FINAL SUBMITTAL

SURRY RETAKE EXAM
50-280, 281/2001-301
APRIL 2, 2001 (WRITTEN) &
APRIL 16-17, 2001 (ADMIN)

FINAL RO WRITTEN EXAMINATION

1.

The following conditions exist:

- Unit 1 is at 100%
- Charging pump, 1-CH-P-1A, is running.
- Charging Service Water Pump, 1-SW-P-10A, is running.
- Charging Service Water Pump, 1-SW-P-10B, is tagged out for motor replacement (motor currently removed).
- All other Station components are operable.

Which ONE (1) of the following actions is required if 1-SW-P-10A trips on motor fault?

a. Immediately start 1-CH-P-1B for long term operation and secure 1-CH-P-1A.

b. Establish gravity feed and bleed for the 1-CH-P-1A oil cooler.

c. Establish Charging Service water cross tie from the opposite unit.

d. Place 1-SW-S-10 in service to establish Charging Service Water flow from the Station Service Water System.

2.

Four Operators worked the following schedule at the Reactor Operator position over the past six days: HOURS WORKED (Shift turnover time not included. Do **NOT** assume any hours worked before or after this period.)

OPERATOR	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
1	10	14	off	12	12	12
2	14	12	14	10	off	11
3	off	off	off	13	11	14
4	11	13	14	off	11	12

Which ONE (1) of the operators would be permitted to work a 12-hour shift on Day 7 **WITHOUT** requiring permission to exceed normal overtime limits?

a. 1

b. 2

c. 3

d. 4

3.

Given the following conditions:

- The unit was operating at 100% power when a pipe break occurred inside containment.
- Containment pressure is rising.
- RCS temperature is lowering.

Which ONE (1) of the following differentiates between a main feed line break inside containment and a main steam line break inside the containment of the same size?

a. RCS heat removal would be greater for the steam line break

b. Containment pressure would be greater for the feed line break

c. Containment radiation levels would be greater for the steam line break

d. RCS depressurization would be greater for the feed line break

4.

Given the following conditions:

- HP placed a radioactive waste container (primarily containing Cobalt 60) 5 feet from the Decon Building Area Radiation detector, 1-RM-RI-151.
- Prior to placement of the container, 1-RM-RI-151 was reading 2 mR/hr.
- After placement of the container 1-RM-RI-151 read 10 mR/hr.

If the container is moved 10 feet away from the 1-RM-RI-151 detector, 1-RI-RM-151 will indicate which ONE (1) of the following?

a. 4.0 mR/hr

b. 4.5 mR/hr

c. 6.0 mR/hr

d. 7.0 mR/hr

5.

Given the following conditions:

- At 0110, a Reactor Trip and Safety Injection occurred following an accident.
- At 0112, an Alert was declared due to RCS leakage.
- At 0116, a Site Area Emergency was declared.
- At 0120, a General Emergency was declared.

Which ONE (1) of the following identifies the **LATEST** time that the **INITIAL** notification to State/County officials and the NRC must be completed?

	STATE / COUNTY	NRC
a.	0125	0210
b.	0127	0212
c.	0131	0216
d.	0135	0220

6.

Given the following plant conditions:

- An emergency boration is in progress through 1-CH-MOV-1350, Emergency Borate, per FR-S.1, "Response to Nuclear Power Generation / ATWS."
- 1-CH-FI-1110, Emerg. Borate Flow indicates 33 gpm.
- 1-CH-FI-1122A, CHG Line Flow is in manual and indicates 75 gpm.
- VCT level is 30%.
- VCT Makeup is aligned for automatic operation.
- Normal letdown has been isolated.
- The team has just completed steps 3 and 4 of FR-S.1 (AFW verification and Emergency boration).

Which ONE (1) of the following describes VCT response (assuming no further operator actions)?

a. Will remain essentially unaffected.

b. Will decrease to the auto makeup setpoint and stabilize.

c. Will decrease to the low-level setpoint and cause the charging pump suction to switch to the RWST.

d. Will decrease to the auto makeup setpoint and cycle between the makeup start and stop setpoints.

7.

Given the following conditions:

- The unit is operating at 100% power.
- C-F-7, PRZR RELIEF TK HI PRESS, and C-G-7, PRZR Relief TK Hi LVL have alarmed.
- PRT level and pressure are slowly increasing, but there is **NO** appreciable increase in PRT temperature.
- **NO** other annunciators are in alarm.

Leakage past which ONE (1) of the following has caused the present PRT condition?

a. 1-RC-PCV-1455C, Pressurizer PORV.

b. 1-RC-SV-1551A, Pressurizer Safety valve.

c. 1-CH-RV-1209, Low Pressure L/D Line Relief leakby.

d. 1-CH-RV-1382, RCP #1 Seal Water Return Line Relief leakby.

8.

Which ONE (1) of the following conditions would result in a reactor trip?

a. 1-MS-PT-1447, First Stage Turbine Pressure, fails low with power level at 22%.

b. NI-43, PR Channel N43, fails low with power level at 49%.

c. 1-MS-PT-1446, First Stage Turbine Pressure, fails high with power level at $1x10^{-8}$ amps.

d. NI-44, PR Channel N44, fails high with power level at at $1x10^{-8}$ amps.

9.

Which ONE (1) of the following describes why RCS subcooling must be greater than 30°F [85°F] prior to starting an RCP in FR-P.1, Response to Imminent Pressurized Thermal Shock Condition?

a. RCP restart may result in reduced SI flow to the core leading to an inadequate core cooling situation.

b. Inadequate subcooling corresponds to inadequate #1 RCP seal D/P using RCS Psat/Tsat relationships.

c. RCP restart during a SBLOCA may result in deeper core uncovery leading to an inadequate core cooling situation.

d. RCP restart with inadequate subcooling may result in rapid RCS depressurization, complicating the PTS concern.

10.

Given the following plant conditions:

- The plant has experienced a reactor trip.
- The Unit SRO directs the RO to manually initiate Safety Injection.
- The RO inadvertently depresses ONE (1) Consequence Limiting Safeguards (CLS) pushbutton instead of the Safety Injection pushbuttons.

Which ONE (1) of the following identifies functions that will occur, if any?

a. No actions occur. Simultaneous pushing of BOTH pushbuttons is required.

b. Phase I Containment Isolation only.

c. Phase I and Phase II Containment isolation only.

d. Phase I, Phase II, and Phase III Containment isolation.

11.

Given the following conditions:

- The unit is operating at 77% power.
- Condenser backpressure is 25.5 in - Hg and degrading slowly.
- A power reduction is in progress in an attempt to stabilize backpressure.
- **NO** cause has yet been identified.

Which ONE (1) of the following actions should be taken in accordance with AP-14.00, "Loss of Main Condenser Vacuum"?

a. Trip the reactor and go to E-0.

b. Trip the turbine and verify the plant stabilizes on the steam dumps at the point of adding heat.

c. Trip the turbine and verify the plant stabilizes on the steam dumps at approximately the current power level.

d. Continue the power reduction.

12.

Given the following conditions:

- The plant is shutdown following a reactor trip.
- RCPs are all secured.
- The "B" Train ICCM fails
- "A" ICCM has been providing erratic indications.
- Primary Plant parameters indicate the following:

INSTRUMENT	PARAMETER	VALUE
1-RC-PI-1455	PZR Press Protection	1485 psig
1-RC-PI-1456	PZR Press Protection	1495 psig
1-RC-PI-1457	PZR Press Protection	1515 psig
1-RC-PI-1402	RCS WR Press	1485 psig
1-RC-PI-1403	RCS WR Press	1485 psig
1-RC-TI-1453	PZR Temp (Surge Line)	524°F
1-RC-TR-1454	PZR Temp (Vapor)	630°F
1-RC-TR-1413	RCS Hot Leg WR Temp	538°F
1-RC-TR-1423	RCS Hot Leg WR Temp	538°F
1-RC-TR-1433	RCS Hot Leg WR Temp	534°F
	Highest Five (5) CETCs	548°F
		544°F
		542°F
		542°F
		541°F

Which ONE (1) of the following identifies the valid subcooling indication for "A" ICCM?

a. 46°F.

b. 51°F.

c. 53°F.

d. 58°F.

13.

Given the following conditions:

- A 25 year old male started working for the Operations Department at Surry on March 3rd of this year.
- He previously worked this year at North Anna as part of the Maintenance Department.
- His exposure for this year at the North Anna plant was 1200 mRem TEDE.
- He has received NO Dominion management exposure extensions and NO emergencies exist.

Which ONE (1) of the following is the **TOTAL ADDITIONAL** effective dose equivalent that the individual can receive before being denied RCA access (unless specifically authorized by the Supervisor Exposure Control and Instrumentation)?

a. 600 mRem

b. 800 mRem

c. 2600 mRem

d. 3800 mRem

14.

Given the following conditions:

- Unit 1 is in a refueling outage.
- Robert Wells (Electrical Supervisor) has come to shift seeking a temporary release for 1-FW-P-1A, "A" Main Feed Pump. This temporary release is to verify interlocks with 1-FW-MOV-150A, "A" MFP Discharge valve.
- Luther Farinholt (Mechanical Supervisor) is the only other individual besides Robert Wells on the Craft Supervisor Tracking Sheet.

Which ONE (1) of the following individuals has the responsibility of notifying Luther Farinholt of the temporary release?

a. Unit 1 SRO.

b. Robert Wells.

c. Operator assigned to perform the temporary release.

d. Shift Clerk.

15.

Given the following conditions:

- Fuel is in the vessel; refueling has not taken place.
- RCS temperature is 120°F.
- It is 30 days after the shutdown.
- Pressurizer level is at 22%.
- RHR cooling is lost.

Given the supplied references, which ONE (1) of the following identifies how much time remains before boiling begins occurring in the RCS?

a. 5 minutes

b. 18 minutes

c. 5 hours

d. 18 hours

16.

Given the following plant conditions:

- Unit is operating at 100% power.
- P-250 Computer failed.

Which ONE (1) of the following is NOT a log that is required to be handwritten as a result of this failure?

a. Average Power History Log.

b. RCP Bearing Temperature Log.

c. Charging Pump Bearing Temperature Log.

d. Average Delta Flux History Log.

17.

Given the following plant conditions:

- Unit 1 is at CSD - 140°F and atmospheric pressure.
- All conditions for starting an RCP IAW 1-OP-RC-001, "Starting and Running Any RCP," have been satisfied except for raising RCS pressure.

Which ONE (1) of the following describes the minimum RCS pressure required to start an RCP IAW 1-OP-RC-001?

a. Any RCS pressure which supports a minimum #1 seal return flow of greater than 3 gpm.

b. 205 psig

c. 213 psig

d. 303 psig

18.

Given the following conditions:

- A Reactor Trip and SI have occurred from an unisolable main steam line break on SG "A".
- E-0, "Reactor Trip or Safety Injection," has been completed and the team has completed E-2, "Faulted Steam Generator Isolation."
- SG "A" has been isolated per E-2, "Faulted Steam Generator Isolation," and is dry.
- RCS temperature has been stabilized by dumping steam via the S/G PORV from the intact SGs following the SG "A" dryout.
- The team has transitioned to ES-1.1, "SI Termination."
- SI flowpaths have been secured, normal charging aligned, and letdown placed in service.

Which ONE (1) of the following would be the **FIRST** indication to the operators that a 250 gpm tube leak has subsequently developed in SG "A"?

a. Main Steamline Radiation Monitor for "A" S/G.

b. RCS and "A" S/G pressures equalize.

c. Pressurizer level decreasing.

d. SG "A" level increasing.

19.

While performing 1-OPT-RX-003, "Reactor Power Calorimetric Using Feed Flow and P-250 Computer Points (Manual)," which ONE (1) of the following will result in **ACTUAL** power being **HIGHER THAN INDICATED** power?

a. SG Blowdown is secured prior to starting the data collection.

b. MDAFW Pump "A" is operating with flow being delivered to a SG.

c. Indicated feedwater temperature used is lower than actual.

d. Indicated feedwater flow used is higher than actual.

