

Final Submittal
(Blue Paper)

FINAL RO
WRITTEN EXAMINATION
AND REFERENCES

Question 1

Unit 1 conditions are as follows:

RX Power is 50% and stable

- PZR Pressure is 2100 psig and decreasing
- B/U Heaters are in auto and energized

Which ONE of the following correctly describes the instrument failure that would cause the plant conditions stated above?

- A PT-444 has failed high causing PORV-1456 to open
- B PT-445 has failed high causing PORV-1455C to open
- C PT-445 has failed high causing PORV-1456 to open
- D PT-444 has failed high causing PORV-1455C to open

Question 2

Given the following plant conditions:

- A large break LOCA has occurred on Unit 1.
- The crew has transitioned to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, and has completed the procedure through Step 6.
- The operators have progressed in ES-1.3 to the point where SI suction has been aligned to the Containment Recirc. Sump.

Both LHSI pumps were running when the following indications were noted:

- Amps are oscillating on 1-SI-P-1A
- SI flow is abnormally low and oscillating on 1-SI-P-1A
- Flow and amp indications are normal on 1-SI-P-1B

Which ONE of the following correctly describes the reason for the abnormal SI pump indications and the initial actions the crew should take?

- A Both Recirculation Sumps are blocked.
Place both LHSI pumps in Pull-to-Lock and continue performing the remaining steps of ES-1.3.
- B Only the 'A' LHSI pump suction is blocked.
Perform Attachment 1, Containment Sump Screen Blockage, of ES-1.3 and stop 1-SI-P-1A.
- C Only the 'A' LHSI pump suction is blocked.
Transition to 1-ECA-1.1, "Loss of Emergency Coolant Recirculation," and makeup to the RWST per 1-OP-CS-004.
- D Both Recirculation Sumps are blocked.
Place both LHSI pumps in Pull-to-Lock and transition to 1-ECA-1.1, "Loss of Emergency Coolant Recirculation."

Question 3

Given the following plant conditions:

Unit 1 has just tripped.

Breakers 15A1, 15B1, and 15C1, Transfer Bus to SS Bus Supply Breakers, are closed.

Unit 2 is in Intermediate Shutdown and due to electrical problems, 25A1 and 25B1, Transfer Bus to SS Bus Supply Breakers, are open.

Breaker 25C1, Transfer Bus to SS Bus Supply Breaker, is closed.

Which ONE of the following describes the effect this electrical lineup has on Station equipment?

- A ✓ All SS buses on both Units will experience a load shed signal.
- B Only "C" SS buses on both Units will experience a load shed signal.
- C #2 and #3 EDGs will start and load on the respective 2H and 2J buses.
- D Component Cooling Water Pump, 1-CC-P-1A will receive an auto-start inhibit signal.

Question 4

Given the following plant conditions:

- Unit 1 is operating at 100%
- Letdown flow, CH-FI-1150, is oscillating
- "CHG PP TO REGEN HX HI-LO FLOW" is in alarm

Which ONE of the following describes a cause of the indications above?

- A 1-CH-PCV-1145, Letdown Pressure Control Valve, was closed.
- B 1-CC-TCV-103, NRHX Temperature Control Valve, was opened.
- C The Regenerative Heat Exchanger developed a tube leak.
- D 1-CH-FCV-1122, Charging Line Flow Control Valve, was closed.

Question 5

Given the following plant conditions:

- A loss of all AC power occurred
- Offsite power was restored after 10 minutes
- The actions of ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, are being performed to start a CC Pump

Why are 1-CC-TV-140A and B, RCP Thermal Barrier CC Return Trip Valves verified closed prior to restarting the CC Pump?

- A Protect CC availability by precluding steam formation in the CC piping.
- B Reduce CC heat loads to the minimum based on SW loads.
- C Prevent damage to the RCP bearings due to excessive cooldown rate.
- D Maximize flow to the CVCS components for reestablishing charging, letdown and seal return.

Question 6

Unit 1 conditions are as follows:

- Reactor Power is 100%
- Pressurizer Pressure control is in automatic

Which one of the following correctly describes the immediate response of the pressure control system if the master pressure controller SETPOINT fails high?

- A Both spray valves close and proportional heaters go to maximum output
- B Both spray valves close and only back-up heaters remain energized
- C Both spray valves open and proportional heaters go to minimum output
- D Both spray valves open and proportional and backup heaters de-energize

Question 7

Unit 1 conditions are as follows:

- An ATWS is in progress
- The reactor is NOT tripped
- The Turbine Generator is tripped
- RCS Pressure is 2335 PSI and rising
- Rods are automatically stepping in at 45 steps per/min
- All S/G levels are 10% NR and decreasing
- "A" MDAFW Pump is providing a total AFW Flow of 300 GPM

The crew has just transitioned from E-0 to FR-S.1.

Which ONE of the following correctly describes the IMMEDIATE action required per 1-FR-S.1 based on plant conditions and the reason for performing the action?

- A Open at least one PORV and Block Valve to maintain RCS Pressure to less than 2335 psi.
- B Start all available AFW Pumps to increase AFW Flow to at least 700 GPM to ensure secondary heat sink.
- C Initiate Emergency Boration to add additional negative reactivity.
- D Manually insert control rods to maximize reactivity insertion.

Question 8

A SGTR has occurred on Unit 1.

Current conditions are:

- RCS pressure 1350 psig
- RCS temperature (CETCs) 542 °F
- SG pressures 1000 psig (A) 1060 psig (B) 960 psig (C)
- SG 1B has been confirmed as the ruptured SG

While performing the steps of 1-E-3, "Steam Generator Tube Rupture", the Unit Supervisor found ALL available copies of the procedure had an illegible page. This page contained the required temperatures for determining RCS cooldown temperatures.

The Unit Supervisor directs you to use the steam tables to CALCULATE the required RCS (core exit) temperature with an allowance of 50 °F for subcooling.

The required core exit temperature after the RCS cooldown is...

(Steam Tables provided)

- A 492 °F
- B 500 °F
- C 503 °F
- D 553 °F

Question 9

Given the following plant conditions exist on Unit 1:

- Unit 1 is at 20% power.
- A faulted steam generator has occurred.
- RCS hot leg temperatures: 547F (A), 544F (B), 545F (C).
- RCS cold leg temperatures: 545F (A), 530F (B), 543F (C).
- S/G pressures: 520 psig (A), 515 psig (B), 530 psig (C).
- Steam line flow is 2.2 x 10E6 lbm/hr of rated on A & B S/Gs.
- Steam line flow is 1.0 x 10E6 lbm/hr of rated on C S/G.
- Containment pressure (Channel): 8 psig (1), 7.5 psig (2), 7.5 psig (3), 8 psig (4).

For the given plant conditions, which ONE of the following correctly describes whether or not a Main Steam Line Isolation (MSLI) should or should not have occurred and the reason?

