumps running, and RCS heatup rate at 50°F per hour.
- B. Shutdown Cooling Mode, one Reactor Coolant Pump running, and RCS heatup rate at 50°F per hour.
- C. standby readiness, one Reactor Coolant Pump running, and RCS heatup rate at 70°F per hour.
- D. Shutdown Cooling Mode, two Reactor Coolant Pumps running, and RCS heatup rate at 70°F per hour.

Question 088

Given the following conditions:

- A Unit 1 Reactor Trip has occurred on Low Pressurizer Pressure.
- EOP-0.0A, Reactor Trip or Safety Injection, is in progress.
- All Emergency Core Cooling System (ECCS) equipment is operating as required.
- While performing EOP-0.0A, Reactor Trip or Safety Injection, Step 10, Check PRZR Valve Status, the following conditions exist:
 - Reactor Coolant System (RCS) subcooling is 17°F.
 - Pressurizer level is 100%.
 - 1-PCV-456, PRZR PORV, red position indicator is LIT.
 - Steam Generator 1-02 is depressurizing uncontrollably.

Which of the following lists ALL actions required per EOP-0.0A, Reactor Trip or Safety Injection?

- A. Trip Reactor Coolant Pumps.
If the PORV CANNOT be isolated then transition directly to EOP-2.0A, Faulted Steam Generator Isolation, Step 1.
- B. Trip Reactor Coolant Pumps.
If the PORV CANNOT be isolated then transition directly to EOP-1.0A, Loss of Reactor or Secondary Coolant, Step 1.
- C. Maintain Reactor Coolant Pumps in operation.
If the PORV CANNOT be isolated then transition directly to EOP-2.0A, Faulted Steam Generator Isolation, Step 1.
- D. Maintain Reactor Coolant Pumps in operation.
If the PORV CANNOT be isolated then transition directly to EOP-1.0A, Loss of Reactor or Secondary Coolant, Step 1.

Question 089

Given the following conditions:

- Unit 1 is in MODE 1.
- A fault occurred on XST2.
- XST1 was available and a Slow Transfer was completed.
- During the transient, Emergency Diesel Generator (EDG) 1-01 inadvertently started.
- CS-1EG1, DG1 BKR 1EG1, remained open.
- Reactor power has been reduced to 95%.
- All Auxiliary Feedwater Pumps have been secured and placed in Standby.
- As a result of higher priority issues in the Control Room, 40 minutes have elapsed since the fault on XST2.
- ABN-602, Response to a 6900/480V System Malfunction, Section 8.0, Plant Recovery from a Blackout Sequencer Signal, Step 8.3.8, Check Either DG Supply Breaker – CLOSED, is in progress.

Which of the following actions is required for the present plant conditions and what procedure should be used to perform this action?

EDG 1-01 should be ...

- A. loaded to 3.5 MW for at least 60 minutes per ABN-602, Response to a 6900/480V System Malfunction.
- B. loaded to 3.5 MW for at least 60 minutes per SOP-609A, Diesel Generator System.
- C. stopped immediately per ABN-602, Response to a 6900/480V System Malfunction.

stopped immediately per SOP-609A, Diesel Generator System.

Question 090

Given the following conditions:

- Unit 1 is in MODE 1.
- Both Trains of Station Service Water (SSW) are in service.
- Component Cooling Water (CCW) Train A is in service.
- Annunciator 1-ALB-1, Window 1.10 – SSW TO CCW TRN A ΔP LO, has alarmed.

Which of the following actions is required in accordance with ALM-0011A, 1-ALB-1, Window 1.10 – SSW TO CCW TRN A ΔP LO?

Ensure CCW Pump 1-01 is in service; monitor CCW Surge Tank level and if CCW Surge Tank level is ...