20.

Given the following conditions:

- Refueling Operations are scheduled to commence.
- RCS Boron Concentration is currently 2175 ppm.

Which ONE (1) of the following describes the Tech Spec required RCS boron concentration for refueling operations?

a. Boron concentration is adequate.

b. Boron concentration must be increased by a minimum of 75 ppm.

c. Boron concentration must be increased by a minimum of 125 ppm.

d. Boron concentration must be increased by a minimum of 175 ppm.

21.

Given the following conditions:

- A reactor shutdown is in progress.
- Annunciator G-D-3, NIS Intermediate Range Channel 1 Loss of Compensating Voltage" is lit.
- N-35 indicates stable at 6.0×10^{-10} amps
- N-36 indicates stable at 1.0×10^{-11} amps
- Gammametrics Source range, 1-NI-NFI-190A1, indicates stable at 80 counts.
- Gammametrics Source range, 1-NI-NFI-1270A1, indicates stable at 90 counts.

Which ONE (1) of the following describes the actions required by FR-S.2, Response to Loss of Core Shutdown, to obtain Source Range N-31 and N-32 indication?

a. Push **ONLY** the "Train A Source Range Trip- reset, 1/N 39A" pushbutton.

b. Push **ONLY** the "Train A Intermediate Rng Trip- block, 1/N 38A" pushbutton.

c. Push **BOTH** the "Train A Intermediate Rng Trip- block, 1/N 38A" AND the "Train B Intermediate Rng Trip- block, 1/N 38B" pushbuttons.

d. Push **BOTH** the "Train A Source Range Trip- reset, 1/N 39A" AND the "Train B Source Range Trip- reset, 1/N 39B" pushbuttons.

22.

Given the following conditions:

- The unit is operating at 100% power.
- **NO** scheduled releases are in progress.
- A small leak develops on an inservice letdown radiation monitor (1-CH-RI-118).
- All ventilation systems are in a normal configuration.

Which ONE of the following would alert the operators of the accidental liquid release in progress?

a. Decon Building radiation monitor, 1-RM-RI-151.

b. Vent Vent 1 (Turbine Building Vent Stack) Gas radiation monitor, 1-VG-R1-104.

c. RC letdown HI radiation monitor, 1-CH-RI-118.

d. Process vent gas radiation monitor, 1-GW-RI-102.

23.

Given the following conditions:

- The Control Room has filled with dense smoke from a Main Control Room fire on Unit 1.
- The reactor has been tripped manually by operators.
- The Control Room has been evacuated due to the dense smoke.

Which ONE (1) of the following identifies the procedure(s) that will be used to stabilize Unit 1 conditions after Main Control Room evacuation?

a. 1-E-0, "Reactor Trip Safety Injection."

b. 0-AP-48.00, "Fire Protection – Operations Response."

c. 0-AP-20.00, "Main Control Room Inaccessibility."

d. 0-FCA-1.00, "Limiting MCR Fire."

24.

Given the following conditions:

- The unit is operating at 100% power.
- 1-OPT-RX-005 "Control Rod Assembly Partial Movement," is being performed.
- Annunciator G-A-6, ROD CONT SYSTEM URGENT FAILURE, alarms just as Control Bank "C" rods are being withdrawn.

Which ONE (1) of the following describes the required operator action?

a.
- This is an expected alarm.
- Continue withdrawing Control Bank "C' rods.

b.
- Immediately trip the reactor.
- Initiate 1-E-0, "Reactor Trip or Safety Injection."

c.
- Place the ROD BANK SELECTOR switch in Manual.
- Do NOT move rods until cause of alarm determined.

d.
- Place the ROD BANK SELECTOR switch in Manual.
- Restore Tave and Tref by adjusting rods to pre-test value.

25.

During an accident condition on Unit One, the Balance of plant operator questions the validity of a pressure indication causing a Main Control Room annunciator. He notes there is a black diamond next to the mark number on the bakelite label.

Which ONE (1) of the following identifies the significance of this "Black Diamond"?

a. A maintenance rule risk significant component.

b. Environmentally qualified.

c. A Technical Specification Table 3.7 item.

d. A Regulatory Guideline 1.97 indication.

26.

Given the following conditions:

- The Fuel Handling group reports a dropped spent fuel assembly in the Spent Fuel Pool.
- A valid High Radiation alarm has been acknowledged for 1-RM-153, Fuel Pit Bridge.
- The operating team has entered AP-22.00, "Fuel Handling Abnormal Conditions."

Which ONE (1) of the following actions is required to maintain the Main Control Room environment acceptable?

a. Place the Fuel Building on filtered exhaust.

b. Secure all Main Control Room supply and exhaust air paths.

c. Isolate the Main Control Room supply and exhaust air paths and dump one bottled air bank.

d. Dump both Main Control bottled air banks while maintaining MCR exhaust paths.

27.

Given the following conditions:

- A large break (DBA) LOCA has occurred.
- 2-ECA-1.1, "Loss of Emergency Coolant Recirculation," is being implemented.
- One HHSI Pump is running.
- No LHSI pumps are available.
- Time after trip and SI is 1 hour.
- SI **CANNOT** be terminated due to insufficient subcooling.

Given the supplied references, which ONE (1) of the following states the **MINIMUM** SI flow for these conditions?

a. 560 gpm.

b. 385 gpm.

c. 210 gpm.

d. 200 gpm.

28.

Given the following conditions:

- The unit is operating at 24% power during a plant startup.
- Rods are being withdrawn to raise RCS temperature.
- When the IN-HOLD-OUT lever is released, rods continue to step outward.

Which ONE (1) of the following actions should be taken?

a. Place the ROD BANK SELECTOR switch in Automatic and verify rod motion stops.

b. Place the ROD BANK SELECTOR switch into an individual control bank position and verify rod motion stops.

c. Manually trip the reactor and go to E-0, "Reactor Trip or Safety Injection."

d. Place the IN-HOLD-OUT lever in the "IN" position and verify rods step in or stop.

29.

A Unit 1 Containment Purge is in progress.

Which ONE (1) of the following will automatically terminate the purge on a high radiation signal?

a. 1-RM-RI-162, Manipulator Crane.

b. 1-GW-RI-101, Process Vent Particulate.

c. 1-VG-RI-104, Vent Vent 1 GAS.

d. 1-VG-RI-109, Vent Vent Particulate.

30.

Given the following conditions:

- Reactor power is 35%.
- All control systems are in automatic.
- Pressurizer level transmitter 2-RC-LT-2459 is selected to the upper control channel.
- A small leak develops across the differential pressure bellows for 2-RC-LT-2459, resulting in pressure equalizing across the bellows.

Assuming NO operator actions, which ONE (1) of the following describes the initial instrumentation and plant response to this leak?

	2-RC-LI-459 PZR LVL	2-RC-LI-460 PZR LVL
a.	Increases	Increases
b.	Increases	Decreases
c.	Decreases	Increases
d.	Decreases	Decreases

31.

Given the following conditions:

- All systems are in automatic.
- At 100% power, 1-FCV-CN-107 fails open.
- Alarms H-G-5/6/7, STM GEN A/B/C level errors annunciate.
- All SG narrow range levels are decreasing.

Which ONE (1) of the following actions is required per AP-21.00, "Loss of Main Feedwater Flow?"

a. Take manual control of main feed reg. valves and increase flow.

b. Trip the reactor and perform E-0, "Reactor Trip or Safety Injection."

c. Start the 3rd condensate pump and reduce turbine load using the limiter.

d. Perform a rapid load reduction per AP-23.00, "Rapid Load Reduction."

32.

The following information is available:

INDICATOR	PRE-EVENT VALUE	POST-EVENT VALUE
CTMT Temp 1-LM-TI-100-1	90°F	105°F
CTMT Temp 1-LM-TI-100-2	92°F	107°F
CTMT Press 1-LM-PI-101A	10 psia	19.8 psia
CTMT Press 1-LM-PI-101B	10.2 psia	19.9 psia

Given the attached references, which ONE (1) of the following approximates the required "B" electric hydrogen recombiner power setting?

a. 51 KW

b. 41 KW

c. 34 KW

d. 26 KW

33.

Which ONE (1) of the following shift manning configurations is **NOT** allowed in accordance with OPAP-0001, "Operations Department Responsibilities and Authorities," minimum shift requirements, with both units at 100% power?

	SS	SRO	RO	AO	STA
a.	1	1	3	9	1
b.	1	3	4	4	2
c.	1	1	4	7	1
d.	1	2	6	3	2

34.

Given the following conditions:

- Unit 1 is operating at 100% power.
- Annunciator B-E-6, "IA LO HDR PRESS/1A COMPR 1 TRBL," has just illuminated.
- All station-related air controls and components are available with controllers/controls in auto.
- Unit 1 Instrument air pressure currently reads 79 psig and slowly decreasing.
- Assume all automatic actions have occurred and all components are functioning as designed

Which ONE (1) of the following has **NOT** automatically performed an action to assist in maintaining air pressure?

a. 1-SA-SOV-175, Service air isolation, automatically closes.

b. Unit 2 Service Air Compressor auto-started.

c. 1-IA-D-1, "Unit 1 Instrument Air Dryer," bypassed.

d. Unit 1 Instrument Air Compressor auto-started.

35.

Given the following conditions:

- The unit was operating at 100% with bank D rods at 218 steps when a failure of UPS 1A1 inverter occurred. The static switch does not swap.
- **NO** reactor trip occurred.
- Rods **CANNOT** be withdrawn.

Which ONE (1) of the following is preventing rod motion?

a. Power range high flux rod stop

b. Intermediate range high flux rod stop

c. Overtemperature ΔT rod stop

d. Overpower ΔT rod stop

36.

Given the following plant conditions:

- A SI occurred on Unit 1 due to a SBLOCA.
- The team has completed 1-E-0, "Reactor Trip or Safety Injection."
- The team transitioned to 1-E-1, Loss of Reactor or Secondary Coolant."
- Containment pressure is 13.2 psia and slowly increasing.

Which ONE (1) of the following would prevent terminating SI when the SI termination criteria step is performed?

a. RCS subcooling is 40°F and slowly decreasing.

b. S/G level is 25% and slowly increasing.

c. RCS pressure is 1890 psig and slowly decreasing.

d. Pressurizer level is 30% and slowly decreasing.

37.

Given the following conditions:

- Unit 2 is in mid-loop operation to repair a S/G primary manway leak.
- The RCS is vented by two Pressurizer Safety Valves being removed.
- RCS level is 12.5 feet in the Standpipe and rising very slowly.
- RHR pump "A" is in service at 3500 gpm.
- The operator notices that RHR flow and pump discharge pressure are oscillating.

Which ONE (1) of the following actions would tend to stabilize RHR flow and pressure?

a. Start the RHR pump "B" at 3500 gpm.

b. Lower charging flow to stabilize RCS level.

c. Lower "A" RHR pump flow.

d. Open the RV head vents.

38.

Given the following conditions:

- Unit 1 is operating at 100% power.
- #3 EDG is tagged out to repair a leaking oil fitting.
- A tornado touches down in the switchyard.
- The transient resulting from the destruction causes a trip of the Main Generator.
- "A" and "C" Reserve Station Transformers are destroyed by debris generated by the tornado.
- #1 EDG is unable to start due to a faulty air lineup.
- After the initial transient, it is noted that **BOTH** of the Reactor Trip breaker indications are RED.

Which ONE (1) of the following describes the required operator action(s)?

a. Enter FR-S.1, "Response to Nuclear Power Generation / ATWS," due to the ATWS.

b. Enter E-0, "Reactor Trip or Safety Injection," due to the turbine trip and then FR-S.1 due to the ATWS.

c. Enter ECA-0.0, "Loss of All AC Power," due to the electrical conditions.

d. Enter FR-S.1 due to the ATWS, then ECA-0.0 due to the electrical conditions.