- A A MSLI should NOT have occurred because two S/Gs have pressures above the isolation setpoint and only one indicates high steam flow.
- B A MSLI should have occurred because of high steam line flow coincident with low loop average temperatures.
- C A MSLI should NOT have occurred because Containment pressure is below the required setpoint to receive a MSLI signal.
- D A MSLI should have occurred because of high steam line flow coincident with low steam line pressures.

Question 10

Given the following plant conditions:

- Unit 1 has experienced a loss of all feed condition
- The SRO has entered into 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK and directed the Reactor Operator to trip all RCPs
- RCS hot leg temperatures are 570 °F
- CETCs are 575 °F and slowly DECREASING
- All three (3) S/Gs are reading approximately 5% Wide Range level
- RCS Bleed and Feed is in progress

Several minutes later the auxiliary operator reports that an AFW pump is available.

When recovering feed for these conditions, which ONE of the following statements correctly describes how feed must be aligned per 1-FR-H.1 and the reason?

- A Feed ONE S/G at the maximum flow rate possible in order to re-establish a heat sink as soon as possible.
- B Feed ONE S/G at the minimum verifiable flow rate possible in order to minimize thermal stresses applied to SG U-tubes.
- C Feed ALL S/Gs at the maximum flow rate possible in order to re-establish a heat sink as soon as possible.
- D Feed ALL S/Gs at the minimum verifiable flow rate possible in order to minimize thermal stresses applied to SG U-tubes.

Question 11

Given the following plant conditions:

- Unit 1 experienced a loss of all AC power at 09:38
- The total amount of DC loads on the Station battery at this time is 225 amps

Assuming DC loading does not change, which ONE of the following is the LATEST calculated time before AC power must be restored to ensure that the Station Batteries do not become COMPLETELY discharged?

- A 10:38
- B 13:38
- C 15:38
- D 17:38

Question 12

Plant conditions are as follows:

- #3 diesel generator is running and independently supplying the emergency bus @ 60 hertz.
- Governor Speed Droop is set to the scribe mark.

Which ONE of the following correctly describes the response of the EDG frequency to changes in load?

- A As additional load is placed on the bus, frequency will lower slightly but will be restored to 60 hertz by the automatic governor control system.
- B As additional load is placed on the bus; frequency will rise and stabilize at a value higher than 60 hertz.
- C As additional load is placed on the bus; frequency will lower and stabilize at a value lower than 60 hertz.
- D There will be no effect since this setting only has an effect on the diesel operating characteristics when it is operating in parallel with another source.

Question 13

Given the following plant conditions:

- Unit 1 shutdown 72 hrs earlier and is in an Intermediate Shutdown condition.
- RCS Temperature is 310 °F.
- 'A' Train of RHR is in service.
- A loss of Vital Bus III/IIIA has occurred.

Which ONE of the following correctly describes:

- (1) The effect of the loss of Vital Bus III/IIIA on 1-RH-FCV-1758 (RHR HX Control Valve) and
- (2) The subsequent impact, if any, on CC flow thru the RHR Heat Exchangers.

- A (1) 1-RH-FCV-1758 fails closed.
(2) Component Cooling flow to the RHR Heat Exchangers decreases.
- B (1) 1-RH-FCV-1758 fails open.
(2) Component Cooling flow to the RHR Heat Exchangers remains the same.
- C (1) 1-RH-FCV-1758 fails closed.
(2) Component Cooling flow to the RHR Heat Exchangers remains the same.
- D (1) 1-RH-FCV-1758 fails open.
(2) Component Cooling flow to the RHR Heat Exchangers decreases.

Unit 1 was operating at 100% power when a loss of all Circulating Water pumps occurred.

Which ONE of the following is (1) the canal level setpoint requiring turbine trip and (2) the associated automatic actuations that occur at this level?

- A (1) 17.2 feet, (2) SW flow to the Bearing Cooling and the Component Cooling Heat Exchangers is automatically isolated.
- B (1) 23.5 feet, (2) SW flow to the Recirculation Service Water Heat Exchangers is automatically isolated.
- C (1) 23.5 feet, (2) SW flow to the Bearing Cooling and the Component Cooling Heat Exchangers is automatically isolated.
- D (1) 17.2 feet, (2) SW flow to the Recirculation Service Water Heat Exchangers is automatically isolated.

Question 15

Unit 1 is operating at 50% after a shutdown for maintenance.

Containment Instrument Air header is 70psi and decreasing.

Which ONE of the following correctly describes the current status of air supply to the PZR PORV's and Letdown isolation valves?

- A PZR PORV's are supplied from instrument air header
Letdown isolation valves air pressure is above minimum to keep valves fully open
- B PZR PORV's are supplied from compressed air back-up
Letdown isolation valves air pressure is below minimum to keep valves fully open
- C PZR PORV's are supplied from compressed air back-up
Letdown isolation valves air pressure is above minimum to keep valves fully open
- D PZR PORV's are supplied from instrument air header
Letdown isolation valves air pressure is below minimum to keep valves fully open

Question 16

Given the following plant conditions:

- Unit 1 has tripped due to lowering Pressurizer level.

The SRO is performing Step 12 (Check RCS – Has been maintained intact outside of containment) of 1-E-0, REACTOR TRIP OR SAFETY INJECTION.

Which ONE of the following valid sets of indication/alarms REQUIRES transition to 1-ECA-1.2, LOCA OUTSIDE CONTAINMENT, per 1-E-0?

- A 0-RM-A2, UNIT 1 MN STM ABC RAD MON ALERT
VSP-F4, AUX BLDG SUMP HI LEVEL
- B 0-RMA-D6, VENT STACK #2 PART ALERT/HI
1-ACB-C4, LOW COND SUMP A LEVEL HI-HI/LO-LO
- C 0-RM-A2, UNIT 1 MN STM ABC RAD MON ALERT
1-ACB-C4, LOW COND SUMP A LEVEL HI-HI/LO-LO
- D 0-RMA-D6, VENT STACK #2 PART ALERT/HI
VSP-F4, AUX BLDG SUMP HI LEVEL

Question 17

Unit 1 was at 100% power when all steam generators faulted outside containment.

The crew is performing 1-ECA-2.1, Uncontrolled Depressurization of all SG's.

- RCS Temperature is 450 degrees F and decreasing slowly
- RCS pressure is 1550 psig and decreasing slowly
- Two charging pumps are running and aligned to the RCS
- All main steam trip valves and main steam trip bypass valves are closed
- All SG pressures are 215 psig and decreasing
- All SG levels are 20% WR and decreasing
- Total auxiliary feedwater flow is 700 gpm

Which ONE of the following correctly describes how heat removal from the RCS must be accomplished per 1-ECA-2.1 for the given plant conditions?

- A RCS forced circulation and dumping steam from S/G's
- B RCS natural circulation and dumping steam from S/G's
- C RCS forced circulation and RCS "Feed and Bleed"
- D RCS natural circulation and RCS "Feed and Bleed"

Question 18

Given the following plant conditions:

- Unit 1 experienced a Reactor Trip.
- E-0, "Reactor Trip or Safety Injection," was completed and the team transitioned to ES-0.1, Reactor Trip Response."
- Subsequently all AFW pumps were lost and the team entered FR-H.1, "Response to a Loss of Secondary Heat Sink."
- The operators desire to start a MFW pump and use the MFRV bypass valves to control feed flow to the SG.
- Annunciator A-F-3, SI INITIATED TRAIN A is NOT LIT.
- Annunciator A-F-4, SI INITIATED TRAIN B is LIT.