- A. rising, enter ABN-502, Component Cooling Water System Malfunctions, for leakage into the CCW system.
- B. stable, remain in ALM-0011A, Alarm Procedures Manual to isolate Train A CCW Heat Exchanger.
- C. lowering and can NOT be maintained greater than 65%, enter ABN-502, Component Cooling Water System Malfunctions, for leakage out of CCW.
- D. lowering but can be maintained greater than 65%, enter ABN-501, Station Service Water System Malfunctions, to ensure SSW Pump 1-01 is shutdown.

Question 091

Given the following conditions:

- Unit 1 is in MODE 5.
- A Containment Purge is planned.
- Containment pressure is 1.1 psig.

Which of the following identifies the impact on the Containment and what actions should be taken?

- A. Containment Ventilation Isolation signal must be bypassed until the purge is initiated.
Refer to SOP-706, Digital Radiation Monitoring System, Section for Bypassing Containment Ventilation Isolation.
- B. Outage Auxiliary Containment Cooling Unit Fan should be redirected towards any highly contaminated areas to maximize purge impact.
Contact Health Physics personnel for guidance on redirecting discharge flow per SOP-801A, Containment Ventilation System.
- C. Containment pressure must be reduced using the Containment Pressure Relief System.
Refer to SOP-801A, Containment Ventilation System, and lower Containment pressure to atmospheric.
- D. Fuel Transfer Tube Gate Valves must be closed to ensure Spent Fuel Pool level is unaffected by the purge.
Refer to RF0-404, Refueling Gate Operation, for guidance regarding positioning of the Fuel Transfer Tube Gate Valves.

Question 092

Given the following conditions:

- Unit 1 is at 100% power.
- Annunciator 1-ALB-7B, Window 3.5 – SEC SMPL PNL TRBL, is in alarm.
- ABN-304, Main Condenser and Circulating Water System Malfunction, Section 4.0, Main or Auxiliary Condenser Tube Leak, is in progress.
- Chemistry has verified Steam Generator Blowdown Sodium concentration at 1500 ppb.

Which of the following is performed to mitigate the situation?

- A. Trip the Reactor and enter EOP-0.0A, Reactor Trip or Safety Injection.
Remove all Condensate Polishers from service.
- B. Trip the Reactor and enter EOP-0.0A, Reactor Trip or Safety Injection.
Maximize Steam Generator Blowdown flow.
- C. Initiate a power reduction per IPO-003A, Power Operation to be less than or equal to 50% power within 24 hours.
Maximize Steam Generator Blowdown flow.
- D. Initiate a power reduction per IPO-003A, Power Operation to be less than or equal to 50% power within 24 hours.
Remove all Condensate Polishers from service.

Question 093

Given the following conditions:

- Unit 1 is performing a heatup per IPO-001A, Plant Heatup from Cold Shutdown to Hot Standby.
- Reactor Coolant System temperature is 340°F.
- 1-RE-6290A, Containment High Range Radiation Monitor, has failed.

Which of the following is required by Technical Specifications as a result of this failure?

- A. Initiate the REQUIRED ACTION to restore the monitor to OPERABLE status within 7 days after MODE 3 entry.
- B. Initiate the REQUIRED ACTION to restore the monitor to OPERABLE status within 7 days of the failure.
- C. Initiate the REQUIRED ACTION to restore the monitor to OPERABLE status within 30 days after MODE 3 entry
- D. Initiate the REQUIRED ACTION to restore the monitor to OPERABLE status within 30 days of the failure.

Question 094

Given the following conditions:

- Unit 2 has been at 100% power for 2 hours.
- Chemistry has just reported the following Reactor Coolant System samples:
 - Chloride concentration is 2000 ppb.
 - Fluoride concentration is 1900 ppb.

Which of the following actions should be performed per the Technical Requirements Manual and why?

Within six hours, place the Unit in...

- A. MODE 2 because only the chloride concentration has exceeded the steady-state limit.
- B. MODE 2 because the chloride and fluoride concentrations have exceeded the transient limit.
- C. MODE 3 because only the chloride concentration has exceeded the steady-state limit.
- D. MODE 3 because the chloride and fluoride concentrations have exceeded the transient limit.