39.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- A pipe break in the Component Cooling (CC) System in the Auxiliary Building results in a loss of CC requiring implementation of AP-15.00, "Loss of Component Cooling."

Which ONE (1) of the following will require the Reactor Operator to manually trip Unit 1?

a. Efforts to restore CC flow have failed.

b. 0-VSP-D7, CC Surge Tank Low Level annunciator alarms and surge tank level is decreasing.

c. Auxiliary Building radiation monitors are alarming due to the high activity in the CC System.

d. Efforts to establish makeup to the CC System were not successful within five (5) minutes.

40.

Given the following conditions:

- RCS pressure is 1805 psig and slowly decreasing.
- All Main Steam Trip Valves are open.
- Tavg is 537°F and decreasing.
- Steam Generator pressures and Steam Flows are:

SG	PRESSURE	STEAM FLOW
"A"	615 psig and decreasing	1.7×10^6 lbm/hr
"B"	745 psig and stable	0.05×10^6 lbm/hr
"C"	740 psig and stable	0.05×10^6 lbm/hr

Which ONE (1) of the following Safety Injection signals would be actuated?

a. Header to Line ΔP.

b. Low Pressurizer Pressure.

c. High Steam Line Flow with Low Tave.

d. High Steam Line Flow with Low Steam Line Pressure.

41.

Hi Hi CLS will actuate when (1) out of (2) containment pressure channels increase to 23 psia. Hi Hi CLS can be reset when (3) channels decrease to (4) psia.

Which ONE (1) of the following sets of parameters completes the coincidence and setpoint for Hi Hi CLS?

	(1)	(2)	(3)	(4)
a.	2	3	3	17.7
b.	3	4	2	14.2
c.	2	4	3	14.7
d.	3	3	2	14.7

42.

Given the following conditions:

- The unit is operating at 100% power.
- Normal letdown is in service.
- Pressurizer level control is in automatic.
- Leakage past the hydrogen pressure regulator to the VCT causes pressure in the VCT to increase.

Which ONE (1) of the following describes the effect on RCP seal flow?

	No. 1 SEAL LEAKOFF FLOW	No. 2 SEAL LEAKOFF FLOW
a.	Increases	Increases
b.	Decreases	Decreases
c.	Decreases	Increases
d.	Increases	Decreases

43.

Given the following conditions:

- A reactor trip occurred from 20% power as a result of a low-low level in "A" SG.
- Coincident with the reactor trip, "H" bus de-energized and was subsequently energized by the #1 EDG.
- Twenty (20) seconds following the trip, SG levels have decreased to a minimum value of:

SG	LEVEL
"A"	12%
"B"	28%
"C"	26%

Which ONE (1) of the following describes the expected condition of the Auxiliary Feedwater pumps 20 seconds following the trip?

	MDAFW PUMP "A"	MDAFW PUMP "B"	SDAFW PUMP
a.	Running	Running	Off
b.	Off	Running	Running
c.	Off	Running	Off
d.	Off	Off	Running

44.

Given the following conditions:

- The plant is operating at 50% power.
- All control systems are operating in automatic.
- The First Stage Pressure Channel Selector switch is aligned to the PT-447 position.
- First Stage Pressure Transmitter PT-446 fails low.

Which ONE (1) of the following plant responses is expected?

a. Feedwater Regulating Valves throttle closed.

b. Control Rods step inward.

c. Automatic rod control is blocked.

d. Steam Dumps have a demand signal.

45.

Given the following conditions:

- Spent fuel water temperature is 102°F.
- Fuel Building room temperature is 89°F.

Which ONE (1) of the following describes the Main Control Room spent fuel pool temperature indication if pool level drops 3 feet?

a. Temperature increases due to less water mass to absorb the spent fuel decay heat.

b. Temperature increases off-scale high due to RTD failure mode.

c. Temperature decreases off-scale low due to RTD failure mode.

d. Temperature decreases to approximately room temperature due to uncovering the RTD.

46.

With the reactor critical at $7x10^{-6}$ amps, the vital bus breaker supplying N-35, Intermediate Range NI, trips.

Which ONE (1) of the following describes the effect on control rods?

a. Reactor trip due to 1/2 Intermediate range bistables greater than 35%.

b. Rods step in due to power core power mismatch.

c. Auto rod withdrawal is blocked but manual withdrawal is not affected.

d. No effect.

47.

Given the following conditions:

- 1-SI-P-1A, "A" LHSI pump is tagged out for seal replacement.
- A LOCA has occurred inside Containment.
- Following the Safety injection, "J" bus power was lost and **NOT** restored (fault on the bus).
- The team has progressed through E-0, E-1, and is currently in ECA-1.1," Loss of Emergency Coolant Recirculation," due to no LHSI pumps running.
- Containment pressure is currently 32 psia and slowly decreasing.

Using the supplied reference and the conditions above, which ONE (1) of the following identifies the CS and RS spray configurations the operating team is capable of establishing to meet the CS requirements?

a. 2 CS pumps and 2 RS pumps.

b. 2 CS pumps and 1 RS pump.

c. 1 CS pump and 2 RS pumps.

d. 1 CS pump and 3 RS pumps.

48.

Given the following conditions:

- A recovery from a small break LOCA is in progress.
- NO RCPs are running.
- 1-ES-1.2, "Post-LOCA Cooldown and Depressurization," is being implemented.
- Depressurization of the RCS has commenced.
- Pressurizer level has just risen rapidly from off-scale low to 50%.

Which ONE (1) of the following identifies why the pressurizer level has rapidly increased?

a. Increased SI flow.

b. Voiding of the reactor vessel head.

c. Increased pressurizer spray flow.

d. Voiding in the pressurizer level reference leg, causing erroneous indication.

49.

Given the following conditions:

- The unit is operating at 100% power.
- Rod Control is in Manual.
- A safety valve fails open on SG "B".

Which ONE (1) of the following describes the effect on indicated power and RCS Tavg?

	INDICATED NIS POWER	RCS T-AVG
a.	Increases	Remains Relatively Constant
b.	Increases	Decreases
c.	Remains Relatively Constant	Remains Relatively Constant
d.	Remains Relatively Constant	Decreases

50.

Given the following conditions:

- The unit is operating at 85% power.
- Control Rod Bank "D" Demand is at 195 steps.
- IRPI indication for Bank "D" Group 1 Control Rods are as follows:

ROD	**POSITION**
H-2	181 steps
B-8	181 steps
H-14	205 steps
P-8	205 steps

Which ONE (1) of the following ensures Tech Spec rod alignment requirements are met?

a. Are met under these conditions.

b. If Control Rods H-2 and B-8 is verified aligned to at least 183 steps.

c. If power is reduced below 60%.

d. If Control Rod H-14 and P-8 are verified aligned to at most 197 steps.

51.

Given the following conditions:

- A reactor trip and safety injection have occurred.
- Due to multiple failures, an entry has been made to 1-ECA-2.1, "Uncontrolled Depressurization of All Steam Generators."
- Containment pressure is 9 psia.
- The RCS cooldown rate is 130°F/hour.
- AFW flow is presently greater than 400 gpm to each S/G.
- SG wide range levels are:

SG	LEVEL
"A"	1%
"B"	3%
"C"	14%

Which ONE (1) of the following actions should be taken?

a. Secure all AFW to "A" and "B" SGs, while feeding "C" SG at a rate of 60 gpm.

b. Secure all AFW flow to all SGs until "C" SG is below 7%, then feed **ONLY** "C" SG at a rate of 60 gpm.

c. Feed "A" and "B" SGs at a rate of 60 gpm while feeding "C" SG only as needed to maintain the RCS cooldown rate below 100°F/hour.

d. Feed all SGs at a rate of 60 gpm.

52.

Given the following conditions:

- The unit is operating at 100% power.
- Testing is being performed on Reactor Trip Breaker "B" and it is currently open.
- A loss of the "A" 125 VDC Distribution Panel occurs.
- Reactor Trip Breaker "A" fails to open.

Which ONE (1) of the following describes the expected response of the plant due to this sequence of events, assuming NO operator action?

a. **NO** reactor trip occurs.

b. Reactor Trip Bypass Breaker "B" opens on an Undervoltage trip **ONLY**, resulting in a reactor trip.

c. Reactor Trip Bypass Breaker "B" opens on a Shunt trip **ONLY**, resulting in a reactor trip.

d. Reactor Trip Bypass Breaker "B" opens on **BOTH** an Undervoltage trip and a Shunt trip, resulting in a reactor trip.

53.

Given the following conditions:

- The unit is in Hot Standby.
- A change in boron concentration from 500 ppm to 470 ppm is required.

Given the supplied references, which ONE (1) of the following identifies approximately how many gallons of primary water must be added to make this change?

a. 70 gallons

b. 90 gallons

c. 3,000 gallons

d. 4,500 gallons

54.

Given the following conditions:

- Unit 2 is being ramped to 100% following a refueling outage.
- The following Plant Parameters are noted:

PARAMETER	**VALUE**
Loop "A" Tavg	574°F
Loop "B" Tavg	573°F
Loop "C" Tavg	573°F
NI-41	100.0%
NI-42	99.0%
NI-43	99.0%
NI-44	100.0%
Loop "A" ΔT	102%
Loop "B" ΔT	102%
Loop "C" ΔT	102%
Loop "C" Steam Flow	3.9×10^6lbm/hr
Loop "B" Steam Flow	3.9×10^6lbm/hr
Loop "C" Steam Flow	3.95×10^6lbm/hr
Loop "A" Feed Flow	3.9×10^6lbm/hr
Loop "B" Feed Flow	3.9×10^6lbm/hr
Loop "C" Feed Flow	3.85×10^6lbm/hr
1st Stage Press (446)	101%
1st Stage Press (447)	101%
Generator Output	865 MWe

Which ONE (1) of the following indicates actual reactor power and the expected operations response?

a. 99.5%. The power ramp may continue until the plant is at 100%.

b. 99.5%. Power should be held constant to perform a calorimetric.

c. Greater than 100%. Power should be held constant to perform a calorimetric.

d. Greater than 100%. Power should be immediately lowered.

55.

Which ONE (1) of the following identifies the minimum level of approval for a safety-related temporary modification?

a. Shift Supervisor (SS)

b. Operations Manager on Call (OMOC)

c. Station Nuclear Safety Operating Committee (SNSOC)

d. Management Safety Review Committee (MSRC)

56.

Given the following conditions:

- The plant is operating at 43% power.
- An electrical transient causes a momentary underfrequency condition on “A” 4160V SS Bus.
- Moments later, an undervoltage condition is also sensed on “A” 4160V SS Bus.
- The RCP powered from “A” 4160V SS Bus trips.
- The other two RCPs remain running.

A reactor trip occurs due to the above transient.

Which ONE (1) of the following identifies the signal, which **DIRECTLY** generated the reactor trip?

a. Bus underfrequency

b. Bus undervoltage

c. Low flow

d. Pump breaker trip

57.

The following plant conditions exist:

- Unit 1 was at 100% power when a Hi-Hi CLS signal was received.
- All three containment air recirc fans were operating at the time of the Hi-Hi CLS signal.

Which ONE (1) of the following describes the response of the Containment Air Recirc fans to the CLS signal?

a. All Containment Air Recirc Fans trip off.

b. No Containment Air Recirc Fans trip off.

c. "A" and "B" Containment Air Recirc Fans trip off.

d. "C" Containment Air Recirc Fan trips off.

58.

The following conditions exist:

- Unit 1 is operating at 100% power.
- "B" Charging pump is running.
- "A" Charging pump is in Auto.
- "C" Charging pump is in Auto with its normal supply breaker racked in.