Which ONE of the following correctly describes the MINIMUM actions necessary to start a Main Feed Pump and open the MFRV bypass valves?

- A Reset the B train SI Signal from the MCR only.
- B Reset the B train SI signal from the MCR first and then depress the FW Isolation Reset pushbuttons.
- C Locally block or clear the B train SI signal only.
- D Locally block or clear the B train SI signal first and then reset the B train SI signal from the MCR.

Question 19

Unit one reactor power is at 85% and stable

Control rods are in automatic

A failure results in the following alarms actuating:

- H-A-4 Tave/Tref Deviation
- H-C-4 Low Tave to FW Cont

Loop Tave indications are 569 °F

Which ONE of the following correctly describes how control rods will initially respond with no operator action?

- A Rods step in at 8 SPM
- B Rods step out at 40 SPM
- C Rods step out at 72 SPM
- D Rods do not move

Question 20

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- One Bank "A" Rod has dropped into the core.
- At the same time as the initial rod drop occurred, another Bank "A" Rod is noticed to be moving erratically into the core (Moving several steps, then stopping, then moving several more steps)
- 1E-E3, DELTA FLUX DEVIATION is in alarm.

Which ONE of the following actions is procedurally required to be taken?

- A Trip the reactor.
- B Reduce Reactor Power to between 70% - 74%.
- C Initiate boration to reduce power to < 90% rated with no rod movement.
- D Place the ROD CNTRL MODE SEL switch to the MAN position. Power reduction is not required.

Question 21

Unit 1 started a plant shutdown from 100% power with all control rods fully withdrawn.

The following conditions currently exist:

- The plant is at 80% power ramping down at 155 mw/hr
- Bank D rod position indication is 190 steps withdrawn
- Upper Ion Chamber Deviation is alarming
- Lower Ion Chamber Deviation is normal
- NIS PR Channel Average Flux Deviation is normal

Which ONE of the following correctly describes the cause of the given indications?

- A One Bank D rod has fallen to the bottom of the core
- B One Bank D rod is stuck at the fully withdrawn position
- C Loss of High Voltage power supply to a PR Channel
- D Summing and level amplifier failure for one PR Channel

Question 22

Given the following plant conditions:

- Unit 1 is in a Refueling Shutdown condition
- There are 35 individuals in containment performing various maintenance activities
- A valid HIGH level alarm is received on 1-RM-RMS-162, Manipulator Crane Area radiation monitor
- Containment Purge is in operation
- No fuel movements are currently in progress

Which ONE of the following actions is required IAW 1-RM-K8, "1-RM-RI-162 HIGH" alarm response procedure?

- A Verify containment iodine filtration fans are secured.
- B Verify containment air recirc fans are secured.
- C Verify containment instrument air suction fans have automatically realigned.
- D Initiate 0-AP-22.00, FUEL HANDLING ABNORMAL CONDITIONS.

Question 23

Given the following plant conditions:

- Unit 1 was at 100% power.
- Noxious fumes forced the evacuation of the control room.
- 0-AP-20.00, Main Control Room Inaccessibility was entered.

Which ONE of the following identifies the MINIMUM required manipulation(s) to transfer "A" charging pump control and charging flow control to the Auxiliary Shutdown Panel?

- A Place "H" Group Transfer Switch to "LOCAL."
- B Place "J" Group Transfer Switch to "LOCAL."
- C Place "J" Group Transfer Switches to "LOCAL" and the switches for half station & Manual/Auto controller 1-CH-FCV-1122 to "LOCAL."
- D Place "H" Group Transfer Switch to "LOCAL" and the switch for half station controller 1-CH-FCV-1122 to "LOCAL."

Question 24

Given the following plant conditions:

- Unit 1 is @ 100% power
- All systems are in a NORMAL lineup
- A ramp to 75% is in progress to perform turbine valve testing
- Annunciator 1-RM-E7, RC LDN HIGH ALERT/FAILURE, is in alarm

Which ONE of the following correctly describes (1) the action required IAW 1-RM-E7 to minimize the consequences of this event and (2) the reason for the action?

- A (1) Ensure excess letdown is removed from service.
(2) To minimize Auxiliary Building radiation
- B (1) Place excess letdown in service and verify aligned to the excess letdown filter.
(2) To provide additional cleanup via excess letdown system filtration.
- C (1) Remove normal letdown from service.
(2) To minimize Auxiliary Building radiation.
- D (1) Ensure normal letdown is in service aligned to the IX train.
(2) To provide cleanup via normal letdown system filtration.

Question 25

Plant conditions are as follows:

- Unit 1 operators are performing FR-H.2 "Response to S/G Overpressure"
- "A" S/G pressure is 1145 psig and stable
- "A" S/G narrow range level is 50% and rising
- RCS Hot temperatures are 545 degrees F and stable
- All three RCPs are running
- Attempts to dump steam from "A" SG were unsuccessful

Which ONE of the following correctly describes the required actions based on plant conditions?

- A Isolate AFW flow to the "A" SG and reduce "A" SG pressure using the S/G blowdown system
- B Increase AFW flow to the "A" SG and dump steam from the unaffected SG's to reduce RCS temperature
- C Isolate AFW flow to the "A" SG and dump steam from the unaffected SG's to reduce RC temperature
- D Increase AFW flow to the "A" SG and reduce "A" SG pressure using the S/G blowdown system

Question 26

Given the following plant conditions:

- @ 10:00 AM Unit 1 experienced a LOCA that resulted in significant core damage.
- @ 11:20 AM Peak Containment Pressure is observed at 6.2 psig.
- @ 11:30 AM Peak Containment Radiation level s observed at 110,000 R/hr.
- @ 11:35 AM (Current time) Containment radiation level is 90,000 R/hr, Containment pressure is 5.0 psig. Both are slowly lowering.

Which ONE of the following correctly describes whether or not the crew must use Adverse Values when implementing the EOPs and the reason?

- A Adverse values MUST still be used.
Adverse containment conditions now exist due to the current containment pressure.
- B Adverse values MUST still be used.
Adverse containment radiation values previously existed.
- C Adverse values are NO longer required to be used.
Adverse containment conditions no longer exist due to the current containment radiation dose rate
- D Adverse values are NO longer required to be used.
Adverse containment conditions no longer exist due to current containment pressure.

Question 27

Given the following plant conditions:

- A Small Break LOCA has occurred on Unit 1
- RCS pressure is 1100 psig and slowly lowering
- The crew is performing the actions of ES-1.2, Post LOCA Cooldown and Depressurization
- The crew was depressurizing the RCS per step 14 of ES-1.2
- Pressurizer level was 36% and slowly increasing

The depressurization was stopped and the team continued in ES-1.2 to isolate HHSI flow and align normal charging.