Question 095

Given the following conditions:

- Unit 1 is at 100% power
- The following annunciators are in alarm:
 - 1-ALB-8A, Window 2.7 – MSL 2 1 OF 3 PRESS LO.
 - 1-ALB-8A, Window 2.8 – SG 2 STM & FW FLO MISMATCH.
 - 1-ALB-8A, Window 2.12 – SG 2 LVL DEV.
- Plant indications are as follows:
 - 1-FI-522A, SG 2 STM FLO, is 3.8×10^6 lbm/hr and steady.
 - 1-FI-523A, SG 2 STM FLO, is 0 lbm/hr and stable.
 - 1-PI-524A, MSL 2 PRESS CHAN I, is 1000 psig and stable.
 - 1-PI-525A, MSL 2 PRESS CHAN II, is 0 psig and stable.
 - 1-LT-529A, SG 2 LVL (NR) CHAN I, is 64% and lowering.
 - 1-FI-520A, SG 2 FW FLO, is 1.5×10^6 lbm/hr and stable.

Which of the following identifies the correct procedure entry necessary to mitigate the malfunction?

- A. Enter ABN-707, Steam Flow Instrument Malfunction.
- B. Enter ABN-709, Steam Line Pressure, Steam Header Pressure, Turbine 1st Stage Pressure, And Feed Header Pressure Instrument Malfunction.
- C. Enter ABN-708, Feedwater Flow Instrument Malfunction.
- D. Enter ABN-710, Steam Generator Level Instrument Malfunction.

Question 096

Given the following conditions:

- The only OPERABLE Hydrogen Recombiner X-01 is in service for Unit 1 Reactor Coolant System degasification.
- Hydrogen feed concentration is 5% and the Oxygen feed is 2%.
- The Outlet (Product) Oxygen Analyzer has failed.

What are the required actions for this failure?

- A. Immediately suspend Waste Gas Holdup System operations or analyze grab samples every 24 hours and maintain Oxygen less than 1%.
Restore the channel to OPERABLE status within 30 days.
- B. Immediately reduce Hydrogen Feed Concentration to less than 4%.
Restore the Channel to OPERABLE status within 30 days.
- C. Immediately suspend Waste Gas Holdup System operations or analyze grab samples every 24 hours and maintain Oxygen less than 1%.
Restore the channel to OPERABLE status within 60 days.
- D. Immediately reduce Hydrogen Feed Concentration to less than 4%.
Restore the Channel to OPERABLE status within 60 days.

Question 097

Given the following conditions:

- Unit 1 is in Mid-Loop Operation with vessel level at 56" above core plate.
- Reactor Coolant System temperature is 106°F.
- Irradiated fuel is in the reactor vessel.

Which of the following describes how these plant conditions impact the ability to perform work on Containment penetrations?

- A. NO work may be performed which impairs any penetrations.
- B. There are NO limitations or restrictions placed on the number of impaired penetrations.
- C. Work may impair up to 10 penetrations only if pre-approved temporary seals available at the work site.
- D. Work may impair an unlimited number of penetrations with pre-approved temporary seals available at the work site.

Question 098

Given the following conditions:

- Unit 1 has experienced a manual Reactor Trip and Safety Injection initiation based on lowering Reactor Coolant System (RCS) pressure and lowering Pressurizer level.
- EOP-0.0A, Reactor Trip and Safety Injection is in progress.
- The following parameters are noted during diagnostics:
 - All three Pressurizer Safety Valves are CLOSED.
 - Both Pressurizer Spray Valves are CLOSED.
 - Both Pressurizer PORVs are CLOSED.
 - RCS subcooling is 15°F and stable.
 - RCS pressure is 1530 psig and stable.
 - All Reactor Coolant Pumps have been STOPPED.
 - All Steam Generator Pressures are 1080 psig and slowly rising.
 - COG-182, Condenser Off-Gas Radiation Monitor, is Normal.
 - MSL-178 through MSL-181, Main Steam Line Radiation Monitors, are GREEN and stable.
 - SGS-164, SG Blowdown Sample Radiation Monitor, is GREEN and stable.
 - All Steam Generator levels are 52% and slowly rising under operator control.
 - Containment Pressure is 0.2 psig and stable.
 - Containment Recirc Sump level is 808' and stable.
 - Containment Radiation on Grid 4 is Normal.
 - The following Area Radiation Monitors on Grid 4 indicate RED and rising.
 - 1-RE-6259A, PENET AREA RM 77S.
 - 1-RE-6259B, PENET AREA RM 77N.
 - X-RE-5570A, S WRGM EFFLUENT.