Which ONE (1) of the following would occur if the Inside Service Building Operator racked in the "C" Charging pump alternate supply breaker?

a. "C" Charging pump would auto-start after "B" Charging pump trips.

b. "B" Charging pump would trip and no other charging pump would auto-start.

c. "A" and "C" Charging pumps will auto-start after "B" Charging pump trips.

d. "A" Charging pump only would auto-start after "B" Charging pump trips.

59.

Given the following conditions:

- The unit is experiencing a loss of all feedwater event and FR-H.1, "Response to Loss of Secondary Heat Sink," has been entered.
- NO AFW flow is available.

Which ONE (1) of the following describes when the operator is required to trip the RCPs and immediately initiate feed and bleed?

a. Five highest core exit TC temperatures are 652°F, 650°F, 649°F, 648°F, and 645°F and are all rising.

b. RCS hot leg temperatures are 652°F, 646°F, and 648°F and are all rising.

c. Pressurizer levels are indicating 83%, 87%, and 84% and are all rising.

d. SG wide range levels are 5%, 6%, and 12% and are all stable.

60.

Given the following conditions:

- A Unit trip and safety injection have occurred due to a Steam Generator Tube Rupture on "A" SG.
- 1-ES-3.1, "Post-SGTR Cooldown using Backfill," is being implemented.
- RCS pressure is 940 psig.
- It has been determined that the accumulators should be isolated.
- The breakers for the accumulator discharge valves (1-SI-MOV-1865A, B, C) have been closed.
- The "A" accumulator discharge valve (1-SI-MOV-1865A) loses light indication after it is given a closed signal.
- "B" and "C" accumulator valves stroke closed as expected.

Which ONE (1) of the following actions should be taken regarding "A" accumulator?

a. Slow the rate at which the RCS is being depressurized to allow a controlled injection of the accumulator.

b. Drain the accumulator to the Primary Drains Transfer Tank.

c. Vent the accumulator to the Process Vent System.

d. Maintain RCS pressure above 800 psig until a Containment entry can be made to locally close the discharge valve.

61.

The Unit Reactor Operator needs a short-term relief to get his lunch in the Annex and take a restroom break.

Which ONE (1) of the following is <u>NOT</u> required to be performed as part of turnover to the relieving Reactor Operator?

a. Shift Relief Checklist must be completed.

b. Verifying that no uncontrolled unit transient is in progress.

c. Discuss evolutions in progress that could affect unit status.

d. Inform Unit Senior Reactor Operator that turnover has occurred.

62.

Given the following conditions:

- The unit is operating at 100% power.
- RCS Tavg is 573°F and stable.
- PZR level is 53.7% and stable
- VCT level is 31% and stable.
- Letdown flow is 45 gpm (FI-150).
- RCP seal injection flows are:

<u>RCP</u>	<u>SEAL INJ</u>
"A"	8.3 gpm
"B"	7.9 gpm
"C"	7.8 gpm

- Seal return flows are:

"A"	3.4
"B"	3.3
"C"	3.3

Which ONE (1) of the following would be the expected flow indication on 1-CH-FI-122A, Charging Header Flow, assuming NO RCS leakage?

a. 21 gpm

b. 31 gpm

c. 36 gpm

d. 54 gpm

63.

The following conditions exist:

- A valve lineup is required on the Gas stripper.
- Operations and Health Physics have predicted the following:
- The lineup will take 4.5 Man-Hours.
- The dose rates within the area are 30 mr/hr.
- If shielding were placed, the dose rates would be 10 mr/hr.
- The time to place the shielding is 1.25 hours and takes 2 persons (assume the dose rate for these individuals is 30 mr/hr during the entire evolution).

Which ONE (1) of the following identifies the minimum dose that can be achieved for this evolution?

a. 45 mr

b. 83 mr

c. 120 mr

d. 135 mr

64.

Given the following conditions:

- The Unit was operating at 100% power.
- G-A-6, ROD CONT SYS URGENT FAILURE is lit.
- G-B-5, COMPU PRINTOUT ROD CONT SYS is lit.
- G-H-1, NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC is lit.
- G-H-2 RPI ROD BTM < 20 STEPS is lit.

Which ONE (1) of the following procedures is initially implemented to respond to the event?

a. AP-1.00, "Rod Control System Malfunction."

b. AP-1.01, "Control Rod Misalignment."

c. AP-1.02, "Individual Rod Position Indicators (IRPI)."

d. AP-4.00, "Nuclear Instrumentation Malfunction."

65.

Given the following conditions:

- A line break caused the Fire Header pressure to drop.
- Fire Header pressure eventually stabilized at 83 psig.

Which ONE (1) of the following expected fire system responses would have resulted in this condition?

a. The Electric Fire Pump automatically started, then the Diesel Fire Pump automatically started.

b. The Electric Fire Pump automatically started and the Diesel Fire Pump remained in standby.

c. The Diesel Fire Pump automatically started, then the Electric Fire Pump automatically started.

d. The Diesel Fire Pump automatically started and the Electric Fire Pump remained in standby.

66.

Given the following conditions with the #1 EDG paralleled to the "F" transfer bus for a load test:

- Voltage – 4200 V
- Load – 1560 Kw
- Speed – 900 RPM
- VARS - +270 KVAR
- Frequency – 59.8 Hz

Which ONE (1) of the following describes the indications of taking the "Emerg Gen No 1 Volt ADJ" to the lower position?

a. Voltage decreases

b. VARS decrease

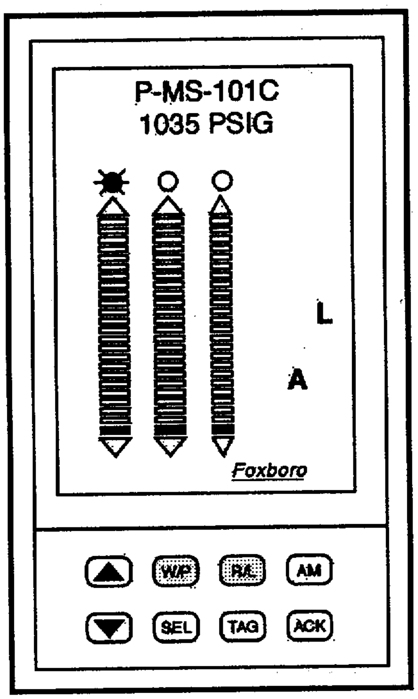
c. Speed decreases

d. Frequency increases

67.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- The "A" S/G PORV controller is in the condition pictured below.



- The steam line pressure input to the "A" S/G PORV controller fails high.

Which ONE (1) of the following describes the "A" S/G PORV response to this failure?

a. No response. The PORV controller is in LOCAL CONTROL from the instrument racks.

b. The "A" S/G PORV opens fully.

c. No response. The PORV is in the SETPOINT ADJUST mode of control.

d. The PORV is incapable of automatic operation due to the controller sensing an input failure.

68.

Given the following conditions:

- A small break LOCA has occurred.
- Entry has been made into FR-C.1, "Response to Inadequate Core Cooling."
- CETs are all indicating between 740°F and 760°F and rising slowly.
- RCS pressure has stabilized at 1605 psig.
- PZR level is off-scale low.
- RVLIS Full Range is indicating 39% and lowering slowly.
- HHSI is <u>NOT</u> available.
- SG pressures are all between 360 psig and 400 psig.

Which ONE (1) of the following actions should be taken?

a. Dump steam to cooldown and depressurize the RCS to provide LHSI flow.

b. Open the RCS Vent System valves to depressurize the RCS to provide LHSI flow.

c. Start an RCP immediately to provide forced cooling flow.

d. Open the PZR PORVs to depressurize the RCS to provide LHSI flow.

69.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- Unit 2 is operating at 60% power with "A" MFP out of service for repairs.
- Low Level Transformer 1G is lost due to a lightning strike, causing a loss of four (4) Circ Water Pumps.

Which ONE (1) of the following describes the correct operator response for this event IAW AP-12.01, "Loss of Intake Canal Level?"

a. Reduce turbine load and throttle Circ Water to the condenser waterboxes to conserve canal level. When condenser vacuum reaches 19" Hg, manually trip both Units.

b. Manually trip both Units when Annunciator B-E-6, INTAKE CANAL HI-LO LEVEL, alarms for low canal level at 26 feet.

c. Initiate 1-E-0, Reactor or Safety Injection, when canal level decreases to 23.5 feet.

d. Manually trip both Units when canal level decreases below 17 feet, 2 inches.

70.

Given the following conditions:

- The unit is operating at 2% power.
- The following RCP indications are observed:

INDICATION	RCP "A"	RCP "B"	RCP "C"
Motor Bearing Temperatures	210°F and ↑ slowly	180°F and stable	195°F and ↑ slowly
#1 Seal Leakoff Temperatures	150°F and stable	150°F and stable	165°F and ↑ slowly
#1 Seal Leakoff Flow	5.8 gpm and stable	4.2 gpm and stable	3.8 gpm and stable
Seal Injection	7.4 gpm	8 gpm	8.2 gpm
Frame Vibration	3.6 mils and ↑ at 0.1 mil per hr	2.8 mils and stable	4 mils and ↑ at 0.05 mil per hr
Shaft Vibration	12 mils and stable	7 mils and stable	9.5 mils and ↑ at 0.6 mils per hour

Which ONE (1) of the following describes the actions required for this condition?

a. Stop "A" RCP and enter Technical Specification 3.1, Reactor Coolant System.

b. Trip the reactor, initiate E-0, "Reactor Trip or Safety Injection," and stop "A" RCP.

c. Stop "C" RCP and enter Technical Specification 3.1, Reactor Coolant System.

d. Trip the reactor, initiate E-0, "Reactor Trip or Safety Injection," and stop "C" RCP.

71.

A fire in the Main Control Room has forced evacuation. The fire has initiated a transient, which has left <u>NO</u> Unit 1 CC pumps running.

Which ONE (1) of the following identifies how a Unit 1 CC pump can be restarted?

a. Depress the "START" pushbutton inside the breaker cubicle.

b. Transfer control to the Aux Shutdown Panel (ASDP) and start the pump at the ASDP.

c. At the Breaker panel, select "Local," and start the pump at the breaker control panel.

d. Locally start the pump from the Unit 1 Appendix "R" panel.

72.

Which ONE (1) of the following actions occurs when a high radiation alarm is received on RI-CC-105 or 106, Component Cooling Water Radiation Monitor?

a. Isolates the makeup header to the Component Cooling (CC) System.

b. Shuts the CC Surge Tank Vent Valve.

c. Isolates the RCP thermal barrier CC return header.

d. Shuts the CC Temperature Control Valve to the NRHX.

73.

Given the following plant conditions:

- Unit 1 is in Refueling Shutdown.
- Fuel movement is in progress.
- Due to a malfunction in the manipulator crane control circuitry, the underload protection circuit stopped the hoist downward travel before the fuel assembly was fully set down on the lower core plate pins.

Which ONE (1) of the following individuals can authorize the interlock bypass for the underload condition to allow fully lowering the fuel assembly into the core?

a. Unit 1 SRO.

b. Shift Supervisor.

c. Refueling SRO.

d. Operations Manager on Call (OMOC).

74.

Given the following conditions:

- The unit is operating at 50% power.
- PZR level transmitter 1-RC-LT-460 (channel II) failed low and was removed from service.
- The PZR high level Reactor Trip and low level Annunciator bistables associated with 1-RC-LT-460 were placed in the TRIPPED condition.
- PZR level channel selector switch 1-RC-LM-459 was selected to Position 2, Channel 1 upper, Channel 3 lower position.

Which ONE (1) of the following describes the function provided by PZR level transmitter 1-RC-LT-461 under these conditions?

a. Energizes the backup heaters on a high level deviation.

b. Decreases charging flow on an increasing level.

c. De-energizes the proportional and backup heaters on a low level.

d. Automatically closes 1-CH-LCV-1460A on a low level.