- Both LHSI pumps have been stopped
- Both 1-CH-P-1A and 1-CH-P-1B have been stopped
- Normal charging is aligned to the charging header via 1-CH-P-1C

When the team begins Step 25, VERIFY SI FLOW NOT REQUIRED, the following conditions are noted:

- RCS subcooling is 35°F and trending DOWN
- 1C-D8, PRZR LO LVL annunciator is lit after charging flow was maximized

Based on these indications which ONE of the following actions is required IAW ES-1.2?

- A Re-initiate SI by using the manual SI pushbuttons.
- B Start 1-CH-P-1B and leave normal charging aligned to the charging header.
- C Manually start the charging pumps and align HHSI to the cold legs.
- D Manually start the LHSI pumps and align LHSI to the cold legs.

Question 28

An RCP breaker failed to close while starting an RCP. The following conditions were noted during the investigation into the problem:

- Hot Leg Loop Isolation Valve Open
- Cold Leg Loop Isolation Valve Open
- Bearing Lift Pump Running with a discharge pressure of 400 psig
- 4160V busses energized

Which ONE of the following is the cause of the RCP motor breaker failing to close?

- A A failure of the RCP speed sensing relay
- B Loop Bypass Line Isolation Valve Limit Switch indicating open
- C RCP motor stator temperature element failed high
- D RCP oil reservoir low level

Question 29

Unit 1 is in a refueling outage preparing to move fuel.

Unit 1 RWST level is at 3% following a maintenance inspection of the tank.

Unit 1 Cavity level is decreasing at a rate of $\frac{1}{4}$ inch per minute.

Unit 2 is at 100%

Which ONE of the following correctly identifies the source of makeup water to the Unit 1 refueling cavity IAW 1-AP-22.01 "Loss of Refueling Cavity Level"?

- A Unit 1 LHSI from Unit 2 RWST
- B Unit 1 HHSI from Unit 1 VCT
- C Unit 1 HHSI from Unit 2 RWST
- D Unit 1 LHSI from Unit 1 VCT

Question 30

Which ONE of the following correctly describes the effect of de-energizing Bus 1J1 on (1) the RHR suction and discharge valves and (2) the effect this would have on placing the RHR system in service?

- A (1) ONLY 1-RH-MOV-1701, RHR Suction Isolation would be de-energized.
(2) ONLY the ability to remotely establish an RHR suction path is lost.
- B (1) ONLY 1-RH-MOV-1720B, RHR Discharge Isolation, would be de-energized.
(2) ONLY the ability to remotely establish an RHR discharge path is lost.
- C (1) 1-RH-MOV-1701, RHR Suction Isolation, AND 1-RH-MOV-1720B, RHR Discharge Isolation, would be de-energized.
(2) ONLY the ability to remotely establish an RHR suction path is lost
- D (1) 1-RH-MOV-1701, RHR Suction Isolation, AND 1-RH-MOV-1720B, RHR Discharge Isolation, would be de-energized.
(2) ONLY the ability to remotely establish an RHR discharge path is lost.

Question 31

Which ONE of the following identifies the time requirement and basis for manually securing one of two running Low Head Safety Injection pumps if RCS pressure is greater than 185 psig?

- A 60 minutes, prevent overheating of a LHSI pump running at shutoff head
- B 30 minutes, prevent overheating of a LHSI pump running at shutoff head
- C 30 minutes, prevent long term vibration induced fatigue failure of recirc piping
- D 60 minutes, prevent long term vibration induced fatigue failure of recirc piping

Question 32

Which ONE of the following correctly describes the condition that will directly cause an automatic closure of the letdown orifice isolation valves (HCV-1200 A, B, C)?

- A Letdown high flow signal
- B No charging pumps running
- C High VCT level
- D Low VCT level

Question 33

Unit 1 is operating at 100% power and all systems are in their NORMAL configuration.

CC discharge header radiation monitor and CC surge tank levels are steadily rising.

Which ONE of the following components, if leaking, can cause an automatic valve closure due to increased component cooling water flow?

- A RCP Thermal Barrier
- B Primary Sample Cooler
- C Excess Letdown Heat Exchanger
- D Non-regenerative Heat Exchanger

Question 34

Given the following plant conditions for Unit 1:

- Reactor Power - 100%
- A 20% power reduction is required for emergent maintenance
- Boration is initiated to allow for the power reduction with NO rod movement

As the down power is initiated the PRZR Pressure Master Controller OUTPUT sticks at 30% with no further operator actions taken during the down power

Which ONE of the following correctly describes (1) how PRZR pressure during a down power with the master pressure controller malfunction compares to PRZR pressure during a down power without the master pressure controller malfunction and (2) the reason for this difference?

- A (1) PRZR pressure will be LOWER with the master pressure controller malfunction.
- (2) As Tave decreases during the power reduction, pressurizer pressure will decrease and pressurizer heaters will not energize to compensate.
- B (1) PRZR pressure would be HIGHER during the power reduction with the master pressure controller malfunction.
- (2) As Tave increases during the power reduction, pressurizer pressure will increase and the spray valves will not open to compensate.
- C (1) PRZR pressure would be HIGHER during the power reduction with the master pressure controller malfunction.
- (2) As pressurizer level increases during the power reduction, the pressurizer level control valve will not compensate and pressurizer pressure will increase.
- D (1) PRZR pressure will be LOWER during the power reduction with the master pressure controller malfunction.
- (2) As pressurizer level decreases during the power reduction, the pressurizer level control valve will not compensate and pressurizer pressure will decrease.

Question 35

Unit 1 is at 100% power

- Reactor Trip Breaker "A" (RTA) is racked to TEST for maintenance and closed
- Reactor Trip Bypass Breaker "A" (BYA) is racked in and closed

A Reactor trip signal for channel "A" RPS is received

Which ONE of the following correctly describes the operation of the Reactor trip and bypass breakers with the plant conditions given?

- A Reactor Trip Breaker "B" trips open and Reactor Trip Bypass Breaker "A" trips open
- B Reactor Trip Breaker "A" trips open and Reactor Trip Bypass Breaker "A" trips open
- C Only Reactor Trip Bypass Breaker "A" trips open
- D Only Reactor Trip Breaker "A" trips open

Question 36

Unit 1 is at 90% power and ramping down due to excessive temperatures on the "A" DC bus. During the shutdown a short caused the "A" DC bus to de-energize and "F" Transfer Bus feeder to open.

Prior to any operator action, which ONE of the following correctly describes the status of the power supplies for the "A" train SI components?

- A #1 EDG requires manual starting. Local manual breaker operation is required to provide power to "A" train SI components.
- B #1 EDG is running with it's output breaker open. "A" train SI components have power available from Reserve Station Service Transformers.
- C #1 EDG is running with it's output breaker open. Local manual breaker operation is required to energize "A" train SI components.
- D #1 EDG requires manual starting. "A" train SI components have power available from Reserve Station Service Transformers.