Which of the following indicates the proper action for optimal recovery?

- A. Continue with EOP-0.0A, Reactor Trip or Safety Injection, as no procedure transitions have been identified.
- B. Transition to EOS-1.1A, Safety Injection Termination, as ECCS flow is NOT required.
- C. Transition to ECA-1.2A, LOCA Outside Containment, based on probable leakage into the Safeguards Building.
- D. Transition to EOS-0.0, Rediagnosis, to identify what indication was misinterpreted.

Question 099

Which of the following conditions may the Shift Manager waive the requirement for an Independent Verification or Concurrent Verification?

- A. Radiation exposure greater than 5 mrem is likely.
- B. Areas of radiation dose rates in excess of 10 mrem/hr.
- C. While performing an alignment required by a System Operating Procedure.
- D. On component located inside Unit 1 or Unit 2 Containment during MODE 2.

Question 100

Given the following conditions:

- Unit 2 is in a steady-state full power condition.
- ABN-740B, Control Room Annunciators System and Status Light Malfunction, Section 2.0, Loss of All Control Room Annunciators, was just entered.

Which of the following Technical Specifications / Technical Requirements and associated frequency must be addressed during this event?

Technical Specifications / Technical Requirements Limiting Condition for Operation...

- A. Technical Requirement LCO 13.2.32, Axial Flux Difference (AFD), monitor and log AFD within 30 minutes and hourly thereafter.
- B. Technical Requirement LCO 13.2.32, Axial Flux Difference (AFD), reduce Reactor power to less than 50% within 30 minutes.
- C. Technical Specification LCO 3.4.15, RCS Leakage Detection Instrumentation, perform OPT-303, Reactor Coolant System Water Inventory, every shift.
- D. Technical Specification LCO 3.4.15, RCS Leakage Detection Instrumentation, perform OPT-303, Reactor Coolant System Water Inventory every 72 hours.

CPNPP 2012 NRC Written Examination
Senior Reactor Operator
Answer Key

1. B	26. D	51. B	76. B
2. D	27. A	52. C	77. B
3. C	28. D	53. D	78. C
4. C	29. B	54. C	79. A
5. D	30. B	55. A	80. B
6. B	31. A	56. A	81. A
7. C	32. B	57. B	82. D
8. B	33. B	58. B	83. D
9. A	34. A	59. A	84. A
10. A	35. B	60. D	85. B
11. C	36. C	61. A	86. D
12. D	37. A	62. C	87. A
13. C	38. D	63. C	88. B
14. A	39. B	64. A	89. B
15. A	40. C	65. A	90. C
16. C	41. C	66. C	91. C
17. B	42. B	67. C	92. B
18. D	43. D	68. B	93. C
19. C	44. A	69. D	94. D
20. D	45. D	70. A	95. B
21. D	46. C	71. B <i>BLC ACCEPTED 7/19/12</i>	96. A
22. B	47. B	72. B	97. C
23. B	48. D	73. C	98. C
24. D	49. C	74. D	99. D
25. A	50. A	75. A	100. A