75.

Given the following conditions:

- Reactor power was initially 100%.
- All CC flow has been lost to the RCPs and a reactor trip has been initiated.

Which ONE (1) of the following nuclear instrument indications would warrant entry into FR-S.1, "Response to Nuclear Power Generation/ATWS?"

a. Intermediate range startup rate is +0.1 dpm.

b. Power range indicates 3% and decreasing.

c. Source range startup rate is +0.1 dpm.

d. **NEITHER** source range channel is energized and intermediate startup rate is -0.1 dpm.

76.

Given the following plant conditions:

- Control Rod P-6 dropped into the core from 100% power.
- Unit 1 reactor power is presently at 70% after ramping following the dropped rod.
- The operating team has completed the ICCE brief and is ready to commence withdrawal of Control Rod P-6.
- The time since the rod dropped is 2 hours.

Which ONE (1) of the following identifies the maximum rod withdrawal rate while recovering the dropped rod?

a. 72 steps per minute.

b. 48 steps per minute.

c. 3 steps per hour.

d. 2 steps per hour.

77.

Which ONE (1) of the following can NOT supply a direct suction source of water to the Auxiliary Feedwater Pumps?

a. 1-CN-TK-1, 110,000 Gallon Aboveground Emergency Condensate Storage Tank.

b. 1-CN-TK-2, 300,000 Gallon Normal Condensate Storage Makeup Tank.

c. 1-CN-TK-3, 100,000 Gallon Horizontal Emergency Makeup Tank via the AFW Booster Pumps.

d. Fire Main.

78.

Given the following conditions:

- A turbine governor valve failed shut reducing power from 100% to 70% power.
- RCS Tavg is 567°F.
- PZR Pressure is 2265 psig.
- PZR Level is 51%.

Which ONE (1) of the following describes the expected condition of the proportional heaters and pressurizer spray valves?

	PROPORTIONAL HEATERS	SPRAY VALVES
a.	On	Open
b.	On	Closed
c.	Off	Open
d.	Off	Closed

79.

Following an accident, FR-C.2, "Response to Degraded Core Cooling," is being implemented.

After the performance of several steps in FR-C.2, the following Critical Safety Function Status Tree (CSFST) conditions are noted:

- Integrity - RED
- Core Cooling - RED
- Containment - ORANGE
- Heat Sink - YELLOW
- Subcriticality - YELLOW
- Inventory – YELLOW

Which ONE (1) of the following describes which action should be taken by the Operating Team?

a. Remain in FR-C.2, "Response to Degraded Core Cooling," until completion and then recheck the CSFSTs.

b. Transition to FR-C.1, "Response to Inadequate Core Cooling," due to the RED condition on Core Cooling.

c. Transition to FR-P.1, "Response to Imminent Pressurized Thermal Shock," due to the RED condition on Integrity.

d. Transition to FR-Z.1, "Response to High Containment Pressure," due to the ORANGE condition on Containment.

80.

The following events and actions occurred on Unit 1 in order:

- An unisolable Main Steam Line Break occurred on "A" S/G.
- Auxiliary Feedwater was isolated to "A" S/G.
- AMSAC has been reset to allow securing the Turbine-Driven Auxiliary Feedwater Pump.
- A Safety Injection has just initiated due to the Steam Line Break.
- An AFW MOV open signal is generated when SI is initiated.

Which ONE (1) of the following describes the actions required to close the "A" S/G AFW MOVs?

a. No action is required. The "A" S/G AFW MOVs will remain closed due to "A" S/G low pressure.

b. Immediately place both AFW MOV control switches in the closed position and release. Observe valve position indication until both valves are fully closed.

c. Wait until the valves are full open, then place and hold both AFW MOV control switches in the closed position until valves are fully closed.

d. Wait until the valves are full open then place both AFW MOV control switches in the closed position and release. Observe valve position indication until both valves are fully closed.

81.

Given the following conditions:

- The unit is operating at 100% power.
- Channel III PZR Pressure PT-457 is failed, with all bistables in the TRIPPED condition.
- An electrical fault occurs which results in a loss of Vital Bus 2.

Which ONE (1) of the following describes the impact that the loss of Vital Bus 2 has on the plant?

a. A reactor trip occurs and **BOTH** trains of Safety Injection initiate.

b. A reactor trip occurs, but **ONLY** Train "A" of Safety Injection initiates.

c. A reactor trip occurs, but **ONLY** Train "B" of Safety Injection initiates.

d. A reactor trip occurs, but **NO** SI occurs.

82.

Given the following conditions:

- Unit 1 is in Hot Shutdown.
- A loss of "F" Transfer Bus occurs.

Which ONE (1) of the following identifies plant equipment that is affected by the power loss?

a.
- 1-RC-P-1A, "A" Reactor Coolant Pump
- 1-FW-P-1A, "A" Main Feed Pump

b.
- 1-RC-P-1B, "B" Reactor Coolant Pump
- 1-FW-P-1B, "B" Main Feed Pump

c.
- 1-RC-P-1C, "C" Reactor Coolant Pump
- 1-FW-P-1B, "B" Main Feed Pump

d.
- 1-CN-P-1B, "B" Condensate Pump
- 1-FW-P-1A, "A" Main Feed Pump

83.

Given the following plant conditions:

- A Large Break LOCA has occurred on Unit 1.
- 1-FR-Z.2, "Response to Containment Flooding," has been initiated due to high water level in Containment.

Which ONE (1) of the following pipe breaks would result in the highest water level inside Containment if the leakage cannot be isolated?

a. Component Cooling header to the Residual Heat Removal Heat Exchanger.

b. Service Water header to the "B" Recirc Spray Heat Exchanger.

c. Containment Primary Grade Water header.

d. Unit 2 RWST via the crosstie line.

84.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- A fault on the "B" DC bus initiates a loss of "B" DC bus.

Which ONE (1) of the following is **NOT** an action that occurs due to the loss of the "B" DC bus?

a. The reactor trips due to loss of power to "B" reactor trip breaker undervoltage coil.

b. #3 EDG auto-starts due to loss of power to the undervoltage detection circuit.

c. Annunciators F through K are de-energized due to loss of power to control circuit.

d. 4KV breakers on "B" Station Service Bus lose control power.

85.

Which ONE (1) of the following describes the correct lineup and operation of the Liquid Waste System?

a. Both High Level Waste Tank Pumps can take suction on both High Level Waste Tanks through a suction crosstie valve and trip off on high level in the High Level Waste Tanks.

b. Both High Level Waste Tank Pumps can take suction on both High Level Waste Tanks through a suction crosstie valve and trip off on low level in the High Level Waste Tanks.

c. The High Level Waste Tank Pumps can take suction on either the High Level Waste Tank or the Low Level Waste Tank through suction line crosstie valves and trip off on high level in the High Level or Low Level Waste Tanks.

d. The High Level Waste Tank Pumps can take suction on either the High Level Waste Tank or the Low Level Waste Tank through suction line crosstie valves and trip off on low level in the High Level or Low Level Waste Tanks.

86.

Given the following conditions:

- The plant is being started up.
- The operator is in the process of shifting feedwater from bypass control to Main Feed Regulating Valve Control with the Main Feed Regulating Valves and Feed Water Bypass Valves all throttled open.
- A Reactor Trip occurs.
- RCS Tavg stabilizes at no load Tavg.

Which ONE (1) of the following identifies the expected position of the Feed Water Regulating Bypass Valves (FRBVs) and the Feed Water Regulating Valves (FRVs)?

	FRBVs	FRVs
a.	Open	Open
b.	Open	Closed
c.	Closed	Open
d.	Closed	Closed

87.

A loss of Component Cooling to the Containment Air Recirc Fans results in Containment temperature increasing from 95°F to 125°F.

Which ONE (1) of the following describes the effects on indicated pressurizer level if actual level in the pressurizer is held constant?

a. Increases due to reference leg heating effects of increasing Containment temperature.

b. Decreases due to reference leg heating effects of increasing Containment temperature.

c. Does not change because indicated pressurizer level is not affected by Containment temperature.

d. Does not change because the mass change due to reference leg heating is displaced back into the pressurizer.

88.

Given the following conditions:

- Unit 1 is in Hot Shutdown.
- The Reserve Station Transformers are supplying all Unit 1 4KV buses.
- A severe short has resulted in a loss of the Unit 1 "B" DC Bus.

Which ONE (1) of the following describes the response of the emergency diesel generators (EDGs)?

	#1 EDG	#3 EDG
a.	Starts and Loads	Does NOT start
b.	Does NOT start	Starts and Loads
c.	Does NOT start	Starts, but does NOT Load
d.	Starts, but does NOT Load	Starts and Loads

89.

Given the following conditions:

- The unit is operating at 80% power.
- A misaligned rod in Group 2 of Control Bank "D" has occurred.
- A recovery of the misaligned rod has just begun.
- Annunciator G-A-6, ROD CONT SYSTEM URGENT FAILURE, has just alarmed.

Which ONE (1) of the following indicates the cause of the "Urgent Failure" alarm?

a. IRPI/Group step counter deviation.

b. Rod sequencing error.

c. Improper bank overlap with the "Rod Control Mode Select" switch in the bank select position.

d. The lift coils of the remaining rods in "D" bank are de-energized.

90.

Which ONE (1) of the following is the specified method for performing independent verification of a locked closed manual valve?

a. Verify that the lock is installed on the correct valve and properly locked.

b. Remove the lock, attempt to turn the valve handwheel in the closed direction, reinstall the locking device.

c. Attempt to move the valve handwheel in the open direction with the lock installed.

d. The verifier must observe the initial valve operations and placement of the locking device.

91.

Given the following conditions:

- The unit has just experienced a reactor trip.
- NO SI equipment has actuated.
- 2 turbine stop valves are shut.
- 3 turbine governor valves are shut.
- RCS pressure is 1860 psig.
- Tavg is 542°F.
- All MSTVs are open.
- SG Pressures and Steam Flows are:

SG	PRESSURE	STEAM FLOW
"A"	925 psig	0.1×10^6 lbm/hr
"B"	935 psig	0.1×10^6 lbm/hr
"C"	845 psig	1.3×10^6 lbm/hr

Which ONE of the following identifies the status of the turbine trip (1), and the automatic SI requirement (2)?

	(1)	(2)
a.	tripped	NOT required.
b.	tripped	required.
c.	NOT tripped	NOT required.
d.	NOT tripped	required.

92.

Given the following conditions:

- A reactor trip occurred due to a loss of offsite power.
- The plant is being cooled down on RHR per 1-ES-0.2, "Natural Circulation Cooldown."
- RVLIS upper range indicates greater than 100%.
- All CRDM fans have been running during the entire cooldown.
- RCS cold leg temperatures are 190°F.
- Steam generator pressures are 50 psig.

Which ONE (1) of the following indicates why steam should be dumped from all SGs?

a. To ensure boron concentration is equalized throughout the RCS prior to taking a sample to verify cold shutdown boron conditions.

b. To ensure all inactive portions of the RCS are below 200°F prior to complete RCS depressurization.

c. To ensure RCS and SG temperatures are equalized prior to any subsequent RCP restart.

d. To ensure RCS temperatures do **NOT** increase during the required 29-hour vessel soak period.

93.

Given the following conditions:

- The unit is operating at 100% power.
- A release is in progress from Waste Gas Decay Tank "A".
- A loss of power to the process vent particulate radiation monitor occurs.
- "A" Process Vent Blower is in service.

Which ONE (1) of the following describes how the release is affected as a result of the loss of power?

a. Automatically terminates.

b. Must be manually terminated.

c. Unaffected.

d. Must be realigned through the "B" Process Vent Blower.

94.

Which ONE (1) of the following conditions related to the Pressurizer would require entry into a Technical Specification action statement?

a. Pressurizer level is 68% with the plant operating at 8% power.

b. Pressurizer pressure is 2185 psig at 45% power.

c. "A" Pressurizer heater group breaker trips open.

d. 1-RC-PCV-1455A controller is in manual.