Question 37

Given the following plant conditions:

- Reactor Startup is in progress below the ECP
- Control Bank "C" is at 35 steps withdrawn
- Reactor Coolant System pressure is 2235 psig and stable
- Tavg is 547 °F and stable
- "A" Reactor Coolant Pump trips and the operator closes 1-RC-PCV-1455A, 'A' Spray Valve

Which ONE of the following correctly describes the effect on the plant after the operator closes the 'A' spray valve?

- A Automatic reactor trip
- B Tavg will decrease
- C Pressurizer level will increase
- D RCS pressure will increase

Question 38

Which ONE of the following correctly describes the components isolated by placing stop logs in the Unit 1 D high level screenwell?

- A One flow path to Unit 1 component cooling heat exchangers
One flow path to both units' charging pump service water
- B One flow path to Unit 1 component cooling heat exchangers
One flow path to Unit 1 recirc spray heat exchangers
- C One flow path to Unit 1 bearing cooling heat exchangers
One flow path to both units' charging pump service water
- D One flow path to Unit 1 bearing cooling heat exchangers
One flow path to Unit 1 recirc spray heat exchangers

Question 39

Unit 2 is at 100 % power

Due to corrective maintenance on both Service Air Compressors, Unit 2 TB instrument air compressor (2-IA-C-1) is running in auto and maintaining normal air pressure.

A Loss of off-site power and a Unit 1 SI have occurred.

Which ONE of the following correctly describes the power source and status of the Unit 2 TB instrument air compressor (2-IA-C-1) for the plant conditions given above?

- A 2J Bus is de-energized
Compressor is not running
- B 2H Bus is energized from #2 EDG
Compressor is running in auto
- C 2H Bus is de-energized
Compressor is not running
- D 2J Bus is energized from #3 EDG
Compressor is running in auto

Question 40

Which ONE of the following conditions is a loss of containment integrity as defined in Technical Specifications?

- A The leakage rate of a containment penetration exceeds the limits of Technical Specifications during COLD SHUTDOWN.
- B Missile shield blocks for the equipment hatch were improperly installed and did not meet seismic requirements during HOT SHUTDOWN.
- C The fuel transfer tube blind flange is not installed with the fuel building transfer tube valve shut while in INTERMEDIATE SHUTDOWN.
- D An inner airlock door seal is leaking and the outer door is opened for an annual cumulative time of 10 minutes to allow access for repairs during POWER OPERATION.

Question 41

Which ONE of the following correctly describes the AUTOMATIC actions that occur when a HIGH alarm is received on Condenser Air Ejector Radiation Monitor, RM-SV-111?

- A CLOSSES SV-TV-102 (Air Ejector Containment Isolation TV) and OPENS SV-TV-103 (Air Ejector Atmospheric Vent Isolation Valve).
- B OPENS SV-TV-102 (Air Ejector Containment Isolation TV) and OPENS SV-TV-103 (Air Ejector Atmospheric Vent Isolation Valve).
- C OPENS SV-TV-102 (Air Ejector Containment Isolation TV) and CLOSSES SV-TV-103 (Air Ejector Atmospheric Vent Isolation Valve).
- D CLOSSES SV-TV-102 (Air Ejector Containment Isolation TV) and CLOSSES SV-TV-103 (Air Ejector Atmospheric Vent Isolation Valve).

Question 42

Unit 1 is operating at 100% power and the following conditions exist in the Unit 1 PRT:

- Temperature - 130°F
- Pressure - 8 psig

Which ONE of the following correctly describes the action required IAW 1-OP-RC-11 (PRT Operations) for the given plant conditions?

- A The PRT must be vented/purged as necessary to decrease pressure
- B The PRT must be sprayed/drained as necessary to decrease pressure
- C The PRT must be vented/purged as necessary to decrease temperature
- D The PRT must be sprayed/drained as necessary to decrease temperature

Question 43

Plant conditions are as follows:

- A Loss of Off-Site Power has occurred
- #1 Emergency Diesel Generator has started but failed to auto load
- It has been determined that the auto-closure circuit for 15H3, #1 EDG Output Breaker, is inoperable and that 15H3 can be manually closed
- When the operator places the sync switch for 15H3 to "ON" he observes 120 volts on the "incoming" meter, 0 volts on the "running" meter, and the synchroscope is stationary at "3-o'clock"

Which ONE of the following correctly describes the actions (if any) required to close 15H3?

- A Raise EDG speed until the synchroscope is turning slowly in the fast direction, then close 15H3 at "11 o'clock".
- B No additional action is necessary. Close 15H3.
- C Momentarily press the "field flash" pushbutton, close 15H3.
- D Raise EDG voltage until the running meter indicates 120 volts, close 15H3.

Question 44

Unit 1 conditions are as follows:

- A normal plant cooldown is in progress
- Residual heat removal cooling is not yet in service
- The component cooling surge tank high-low level annunciator (VSP-D7) is alarming
- The component cooling surge tank level is decreasing slowly

Which ONE of the following conditions would cause the plant indications given above?

- A A tube leak in one of the component cooling heat exchangers
- B A leak in an reactor coolant pump thermal barrier heat exchanger
- C An excessive primary plant cooldown rate
- D A leaking relief valve on the component cooling water surge tank

Question 45

During a Unit 1 SHUTDOWN the following Feedwater System conditions exist:

- "A" MFP is in service.
- The valve line-up configuration in #1 MER is in an at power alignment.
- Feed control is in the process of being transferred from the Feed Reg Valves to the Feed Reg Bypass Valves with the FRV's and bypass valves sharing flow.
- Total feed flow is 3500 gpm.
- "A" Main Feed Recirculation valve is in MANUAL.

INDICATED main feed flow to all S/G's begins increasing without any operator action.

Which ONE of the following correctly describes the cause of the increase in flow for the given plant conditions?

- A Loss of all air to all S/G Feedwater Regulating Valves
- B Loss of all air to all S/G Feedwater Regulating Bypass Valves
- C A MFP discharge flowmeter failing low
- D A MFP discharge flowmeter failing high

Question 46

Both Units are initially at 100% power and containment cooling is aligned to the chilled CC system.

A dual unit manual reactor trip occurs, and both units stabilize at HSD.

Which ONE of the following states the expected response of Unit 1 containment temperature one hour later and why?

- a. Containment temperature is higher due to the loss of the running CC pumps.
- b. Containment temperature is higher due to the loss of the running CD chiller.
- c. Containment temperature is lower due to reduced heat loads in containment.
- d. Containment temperature is lower due to reduced heat loads on the BC system.

Question 47

A Consequence Limiting Safeguards actuation (Hi-Hi CLS) is actuated.

Which ONE of the following Containment Spray System manipulations can be accomplished from benchboard 1-1 in the Control Room without CLS signal being reset?

- A Close MOV-RS-155A, OSRS Pump Suction Isolation Valve.
- B Close MOV-CS-102A, Caustic Additive Tank (CAT) Isolation Valve.
- C Stop Containment Spray Pump 1A.
- D Close MOV-CS-100A, Containment Spray Suction Valve.