CPNPP NRC 2012 SRO Written Exam Reference List

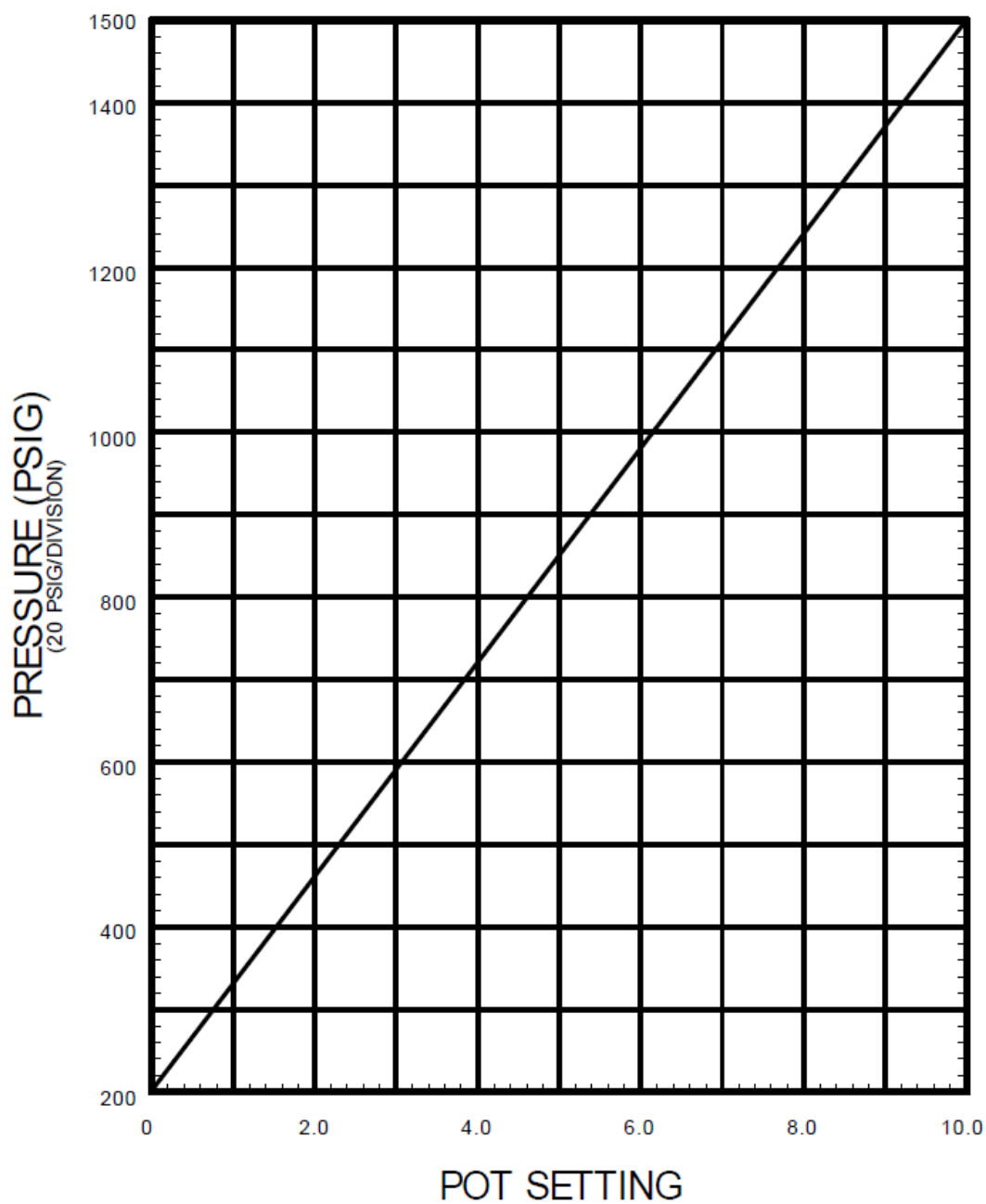
1. IPO-003B, Power Operations, Power Change Thumb Rules
2. TDM-501A, Steam Generator Feedwater Controller Data
3. ECA-1.1B, Loss of Emergency Coolant Recirculation, Attachment 5, Minimum Required ECCS Flow
4. TRM 13.10.31, Explosive Gas Monitoring Instrumentation
5. NRC Generic Fundamentals Equation Sheet
6. Steam Tables

IPO-003B, Power Operations, Power Change Thumb Rules

4.2.10 Power Change Thumb rules (should NOT be used in place of an actual calculation, but may be used as a check to ensure calculations are reasonable).