95.

Given the following conditions:

- The unit is operating at 75%.
- Rod Control is in AUTO.
- Bank "D" control rods are at 195 steps.
- Tref is 566.9°F.
- Loop Tavgs are:

LOOP	T-AVG
"A"	569°F
"B"	567°F
"C"	566°F

Which ONE (1) of the following failures will cause control rods to step inward?

a. Loop A Thot fails high

b. Loop A Tcold fails low

c. Loop B Tcold fails high

d. Loop C Thot fails low

96.

Given the following conditions:

- The unit is operating at 30% power.
- A dropped control rod has just been re-aligned.
- While attempting to reset the Rod Control Urgent Failure alarm, the operator inadvertently pushes the Rod Control STARTUP button.

Which ONE (1) of the following describes the effect of operating the incorrect button?

a. Only Control Bank control rods drop into the core, causing an automatic reactor trip.

b. All rods, including Control Bank and Shutdown Bank rods, drop into the core, causing an automatic reactor trip.

c. All rods remain in their current position and there is **NO** effect on the Rod Control System circuitry.

d. All rods remain in their current position, but the Rod Control System circuitry senses all rods are fully inserted.

97.

The following conditions exist on Unit 1:

- "J" 4160 Volt emergency bus is de-energized due to a fault on the bus.
- A Hi-Hi CLS is initiated due to a Large Break LOCA occurring after "J" Bus was de-energized.

Which ONE (1) of the following describes the Service Water (SW) alignment to the Recirc Spray Heat Exchangers (RSHXs)?

a. All RSHXs will have SW aligned since all SW flowpaths are parallel and redundant.

b. One Inside RSHX and one Outside RSHX will have SW flow aligned through them.

c. Both Inside RSHXs will have SW flow aligned through them.

d. Both Outside RSHXs will have SW flow aligned through them.

98.

Which ONE (1) of the following combinations of Radiation Monitors will automatically isolate Containment Purge on a High Radiation Alarm?

a. RM-161, Containment Hi Range Gamma Area Monitor **(or)** GW-RI-101, Process Vent Particulate Monitor.

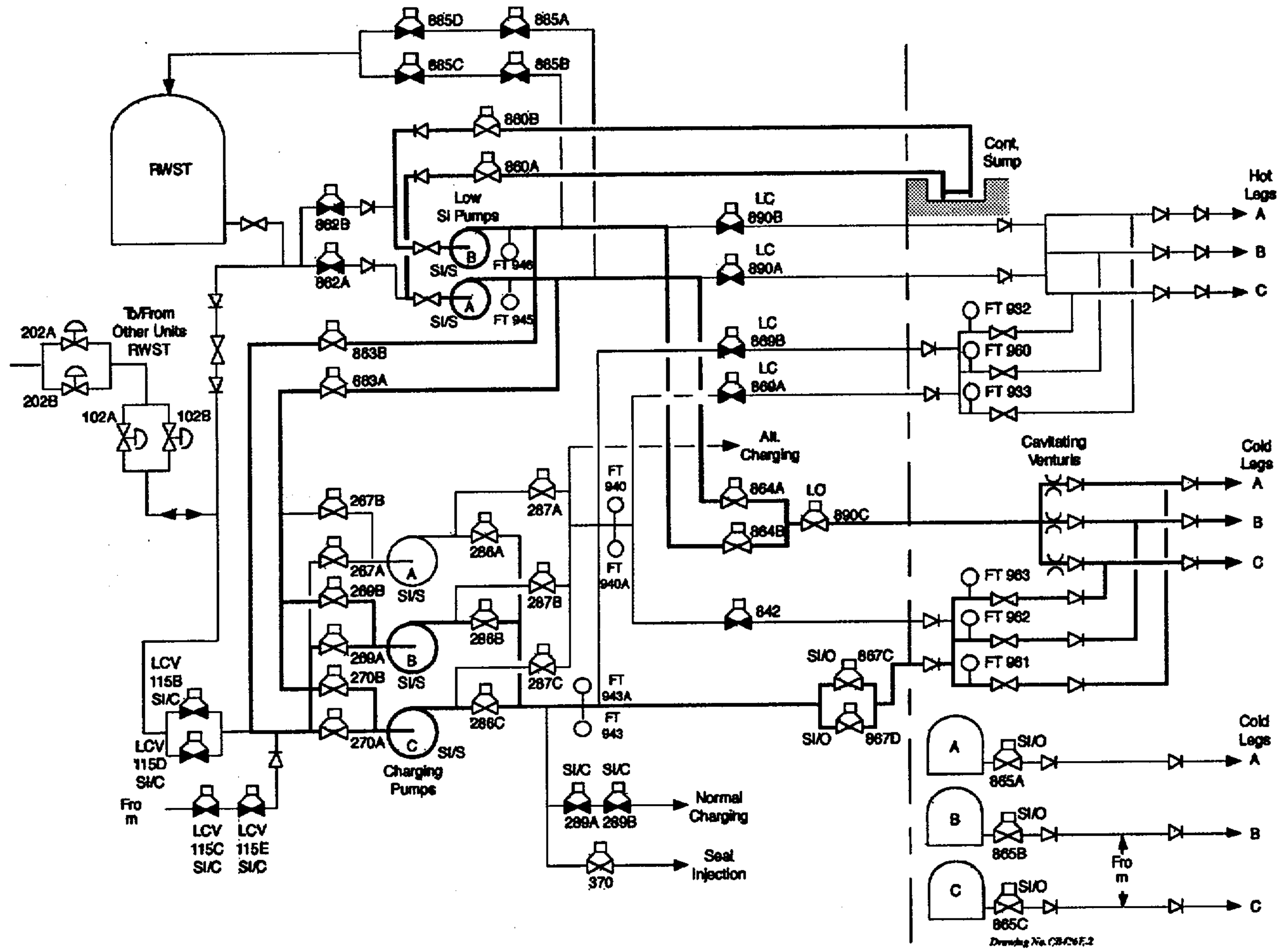
b. RM-162, Manipulator Crane Area Monitor **(and)** RM-163, Reactor Containment Area Monitor.

c. RM-162, Manipulator Crane Area Monitor **(or)** RM-RI-159, Containment Particulate Monitor.

d. GW-RI-102, Process Vent Gas Monitor **(and)** RM-RI-160, Containment Particulate and Gas Monitor.

99.

Given the following drawing containing an ECCS alignment:



Which ONE (1) of the following describes the ECCS alignment?

a. Cold leg injection

b. Cold leg recirculation

c. Hot leg injection

d. Cold leg redundant flowpath

100.

Given the following conditions:

- A Large Break LOCA has occurred.
- 1-E-1, "Loss of Reactor or Secondary Coolant," is being implemented.
- The Unit SRO directs you to "Verify Cold Leg Recirculation Capability."

Which ONE (1) of the following describes the actions permitted during performance of "Verifying Cold Leg Recirculation Capability"?

a. Restoring a flowpath from the containment sump to the LHSI pumps.

b. Aligning a flowpath from the LHSI pumps to the HHSI pumps.

c. Restoring power to SI valves that operate during Recirc Mode Transfer.

d. Aligning a flowpath from SI pumps to the hot legs.

FINAL SUBMITTAL

SURRY RETAKE EXAM
50-280, 281/2001-301
APRIL 2, 2001 (WRITTEN) &
APRIL 16-17, 2001 (ADMIN)

FINAL RO LICENSE EXAM

REFERENCE MATERIAL

SURRY LORP EQUATION SHEETS

Reactor Physics/Health Physics

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

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

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

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

$$DRW \propto \frac{\phi^2_{tip}}{\phi^2_{avg}}$$

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

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

$$\lambda = \frac{\ln 2}{T_{1/2}}$$

$$E = mc^2$$

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

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

$I_1 d_1 = I_2 d_2$ – Line source

$I_1 d_1^2 = I_2 d_2^2$ – Point source

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

SURRY LORP EQUATION SHEETS

Reactor Physics/Health Physics

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

$$\frac{1}{M} = \frac{CR_1}{CR_x}$$

$$P = P_o e^{\left(\frac{1}{\tau}\right)}$$

$$P = P_o 10^{sur(t)}$$

$$SUR = \frac{26.06}{\tau}$$

$$SUR = \frac{26\rho}{1^* + (\beta - \rho)T}$$

$$SUR = \frac{26.06(\lambda_{eff}\rho)}{(\overline{\beta} - \rho)}$$

$$\tau = \frac{\overline{\beta} - \rho}{\lambda_{eff} - \rho}$$

$$\tau = \frac{l^*}{\rho} + \left[\frac{(\overline{\beta} - \rho)}{\lambda_{eff}\rho}\right]$$

$$\lambda_{eff} = 0.1 \sec^{-1}$$

$$\ell^* = 2x10^{-5} \sec$$

$$\tau = \frac{l^*}{(\rho - \overline{\beta})}$$

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

SURRY LORP EQUATION SHEETS
Thermodynamics/Fluid Dynamics

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

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

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

$$\dot{Q} \propto \dot{m}^3{}_{NatCirc}$$

$$\Delta T \propto \dot{m}^2{}_{NatCirc}$$

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

$$w = v\Delta \mathrm{P}$$

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

$$Pwr = W_f\dot{m}$$

$$Pwr = W_f\Delta h$$

$$Cycle\ \ Effeciency = \frac{Net\ Work\ Out}{Energy\ \ In}$$

$$s = v_0t + \frac{1}{2}at^2$$

$$v = s/t$$

$$V_f = V_0 + at$$

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

$$w = \frac{\theta}{t}$$

$$f = ma$$
$$w = mg$$
$$PE = mgn$$
$$F = PA$$

$$\dot{m} = v_{av}A\rho$$

$$\dot{m} = \rho Av$$

$$v(P_e - P_1) + \frac{1}{2}(v_e^{-2} - v_1^{-2}) + g(z_e - z_1) = 0$$

$$Z_1 + P_1v_1 + \frac{v_1^{-2}}{2g} + h_p = Z_2 + P_2v_2 + \frac{v_2^{-2}}{2g} + h_L$$

$$g_c = \frac{32.2\,lbm - ft}{lbf - \sec^2}$$

$$\dot{V} \propto N$$

$$H_p \propto N^2$$

$$BHP \propto N^3$$

$$H_L = K\frac{\dot{v}^2}{2}$$

$$H_L = f\,\frac{LV^2}{2D}$$

$$1\,Mw = 3.41x10^6\ Btu/hr$$

$$1\,hp = 2.54x10^3\ Btu/hr$$

$$1\,Btu = 778\,ft\ lbf$$

$$°C = (5/9)(°F - 32)$$

$$°F = (9/5)(°C) + 32$$

$$1\,kg = 2.21\ lbm$$

$$1\,ft^3 = 7.48\ gal$$

SURRY LORP EQUATION SHEETS

Electrical Theory

$$E = IR$$

$$R_T = R_1 + R_2 + R_3 + \ldots$$

$$L_T = L_1 + L_2 + L_3 + \ldots$$

$$C_T = \frac{1}{\frac{1}{c_1} + \frac{1}{c_2} + \frac{1}{c_3} + \ldots}$$

$$I = \frac{E}{Z}$$

$$Z = \sqrt{R^2 + (X_L - X_c)^2}$$

$$Z = \frac{E}{\sqrt{I_R{}^2 + (I_L - I_c)^2}}$$

$$\theta = \tan^{-1} \frac{X_L - X_C}{R}$$

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots}$$

$$L_T = \frac{1}{\frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} + \ldots}$$

$$C_T = C_1 + C_2 + C_3 + \ldots$$

$$\theta = \tan^{-1} \frac{I_L - I_C}{I_R}$$

$$I_R = \frac{E}{R};\quad I_C = \frac{E}{X_C};\quad I_L = \frac{E}{X_L}$$

$$F = k\frac{q_1 q_2}{r_2}$$

$$k = 9x10^9 \frac{Nm^2}{C^2}$$

$$E = k\frac{q_1}{r^2}$$

$$Pn = 120f$$

$$Period(T) = \frac{1}{f}$$

$$X_L = 2\pi fL;\quad X_c = \frac{1}{2\pi fC}$$

$$Power = EI \quad or \quad Power = VI$$

$$Power\ Factor = pf = \cos\theta$$

$$AP = VI;\ TP = VI\cos\theta;\ RP = VI\sin\theta$$

$$AP = \sqrt{3}VI$$

$$TP = \sqrt{3}VI\cos\theta;\quad RP\sqrt{3}VI\sin\theta$$

FINAL SUBMITTAL

SURRY RETAKE EXAM
50-280, 281/2001-301
APRIL 2, 2001 (WRITTEN) &
APRIL 16-17, 2001 (ADMIN)

FINAL RO AND SRO WRITTEN EXAM WITH ANSWERS

SURRY POWER STATION

JIM CUSTER RE-EXAMINATION

ANSWER KEY WITH REFERENCES ATTACHED

*1.