Question 48

Which two (2) of the following four (4) conditions are MOST LIKELY to result in water hammer?

1. Overfilling a steam generator (YELLOW path condition for secondary inventory).
2. Rapidly heating up secondary piping using the MS trip valve bypass valves.
3. Reinitiating feedwater to a steam generator shortly after the feeding is uncovered.
4. Throttling the Condensate Pump discharge valve before securing the Condensate Pump.

- A Conditions 3 and 4
- B Conditions 1 and 4
- C Conditions 2 and 3
- D Conditions 1 and 2

Question 49

Which ONE of the following correctly describes the operation of the Main Feed Reg Valve M/A station if power to the controller is lost in the associated instrument rack in the relay room?

- A The M/A station will shift to manual and can be controlled manually from the MCR.
- B The M/A station will not automatically shift and output of the controller will increase to 100% demand.
- C The M/A station will not automatically shift and output of the controller will decrease to 0% demand
- D The M/A station will shift to Auto-Hold and can not be controlled manually from the MCR.

Question 50

Which ONE of the following correctly describes the normal and a backup source of water supply to the AFW pumps:

- A Normal - Emergency Condensate Storage tank (1-CN-TK-1, Above Ground Storage Tank) directly to AFW pump suction.
Back-up - Fire main to AFW booster pumps.
- B Normal - Emergency Condensate Storage tank (1-CN-TK-1, Above Ground Storage Tank) to AFW booster pumps.
Back-up - Fire main to AFW booster pumps.
- C Normal - Emergency Condensate Storage tank (1-CN-TK-1, Above Ground Storage Tank) directly to AFW pump suction.
Back-up - Fire main to the AFW pumps.
- D Normal - Emergency Condensate Storage tank (1-CN-TK-1, Above Ground Storage Tank) to AFW booster pumps.
Back-up - Fire main to the AFW pumps.

Question 51

During Operator Rounds you observe the following indications on UPS 1A2:

- Amber Light - Alternate Source Supplying Load Light is LIT.
- All other Amber lights are NOT LIT.
- After contacting the MCR you are informed that no maintenance was performed on UPS 1A2.

Which ONE of the following correctly describes how UPS 1A2 automatically re-aligned for the conditions described above?

- A The Static Switch automatically re-aligned such that UPS 1A2 is now supplied by MCC 1H1-2.
- B The Static Switch automatically re-aligned such that UPS 1A2 is now supplied by MCC 1H1-1.
- C The Bypass Switch automatically re-aligned such that UPS 1A2 is now supplied by MCC 1H1-1.
- D The Bypass Switch automatically re-aligned such that UPS 1A2 is now supplied by MCC 1H1-2.

Question 52

The following Unit 1 conditions exist:

- Unit 1 is at 100% power, steady state conditions.
- The operator notices the DC Ground Detection lights indicate as follows:
 - 'A' DC Ground Detection Lights – one light very bright and one light very dim
 - 'B' DC Ground Detection Lights – both lights dim
- During a Main Control Board walk-down, the operator observes that the white light for 1-FW-P-3A, "A" AFW pump, is out.

Which ONE of the following correctly describes the cause of the plant conditions given above?

- A "1H" bus is de-energized
- B A hard ground exists on the "A" DC bus
- C The "B" DC bus indicates <75 volts DC
- D Operation of the AFWP from the Auxiliary Shutdown Panel has been selected

Question 53

A LOOP has occurred on Unit 1.

- AP-10.07 "Loss of Unit 1 Power" is in progress.
- The #1 EDG is the only source of power to the 1H Bus.

In accordance with 1-AP-10.07, which ONE of the following correctly describes the operation of 1-CC-P-1A?

- A The "A" CC pump can not be started because 15H9, Stub bus supply breaker, is interlocked to prevent closure when the #1 EDG is the only source of power to the 1H Bus.
- B The "A" CC pump should not be started because the # 1 EDG is not sized to handle the starting current in this plant condition.
- C The "A" CC pump should not be started because the # 1 EDG could become overloaded if a HI-HI CLS signal was in progress.
- D The "A" CC pump can not be started because the pump breaker 15H10 is interlocked to prevent closure when # 1 EDG is the sole source of power to the 1H Bus.

Question 54

The plant is operating at 80% power when annunciator 1D-G3, Demin Inlet Divert High Temp, alarms. The operator checks the temperature and notes it is indicating 145 °F. TCV-1143, Demineralizer Divert Valve failed and did not bypass the ion exchangers.

Which ONE of the following correctly describes the effect of this condition on reactor power and the reason?

- A Power level will lower due to the increase in RCS boron concentration.
- B Power level will rise due to the decrease in RCS boron concentration.
- C Power level will lower due to MTC becoming more negative.
- D Power level will rise due to MTC becoming less negative.

Question 55

Unit 1 is operating at 100% power and the operators are performing 1-OPT-ZZ-011, Testing of Miscellaneous Containment Trip Valves.

While testing 1-SS-TV-104A, PRT Gas Space Sample Inside Trip Valve, the valve failed to re-close after opening.

Which ONE of the following is the MINIMUM required per Technical Specification to re-establish containment integrity?

- A Locally close and de-energize both 1-SS-TV-104A and 1-SS-TV-104B.
- B Close and de-energize 1-SS-TV-104B only.
- C Locally close 1-SS-TV-104A and locally close 1-SS-TV-104B. Both valves may remain energized.
- D Close 1-SS-TV-104B only. The valve may remain energized.

Question 56

Given the following plant conditions:

- Unit 1 is operating at 100% power
- Service air header pressure is 85# and decreasing

Which ONE of the following correctly describes the system response for the plant conditions given above with no operator action?

- A The Condensate polishing service air header regulator (CP-PCV-103) will automatically shut
- B The Service air header isolation valve (1-SA-SOV-124) will automatically shut
- C The condensate polishing air compressor (1-CP-AC-1) will automatically start
- D The instrument air compressor (1-IA-C-1) will automatically start

Question 57

What modes of initiation are available for the EHC Deluge system?

- A Manually at the pull station.
Manual push-button from the fire control panel in the MCR.
- B Manually at the pull station.
Automatically by heat detectors.
- C Manual push-button on the sprinkler panel by the deluge header.
Automatically by heat detectors.
- D Manual push-button on the sprinkler panel by the deluge header.
Manual push-button from the fire control panel in the MCR.

Question 58

Given the following plant conditions:

- Unit 1 is operating at 25% reactor power during a startup.
- RCP 1C Trips.

Which ONE of the following describes the expected steady state RCS flow following the trip of 1C RCP?

- A Loops "A" and "B" will indicate 95%.
Loop "C" RCS flow will indicate 0%.
- B Loops "A" and "B" will indicate 110%.
Loop "C" RCS flow will indicate 20%.
- C Loops "A" and "B" will indicate 95%.
Loop "C" RCS flow will indicate 20%.
- D Loops "A" and "B" will indicate 110%.
Loop "C" RCS flow will indicate 0%.