- Power Defect 15 pcm/%
- Rod Worth 3 pcm/step
- Boron Worth 8 pcm/ppm
- Boration 10 gallons/ppm

TDM-501A, Steam Generator Feedwater Controller Data



Parameter Indicator: 1-PI-507, MS HDR PRESS
Indicator Range: 200-1500 psig

REMARKS

ECA-1.1B, Loss of Emergency Coolant Recirculation
Attachment 5, Minimum Required ECCS Flow

ATTACHMENT 5

PAGE 1 OF 1

MINIMUM REQUIRED ECCS FLOW

TIME AFTER REACTOR TRIP (MINUTES)	MINIMUM REQUIRED ECCS FLOW (GPM)
10	620
20	525
30	470
60	380
90	340
120 (2 HOURS)	315
240 (4 HOURS)	255
360 (6 HOURS)	230
480 (8 HOURS)	210
720 (12 HOURS)	190
1440 (1 DAY)	155
2160 (1 DAY 12 HOURS)	140
2880 (2 DAYS)	130
4320 (3 DAYS)	115
10080 (7 DAYS)	90

TRM 13.10.31, Explosive Gas Monitoring Instrumentation

Explosive Gas Monitoring Instrumentation
TR 13.10.31

13.10 EXPLOSIVE GAS AND STORAGE TANK RADIOACTIVITY MONITORING PROGRAM

TR 13.10.31 Explosive Gas Monitoring Instrumentation

TR LCO 13.10.31 Pursuant to **Technical Specification 5.5.12a**, the explosive gas monitoring instrumentation channels shown in **Table 13.10.31-1** shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits specified in **TR 13.10.34** are not exceeded.

APPLICABILITY: During Waste Gas Holdup System operation on the inservice recombiner.

ACTIONS

- NOTE -

Separate Condition entry is allowed for each recombiner.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. An explosive gas monitoring instrumentation channel Alarm/Trip Setpoint less conservative than required.	A.1 Declare channel inoperable.	Immediately
B. Any required channel inoperable.	B.1 Restore the inoperable channel to OPERABLE status.	30 days
C. No inlet oxygen monitor channel OPERABLE on the inservice recombiner.	C.1 Verify the associated inlet hydrogen monitor(s) OPERABLE.	Immediately

TRM 13.10.31, Explosive Gas Monitoring Instrumentation

Explosive Gas Monitoring Instrumentation
TR 13.10.31

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. No outlet oxygen monitor channel OPERABLE on the inservice recombiner.	D.1 Suspend operation of the Waste Gas Holdup System. <u>OR</u> D.2 Take and analyze grab samples while maintaining oxygen < 1% by volume.	Immediately Once per 24 hours
E. Less than the required hydrogen monitor Channels OPERABLE on the inservice recombiner. <u>OR</u> No inlet oxygen monitor channel and no outlet oxygen monitor channel OPERABLE on the inservice recombiner. <u>OR</u> No inlet oxygen monitor channel and no inlet hydrogen monitor channel OPERABLE on the inservice recombiner.	E.1 Suspend oxygen supply to the affected recombiner(s). <u>AND</u> E.2.1 Suspend addition of waste gas to the system. <u>OR</u> E.2.2 Take and analyze grab samples while maintaining oxygen < 1% by volume.	Immediately Immediately Once per 4 hours during degassing <u>OR</u> Once per 24 hours during other operations