The following conditions exist:

- Unit 1 is at 100%
- Charging pump, 1-CH-P-1A, is running.
- Charging Service Water Pump, 1-SW-P-10A, is running.
- Charging Service Water Pump, 1-SW-P-10B, is tagged out for motor replacement (motor currently removed).
- All other Station components are operable.

Which ONE (1) of the following actions is required if 1-SW-P-10A trips on motor fault?

a. Immediately start 1-CH-P-1B for continued operation and secure 1-CH-P-1A.

b. Establish gravity feed and bleed for the 1-CH-P-1A oil cooler.

c. Establish Charging Service water cross tie from the opposite unit.

d. Place 1-SW-S-10 in service to establish Charging Service Water flow from the Station Service Water System.

ANSWER: c

Reference: 1-AP-12.00 steps 1-8, ND-89.5-H/T-2.5.
Difference between Surry and Robinson: New Surry Question

Justification:

a. Guidance to shift charging pumps to minimize heatup is given, however **not** for long-term continued operation (AP-12.00, step 5).

b. Plausible, since SW supply is higher than the oil cooler. No guidance exists for this evolution.

c. Correct Answer (See AP-12.00, Step 8 RNO).

d. Plausible, since this action could be taken to restore SW to the Main Control Room chillers (notice critical load off service water)(AP-12.00, Sep 1 RNO / ND-89.5-H/T-2.5).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- The maximum ΔP across MER 3 SW strainers is 5 PSID.
- SW system low pressure alarms may be caused by obstructed sensing lines to pressure switches.
- ΔP gage sensing lines must be able to vent water for the associated gage to be accurate. 6

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	___LOCALLY CHECK SW STRAINER ΔP - NORMAL	
	a) Motorized strainers: • 1-VS-S-1A • 1-VS-S-1B	a) Locally put duplex strainer 1-SW-S-10 in service IAW the following: 1) Open 1-SW-264, 1-SW-S-10 Inlet. 2) Vent from 1-SW-304, Inlet Hdr Vent. 3) Open 1-SW-265, 1-SW-S-10 Outlet. 4) <u>IF</u> 1-VS-S-1A has high ΔP, <u>THEN</u> close the following Self-Cleaning Strainer SW valves: • 1-SW-301, Inlet • 1-SW-302, Outlet 5) <u>IF</u> 1-VS-S-1B has high ΔP, <u>THEN</u> close the following Rotating Strainer SW valves: • 2-SW-305, Inlet • 2-SW-306, Outlet 6) Clean Motorized Strainers: • 1-VS-S-1A • 1-VS-S-1B
	b) CHG pump SW pump suction strainers: • ()-SW-S-2A, ()-SW-P-10A • ()-SW-S-2B, ()-SW-P-10B	b) Do the following: 1) Put standby strainer in service. 2) Clean dirty strainer.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: The maximum ΔP across MER 5 SW strainers is 10 PSID.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	__LOCALLY CHECK MER 5 SW STRAINER ΔP - NORMAL • 1-SW-S-11	Do the following: a) Put standby strainer in service. b) Clean dirty strainer.
3.	__CHECK CHG PUMP SERVICE WATER SYSTEM - ABNORMAL CONDITION EXISTS	GO TO Step 9.
4.	__VERIFY CHG PUMP SW PUMPS - AT LEAST ONE RUNNING • ( )-SW-P-10A • ( )-SW-P-10B	Manually start pump.

* *

CAUTION: Charging pumps should be secured if bearing temperatures reach 185 °F.

* *

NOTE:
- Preparations should be made to shift charging pumps if bearing temperatures exceed 180 °F.
- The system engineer should be notified as soon as possible if charging pump bearing temperatures exceed 180 °F.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 5.	__CHECK CHG PUMP TEMPERATURES - LESS THAN 180°F	Shift CHG pumps as necessary.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>NOTE</u>: If CHG pump SW pumps are air bound, SW pumps may need to be started and stopped during venting to remove all entrained air.

6. __LOCALLY CHECK CHG PUMP SW PUMP(s)

a) Discharge pressure - GREATER THAN 15 PSIG

a) Do the following:

1) Send operator to Aux Bldg to look for leaks and locally verify SW flow.

2) <u>IF</u> BOTH pumps are running, <u>THEN</u> secure the pump with the lowest discharge pressure.

3) <u>IF</u> BOTH pumps have ZERO discharge pressure, <u>THEN</u> stop BOTH pumps.

4) Vent discharge of secured pump(s). Restart pump(s), stop pump(s), and vent as necessary.

b) Suction pressure - NORMAL

b) Do the following:

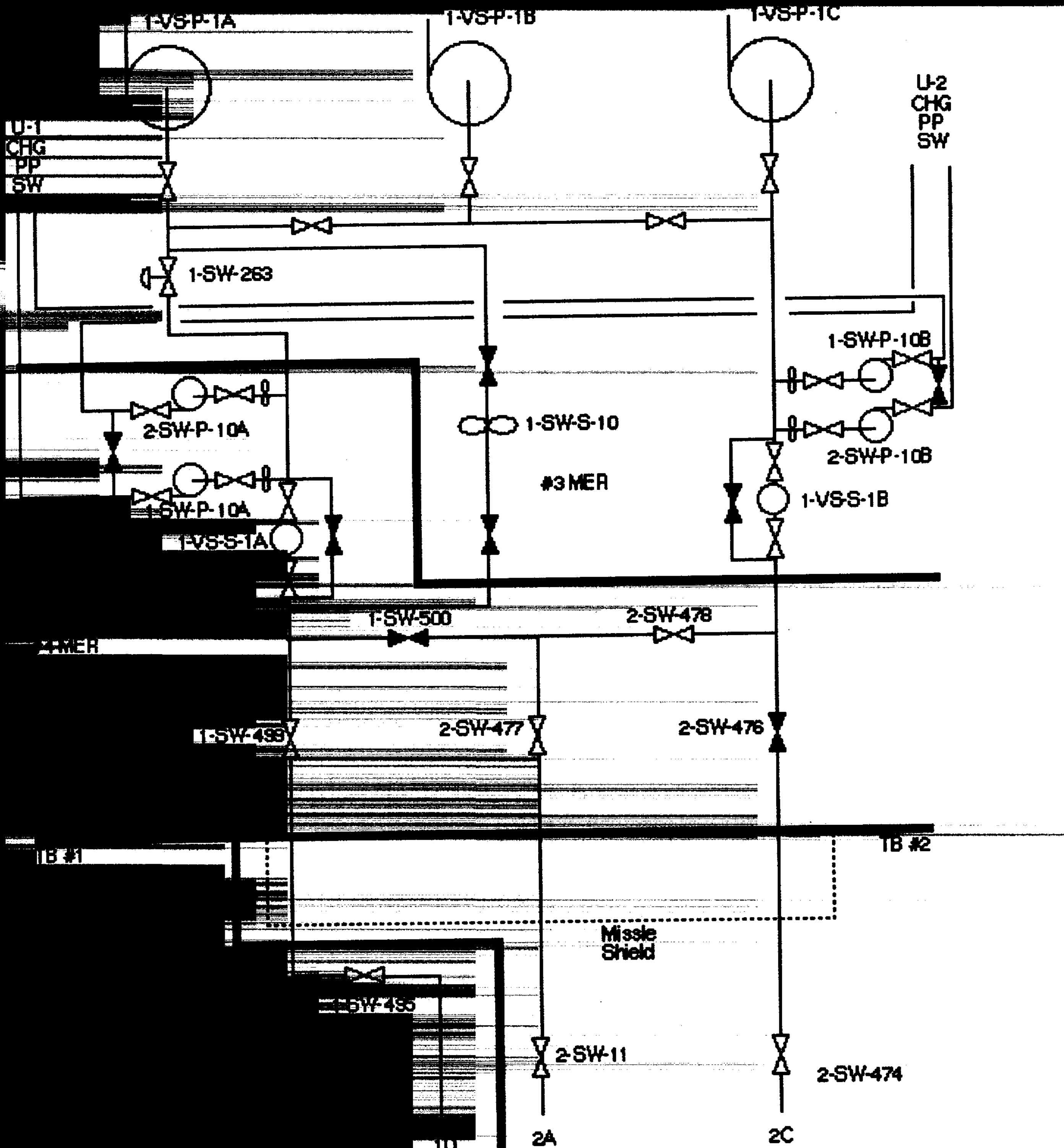
1) Check status of MER 3 Control Room chillers. <u>IF</u> TWO chillers are running, <u>THEN</u> secure one chiller to increase suction pressure.

2) Vent CHG pump SW pump suction piping and strainer.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	__MONITOR SW FLOW TO CHG PUMP(s) USING ERF COMPUTER • Reg Guide 1.97 Group Review • Single PV points: • F( )SW007A • F( )SW008A	Locally monitor SW flow to Intermediate Seal Cooler and CHG pump Lube Oil Coolers.
8.	__CHECK CHG PUMP SW PUMP(s) - ABNORMAL CONDITION CORRECTED	<u>IF</u> opposite unit CHG pump SW unaffected, <u>THEN</u> locally cross-tie SW: • <u>IF</u> ( )-SW-P-10B running, <u>THEN</u> open 2-SW-443. (MER 3) <u>OR</u> • <u>IF</u> ( )-SW-P-10A running, <u>THEN</u> open 1-SW-269. (MER 4) RETURN TO STEP 4.

<u>NOTE</u>: An LCO clock will be entered if the minimum required operable chiller requirement of Tech Spec 3.23 is not met.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	__CHECK MER 3 CONTROL ROOM CHILLERS - ONE RUNNING ON CHILLER WATER LOOP C: • 1-VS-E-4A • 1-VS-E-4B • 1-VS-E-4C	<u>IF</u> 1-VS-E-4A will be realigned from Chiller Water Loop A to Chiller Water Loop C, <u>THEN</u> initiate the appropriate subsection of 0-OP-VS-006, CONTROL ROOM AND RELAY VENTILATION SYSTEM. <u>IF</u> an MER 3 Chiller will be started, <u>THEN</u> GO TO Step 12. <u>IF</u> an MER 3 Chiller will <u>NOT</u> be started, <u>OR</u> 1-VS-E-4A will <u>NOT</u> be realigned, <u>THEN</u> GO TO Step 13.



SERVICE BUILDING SERVICE WATER SUBSYSTEM

QUESTION NUMBER: 1
TIER/GROUP: ***RO*** 1/1 ***SRO*** 1/1
K/A: 062 2.4.24

Knowledge of loss of cooling water procedures (Service Water).