Question 59

Unit 1 is in Refueling Shutdown with fuel movement in progress.
Containment purge is in operation using 1-VS-F-58A.
The Refuel Safety Mode switches are in NORMAL.

Unit 2 is at 100% power.

Which ONE of the following correctly describes the automatic response (if any) of the Unit 1 Containment Purge system to a Unit 2 Safety Injection signal?

- A Dampers to Auxiliary Ventilation system re-align.
Containment Isolation valves (1-VS-MOV-100A/B/C/D) remain open.
- B Dampers to Auxiliary Ventilation system do NOT change positions.
Containment isolation valves (1-VS-MOV-100A/B/C/D) shut.
- C Dampers to Auxiliary Ventilation system do NOT change positions.
Containment Isolation valves (1-VS-MOV-100A/B/C/D) remain open.
- D Dampers to Auxiliary Ventilation system re-align.
Containment isolation valves (1-VS-MOV-100A/B/C/D) shut.

Question 60

Unit 1 conditions are as follows:

- AFW is being supplied by both MDAFW pumps.
- TDAFW pump is tagged out for maintenance.
- S/G C experiences a major feed line break at the point where the main feed line enters S/G C.
- One minute after the event occurs the following Steam Generator Pressures exist:
 - A SG: 900 psig
 - B SG: 900 psig
 - C SG: 400 psig

Which ONE of the following sets of AFW flow rates are possible based on the given plant conditions (assuming no operator action)?

- | | | |
|---|-----------------------------|---------|
| A | COMBINED FLOW TO S/Gs A & B | 350 gpm |
| | FLOW TO S/G C | 350 gpm |
| B | COMBINED FLOW TO S/Gs A & B | 700 gpm |
| | FLOW TO S/G C | 350 gpm |
| C | COMBINED FLOW TO S/Gs A & B | 700 gpm |
| | FLOW TO S/G C | 700 gpm |
| D | COMBINED FLOW TO S/Gs A & B | 0 gpm |
| | FLOW TO S/G C | 700 gpm |

Question 61

Unit 1 was operating at 8% power. Steam dumps and PORVs are closed in manual.

A plant transient has caused the following plant parameter changes with no operator actions:

- Th increasing
- Tc increasing
- PZR Level increasing
- All S/G levels decreasing

Which ONE of the following transients could cause these changes in the plant parameters?

- A Turbine trip
- B Outward rod motion
- C Inward rod motion
- D Main Steam rupture

Question 62

Plant conditions are as follows:

- A gaseous waste discharge is occurring.
- Annunciator RMA-C6 ("PROCESS VENT PART ALERT / HI" alarm) just alarmed and it is above the alarm setpoint.

Which ONE of the following correctly describes the AUTOMATIC actions that must be verified IAW ARP 0-RMA-C6?

- A Shut GW-PCV-103 WGDT Pressure Control Valve
- B Secure CTMT Vacuum Pumps
- C Shut GW-HCV-106 Aerated Vent Isolation Valve
- D Shut GW-FCV-101 Decay Tank Bleed Isolation

Question 63

Which ONE of the following correctly describes why excore nuclear instrumentation must be adjusted over core life?

- A The radial and axial fluxes shift over core life with fuel burnup.
- B "Rod shadowing" becomes a greater influence on detector response as boron concentration is reduced.
- C Aging of the detectors and electronic components introduces indication errors.
- D Detector response degrades due to the high temperatures in containment over core life.

Question 64

The following conditions exist:

- Reactor power is 45% and stable.
- Rods are in bank "D" position due to a failure in the 1AC power cabinet.
- One control rod is withdrawn 10 steps.
- Turbine is in IMP-IN.

Which ONE of the following statements correctly describes the change (if any) in rod insertion limits and shutdown margin?

- A Rod insertion limits remain the same, shutdown margin remains the same.
- B Rod insertion limits increase, shutdown margin remains the same.
- C Rod insertion limits increase, shutdown margin increases.
- D Rod insertion limits remain the same, shutdown margin increases.

Question 65

The pressurizer level control selector switch is in the 459 (Upper Channel)/460 (Lower Channel) position when a failure causes the following plant events to occur over time, in sequence: (Assume no operator actions taken.)

- 1) Charging flow decreased to minimum
- 2) Pressurizer level decreased
- 3) Letdown isolated and PZR heaters tripped off
- 4) Pressurizer level increased until the reactor tripped on pressurizer high level

Based on the above conditions, level channel _____ failed _____.

- A 459 high
- B 460 low
- C 459 low
- D 460 high

Question 66

Which ONE of the following correctly describes the requirements for changing the position of a throttled valve IAW VPAP-1405, Independent, Simultaneous, and Documented Peer Checks Verifications?

- A Simultaneous Verification is required and the valve is opened and then throttled closed to the required position.
- B Independent Verification is required and the valve is closed and then throttled open to the required position.
- C Simultaneous Verification is required and the valve is closed and then throttled open to the required position.
- D Independent Verification is required and the valve is opened and then throttled closed to the required position.

Question 67

During performance of a unit surveillance it is discovered that a motor operated valve (1-SW-MOV-101A, SW to BC HXs) is required to be operated and is de-energized for breaker maintenance.

Which ONE of the following correctly describes the minimum level of permission required to manually operate the valve IAW OP-AA-100?

- A Manager of Nuclear Operations
- B Electrical Maintenance Supervisor
- C Shift Manager
- D Station Nuclear Safety Operating Committee

Question 68

Given the following plant conditions:

- Reactor power is 90 %
- Control rod bank D is at 180 steps
- Rod control is in automatic
- The median delta T signal selector output fails high

Which ONE of the following correctly describes an alarm that will annunciate as a result of the median delta T output failure?

- A The 1E-C8 "OP ΔT " Rx TRIP alarm will be illuminated.
- B The 1G-H8 "Rod Bank D EXTRA-LOW Limit" alarm will be illuminated.
- C The 1E-D8 "OT ΔT " Rx TRIP alarm will be illuminated.
- D The 1G-H5 "Rod Bank A EXTRA-LOW Limit" alarm will be illuminated.

Question 69

Unit 1 is operating at 50% power.

Which ONE of the following conditions requires entry into a Technical Specification action statement during Power operation?

- A #1 diesel generator day fuel tank (base and wall tanks) level contains 209 gallons.
- B Tcold is 553 °F.
- C Fuel Oil below ground storage tanks contains 35500 gallons total.
- D One Charging pump (1-CH-P-1A) is tagged.

Question 70

Which ONE of the following correctly describes the safety requirements for using a Failed Open Air Operated Valve as VENT OR DRAIN points IAW OP-AP-200 Equipment Clearance procedure?

- A Jacking device installed
Valve position visually verified
- B Jacking device installed
Control panel switch tagged
- C Air supply isolated and vented
Control panel switch tagged
- D Air supply isolated and vented
Valve position visually verified

Question 71

While actively moving fuel between the fuel building and containment, the following condition is observed:

Spent Fuel Pool level is four (4) inches higher than Reactor Cavity level.