TRM 13.10.31, Explosive Gas Monitoring Instrumentation

Explosive Gas Monitoring Instrumentation

TR 13.10.31

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TRS 13.10.31.1 Perform a CHANNEL CHECK of each explosive gas monitoring instrumentation channel shown in Table 13.10.31-1 .	Once per 24 hours during Waste Gas Holdup System operation <u>AND</u> Once per 24 hours prior to Waste Gas Holdup System operation.
TRS 13.10.31.2 Perform a CHANNEL OPERATIONAL TEST of each explosive gas monitoring instrumentation channel shown in Table 13.10.31-1 .	31 days
TRS 13.10.31.3 Perform a CHANNEL CALIBRATION of each explosive gas monitoring instrumentation channel shown in Table 13.10.31-1 . This shall include the use of standard gas samples in accordance with the manufacturer's recommendations.	92 days

GENERIC FUNDAMENTALS EXAMINATION
EQUATIONS AND CONVERSIONS HANDOUT SHEET

EQUATIONS

$$\dot{Q} = \dot{m} c_p \Delta T$$

$$\dot{Q} = \dot{m} \Delta h$$

$$\dot{Q} = UA \Delta T$$

$$\dot{Q} \propto \dot{m}_{\text{Nat Circ}}^3$$

$$\Delta T \propto \dot{m}_{\text{Nat Circ}}^2$$

$$K_{\text{eff}} = 1/(1 - \rho)$$

$$\rho = (K_{\text{eff}} - 1)/K_{\text{eff}}$$

$$\text{SUR} = 26.06/\tau$$

$$\tau = \frac{\bar{\beta}_{\text{eff}} - \rho}{\lambda_{\text{eff}} \rho}$$

$$\rho = \frac{\ell^*}{\tau} + \frac{\bar{\beta}_{\text{eff}}}{1 + \lambda_{\text{eff}} \tau}$$

$$\ell^* = 1 \times 10^{-4} \text{ sec}$$

$$\lambda_{\text{eff}} = 0.1 \text{ sec}^{-1} \text{ (for small positive } \rho \text{)}$$

$$\text{DRW} \propto \phi_{\text{tip}}^2 / \phi_{\text{avg}}^2$$

$$P = P_o 10^{\text{SUR}(\tau)}$$

$$P = P_o e^{(t/\tau)}$$

$$A = A_o e^{-\lambda t}$$

$$CR_{S/D} = S/(1 - K_{\text{eff}})$$

$$CR_1(1 - K_{\text{eff}1}) = CR_2(1 - K_{\text{eff}2})$$

$$1/M = CR_1/CR_X$$

$$A = \pi r^2$$

$$F = PA$$

$$\dot{m} = \rho A \bar{v}$$

$$\dot{W}_{\text{pump}} = \dot{m} \Delta P v$$

$$E = IR$$

$$\text{Thermal Efficiency} = \text{Net Work Out/Energy In}$$

$$\frac{g(z_2 - z_1)}{g_c} + \frac{(\bar{v}_2^2 - \bar{v}_1^2)}{2g_c} + v(P_2 - P_1) + (u_2 - u_1) + (q - w) = 0$$

$$g_c = 32.2 \text{ lbm-ft/lbf-sec}^2$$

CONVERSIONS

$$1 \text{ Mw} = 3.41 \times 10^6 \text{ Btu/hr}$$

$$1 \text{ hp} = 2.54 \times 10^3 \text{ Btu/hr}$$

$$1 \text{ Btu} = 778 \text{ ft-lbf}$$

$$^{\circ}\text{C} = (5/9)(^{\circ}\text{F} - 32)$$

$$^{\circ}\text{F} = (9/5)(^{\circ}\text{C}) + 32$$

$$1 \text{ Curie} = 3.7 \times 10^{10} \text{ dps}$$

$$1 \text{ kg} = 2.21 \text{ lbm}$$

$$1 \text{ gal}_{\text{water}} = 8.35 \text{ lbm}$$

$$1 \text{ ft}^3_{\text{water}} = 7.48 \text{ gal}$$