Which ONE of the following is a possible reason for the difference in levels?

- A Containment purge was automatically secured due to a valid high alarm on RM-163, Reactor Containment Area radiation monitor.
- B Containment purge was automatically secured due to a valid high alarm on RM-159, Containment Particulate radiation monitor.
- C Fuel Building exhaust ventilation was manually secured due to a valid high alarm on RM-152, New Fuel Area radiation monitor.
- D Fuel Building exhaust ventilation was automatically secured due to a valid high alarm on RM-153, Fuel Pit Bridge Area radiation monitor.

During a LBLOCA, radiation levels in the fuel building are approximately 100 REM/hr (due to shine). It has been reported that an operator fell down the stairs in the Fuel Building. He is in critical but stable condition and is not expected to survive unless he is removed from the radiation field. It is estimated that it will take 2 people 30 minutes to remove the individual from the radiation field.

Which ONE of the following describes the authorization required for this evolution?

- A Station Emergency Manager authorizes volunteers only
- B Station Emergency Manager authorizes any personnel (volunteers or not)
- C Radiological Assessment Coordinator authorizes volunteers only
- D Radiological Assessment Coordinator authorizes any personnel (volunteers or not)

Question 73

Operations has a task to be performed in the Auxiliary Building near a 20 foot line source that reads 300 mr/hr at (2) feet. Two options exist to complete the assignment:

Option 1: Operator A can perform the assignment in 1 hour, working at a distance of (4) feet from the source.

Option 2: Operator B can perform the same task, using special extension tooling, in 2 hours working at a distance of (6) feet from the source.

Which ONE of the following correctly describes the option that must be selected for the ALARA plan, and the associated total personnel exposure?

- A Option 1 with a total dose of 150 mrem.
- B Option 1 with a total dose of 75 mrem.
- C Option 2 with a total dose of 100 mrem.
- D Option 2 with a total dose of 66 mrem.

Question 74

Given the following plant conditions:

- Reactor power is 75%.
- Feed header pressure has dropped by 100 psig.
- Steam Flow is currently greater than Feed Flow.
- Both Main Feedwater Pumps are operating.

Which ONE of the following is the required IMMEDIATE action of 1-AP-21.00?

- A Place feedwater regulating valves in manual
- B Manually trip the reactor
- C Reduce RX power to 65% or less
- D Start a third Condensate pump

Question 75

The following conditions exist:

- Unit 1 was operating at 100% power when a control rod dropped 16 hours ago.
- The Unit is currently operating at 68% power.

Which ONE of the following describes the proper method of recovery per AP-1.01 and the reason this method is necessary?

- A Reactor power must be held constant below 75% while the rod is withdrawn at two (2) steps per hour to prevent Xenon oscillations.
- B Reactor power must be held constant below 75% while the rod is withdrawn at ten (10) steps per hour to prevent rapid changes in local power densities that could cause DNB.
- C Reactor power is increased to between 70 - 74% while the rod is withdrawn at ten (10) steps per hour to prevent rapid changes in local power densities that could cause DNB.
- D Reactor power is increased to between 70 - 74% while the rod is withdrawn at two (2) steps per hour to prevent Xenon oscillations.

EQUATION SHEET

$$f = ma$$

$$v_{avg} = s/t$$

$$\text{Cycle efficiency} = (\text{Network out})/(\text{Energy in})$$

$$w = mg$$

$$s = V_0 t + \frac{1}{2} at^2$$

$$E = mc^2$$

$$KE = \frac{1}{2} mv^2$$

$$a = \frac{(V_f - V_0)}{t}$$

$$A = \lambda N$$

$$A = A_0 e^{-\lambda t}$$

$$PE = mgh$$

$$V_f = V_0 + at$$

$$w = \theta/t$$

$$\lambda = \ln 2/t_{1/2} = 0.693/t_{1/2}$$

$$w = v\Delta P$$

$$A = \frac{\pi D^2}{4}$$

$$t_{1/2 \text{ eff}} = \frac{[(t_{1/2})(t_b)]}{[(t_{1/2}) + (t_b)]}$$

$$\Delta E = 931 \Delta m$$

$$m = V_{av} A \rho$$

$$I = I_0 e^{-\Sigma x}$$

$$I = I_0 e^{-\mu x}$$

$$I = I_0 10^{-x/\text{TVL}}$$

$$\text{TVL} = 2.3/\mu$$

$$\text{HVL} = -0.693/\mu$$

$$Q = mCp\Delta t$$

$$Q = UA\Delta T$$

$$\text{Pwr} = W_f \Delta h$$

$$P = P_0 10^{\text{SUR}(t)}$$

$$P = P_0 e^{t/T}$$

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

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

$$\text{CR}_x = S/(1 - K_{\text{eff}x})$$

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

$$\text{SUR} = 26\rho/l^* + (\beta - \rho)T$$

$$T = (l^*/(\rho) + [(\beta - \rho)/\lambda\rho])$$

$$T = l/(\rho - \beta)$$

$$T = (\beta - \rho)/(\lambda\rho)$$

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

$$\rho = [(l^*/(T K_{\text{eff}}))] + [\beta_{\text{eff}}/(1 + \lambda T)]$$

$$\rho = (\Sigma fV)/(3 \times 10^{10})$$

$$\Sigma = \text{oN}$$

$$M = 1/(1 - K_{\text{eff}}) = \text{CR}_1/\text{CR}_0$$

$$M = (1 - K_{\text{eff}0})/(1 - K_{\text{eff}1})$$

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

$$l^* = 10^{-4} \text{ seconds}$$

$$\lambda = 0.1 \text{ seconds}^{-1}$$

$$I_1 d_1 = I_2 d_2$$

$$I_1 d_1^2 = I_2 d_2^2$$

$$R/\text{hr} = (0.5 \text{ CE})/d^2 (\text{meters})$$

$$R/\text{hr} = 6 \text{ CE}/d^2 (\text{feet})$$

NUMBER 1-E-3	PROCEDURE TITLE STEAM GENERATOR TUBE RUPTURE	REVISION 35 PAGE 7 of 36
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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CAUTION: • Flow on each Main Steamline should be kept less than 1.0×10^6 PPH to prevent Main Steamline isolation during RCS cooldown with the Steam Dumps.

• If no RCPs are running, RCS cooldown and depressurization may cause a false Integrity Status Tree indication on the ruptured loop. The Cold Leg indication on the ruptured loop should be disregarded until after the performance of Step 35.

NOTE: RCP trip criteria does NOT apply after initiation of an operator controlled cooldown.

8. ___ INITIATE RCS COOLDOWN:

- a) Determine required core exit temperature (ONE TIME):

LOWEST RUPTURED SG PRESSURE (PSIG)	CORF TEMPF
BETW BETV B r	
BE	

- b) Place Steam Dur.
Steam Pressure mo.

(STEP 8 CONTINUED ON NEXT PAGE)