K/A IMPORTANCE: ***RO*** 3.3 ***SRO*** 3.7
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: AOP-022-05

STATE the immediate action steps of AOP-022

REFERENCES: APP-008
AOP-022

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number AOP-022-05 002

JUSTIFICATION:

a. Plausible since a severe unisolated rupture could result in flooding in critical areas, but this is not an immediate operator action.

b. Plausible since the annunciators address the south header, but this is not an immediate operator action.

c. Plausible since this action would isolate the non-ruptured header from the ruptured header, but this is not an immediate operator action.

d. **CORRECT** Immediate action to close the cross-connect valves to prevent a loss of both headers.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Recall of AOP immediate actions

REFERENCES SUPPLIED:

*2.

Four Operators worked the following schedule at the Reactor Operator position over the past six days: HOURS WORKED (Shift turnover time not included. Do **NOT** assume any hours worked before or after this period.)

OPERATOR	**DAY 1**	**DAY 2**	**DAY 3**	**DAY 4**	**DAY 5**	**DAY 6**
1	10	14	off	12	12	12
2	14	12	14	10	off	11
3	off	off	off	13	11	14
4	11	13	14	off	11	12

Which ONE (1) of the operators would be permitted to work a 12-hour shift on Day 7 **WITHOUT** requiring permission to exceed normal overtime limits?

a. 1

b. 2

c. 3

d. 4

ANSWER: a

Reference: VPAP-0103, 6.4.5
Difference between Surry and Robinson: ChangedRTGB to Reactor Operator. Underlined **NOT** and **WITHOUT**. Overtime hours standard same between sites.

Justification:

N/A

6.4.3 No individual shall be permitted to work more than 16 hours straight, excluding shift turnover time without prior approval (Approval To Exceed Overtime Limits (Attachment 1)).

6.4.4 When an employee must work more than 16 hours straight there shall be a break of at least eight hours between work periods, including shift turnover time.

6.4.5 No individual shall work more than 16 hours in any 24 hour period, more than 24 hours in any 48 hour period, or more than 72 hours in any seven day period, excluding shift turnover time without prior approval (Approval To Exceed Overtime Limits (Attachment 1)).

6.4.6 If an NRC-licensed Operator is required to work more than 12 continuous hours, the Operator should be limited to no more than 12 hours performing duties as operator at the board (OATB).

6.4.7 If an NRC-licensed Operator has been working more than 12 hours during periods of extended shutdown (i.e., at duties away from the Main Control Board), then the Operator shall not be assigned licensed duties without at least a 12 hour break preceding such assignment.

6.4.8 Designated administrative staff personnel should provide Station department heads a report showing employees exceeding NRC guidelines on a monthly basis. The supervisory staff is responsible for monitoring compliance with the requirements of this procedure. **[Commitment 3.2.1]**

6.5 Notification of Absences and Personnel Recall

6.5.1 Notification of Absences

a. Personnel expecting to be late or unable to report for work at the scheduled time shall inform the cognizant department supervision at the earliest possible time.

b. Department supervision shall make the necessary arrangements for obtaining replacements for absent employees. This may include holding personnel over from a previous shift until replacements can be obtained.

6.5.2 Personnel Recall

a. The Shift Supervisor has the authority to call out required personnel regardless of discipline.

b. Other Station supervisors may call out subordinate personnel as necessary.

QUESTION NUMBER: 2
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.1.1

Knowledge of conduct of operations requirements.

K/A IMPORTANCE: *RO* 3.7 *SRO* 3.8
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: PLP-015-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in PLP-015 by explaining the basis of each

REFERENCES: PLP-015

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number PLP-015-03 002

JUSTIFICATION:

a. **CORRECT** Working a 12 hour shift on Day 7 would result in this operator working 24 hours out of 48, and 72 hours in 7 days, both of which are permissible.

b. Plausible since this operator would not exceed the 24 hours out of 48 limit and has had a recent day off, but would work 73 hours in 7 days which exceeds limit.

c. Plausible since this operator would not exceed the 72 hours in 7 day limit and has several recent days off, but would work more than 24 hours in 48 which exceeds limit.

d. Plausible since this operator would not exceed the 24 hours out of 48 limit and has had a recent day off, but would work 73 hours in 7 days which exceeds limit.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Compare given data to administrative limits to determine which selection would remain within limits

REFERENCES SUPPLIED:

Δ - RTGB position not applicable to Surry. RTGB changed to Reactor Operator [signature]

Reference — VPAP 0103 6.4.5

*3.

Given the following conditions:

- The unit was operating at 100% power when a pipe break occurred inside containment.
- Containment pressure is rising.
- RCS temperature is lowering.

Which ONE (1) of the following differentiates between a main feed line break inside containment and a main steam line break inside the containment of the same size?

a. RCS heat removal would be greater for the steam line break

b. Containment pressure would be greater for the feed line break

c. Containment radiation levels would be greater for the steam line break

d. RCS depressurization would be greater for the feed line break

ANSWER: a

Reference: N/A
Difference between Surry and Robinson: Identical Question removed non-isolable to take away ambiguity of what this means.

Justification:

N/A

QUESTION NUMBER: 3
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: 054AK1.01

Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): MFW line break depressurizes the S/G (similar to a steam line break)

K/A IMPORTANCE: *RO* 4.1 *SRO* 4.3
10CFR55 CONTENT: *55.41(b) RO* 5 *55.43(b) SRO*

OBJECTIVE: MCD-09-02

DESCRIBE the limiting analysis for the Containment Critical Safety function

REFERENCES: FSAR Accident Analysis
Steam Tables

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number MCD 001

JUSTIFICATION:

a. **CORRECT** Since the latent heat of vaporization would be removed from the RCS as feed water is boiled to steam, a greater amount of heat is removed from the RCS.

b. Plausible since feed water would flash to steam as it entered containment, but the steam break would provide more energy and a higher pressure.

c. Plausible since in the event of a concurrent SGTR gases would escape out the steam break earlier, but would eventually escape to the containment through a feed break once the break is uncovered.

d. Plausible since large amounts of cold feed water would be exiting the break, but the latent heat of vaporization removes more energy from the RCS and results in a greater depressurization.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comparison of different plant responses to different initiating accidents

REFERENCES SUPPLIED:

*4.

Given the following conditions:

- HP placed a radioactive waste container (primarily containing Cobalt 60) 5 feet from the Decon Building Area Radiation detector, 1-RM-RI-151.
- Prior to placement of the container, 1-RM-RI-151 was reading 2 mR/hr.
- After placement of the container 1-RM-RI-151 read 10 mR/hr.

If the container is moved 10 feet away from the 1-RM-RI-151 detector, 1-RI-RM-151 will indicate which ONE (1) of the following?

a. 4.0 mR/hr

b. 4.5 mR/hr

c. 6.0 mR/hr

d. 7.0 mR/hr

ANSWER: a

Reference: ND-81.2-LP-3, page 15.
Difference between Surry and Robinson: Modified Question. Rad Monitors changed for Surry Specific. Reworded for clarification.

Justification:

N/A

Any large object can take on the characteristics of a plane source, a line source or a point source, depending on distance. For example, with a large tank such as the RWST, if you are close to it, it has the characteristics of a plane source. As you move away, it takes on the characteristics of a line source, and, when you get far enough away, it assumes the characteristics of a point source.

a. Point Sources - Of these three types of sources, the point source is the most important due to the way the exposure rate decreases with increased distance. Quantitatively, the dose rate decreases as the square of the distance. This is otherwise known as the "Inverse Square" Law.

Write the following equation on the chalkboard & discuss the meaning of each term: $I_1(D_1)^2 = I_2(D_2)^2$ I_1 = initial intensity or dose rate D_1 = initial distance for I_1 I_2 = final intensity at distance D_2 D_2 = final distance from source

Refer to/display H/T-3.3, Point Source Example Problem. Step through the performance of the problem, answering any trainee questions.

QUESTION NUMBER: 4
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 072K5.02

Knowledge of the operational implications of the following concepts as they apply to the ARM system: Radiation intensity changes with source distance

K/A IMPORTANCE: *RO* 2.5 *SRO* 3.2
10CFR55 CONTENT: *55.41(b) RO* 12 *55.43(b) SRO*

OBJECTIVE: AOP-005-03

EXPLAIN the basis of selected steps, cautions, and notes in AOP-005

REFERENCES: GET

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number AOP-005-03 012

JUSTIFICATION:

a. **CORRECT** Container contributes 8 mr/hr to reading. If double the distance, then rate falls by factor of 1/r squared, or 4. Thus. final container contribution is 2 mr/hr. Background is still present (2 mr/hr) for a total of 4 mr/hr.

b. Plausible if applies the inverse-square-ratio to the entire reading of 10 mr/hr. If double the distance, then rate falls by factor of 4. Final container contribution is 2.5 mr/hr. Background is still present (2 mr/hr) for a total of 4.5 mr/hr.

c. Plausible if applies a linear ratio to the container contribution of 8 mr/hr. Final container contribution calculated to be 4.0 mr/hr. Background is still present (2 mr/hr) for a total of 6.0 mr/hr.

d. Plausible if applies a linear ratio to the entire reading of 10 mr/hr. Final reading calculated to be 5.0 mr/hr. Background is still present (2 mr/hr) for a total of 7.0 mr/hr.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 4

Calculation based on inverse square ratio using a point source

REFERENCES SUPPLIED:

*5.

Given the following conditions:

- At 0110, a Reactor Trip and Safety Injection occurred following an accident.
- At 0112, an Alert was declared due to RCS leakage.
- At 0116, a Site Area Emergency was declared.
- At 0120, a General Emergency was declared.

Which ONE (1) of the following identifies the **LATEST** time that the **INITIAL** notification to State/County officials and the NRC must be completed?

	STATE / COUNTY	NRC
a.	0125	0210
b.	0127	0212
c.	0131	0216
d.	0135	0220

ANSWER: b

Reference: N/A
Difference between Surry and Robinson: Identical Question.

Justification:

N/A

QUESTION NUMBER: 5
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.4.43

Knowledge of emergency communications systems and techniques.

K/A IMPORTANCE: *RO* 2.8 *SRO* 3.5
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: EPSPA01-03

DEMONSTRATE an understanding of the CR/EOF Emergency Communicator

REFERENCES: EPLCA-01

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number EPSPA01-03 001

JUSTIFICATION:

a. Plausible since these times are consistent with the event initiation, but times are based on the declaration time.

b. CORRECT Notifications are required within 15 minutes of the initial declaration to the state/county and 1 hour to the NRC.

c. Plausible since these times are consistent with the declaration of the Site Area Emergency, but times are based on the initial declaration time.

d. Plausible since these times are consistent with the declaration of the General Emergency, but times are based on the initial declaration time.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Calculation of time limits based on knowledge of EP requirements

REFERENCES SUPPLIED:

*6.

Given the following plant conditions:

- An emergency boration is in progress through 1-CH-MOV-1350, Emergency Borate, per FR-S.1, "Response to Nuclear Power Generation / ATWS."
- 1-CH-FI-1110, Emerg. Borate Flow indicates 33 gpm.
- 1-CH-FI-1122A, CHG Line Flow is in manual and indicates 75 gpm.
- VCT level is 30%.
- VCT Makeup is aligned for automatic operation.
- Normal letdown has been isolated.
- The team has just completed steps 3 and 4 of FR-S.1 (AFW verification and Emergency boration).

Which ONE (1) of the following describes VCT response (assuming no further operator actions)?

a. Will remain essentially unaffected.

b. Will decrease to the auto makeup setpoint and stabilize.

c. Will decrease to the low-level setpoint and cause the charging pump suction to switch to the RWST.

d. Will decrease to the auto makeup setpoint and cycle between the makeup start and stop setpoints.

ANSWER: d

Reference: N/A
Difference between Surry and Robinson: Mark numbers changed to Surry Specific. VCT level changed to % (Surry measurement).

Justification:

N/A

QUESTION NUMBER: 6
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: 024AA1.05

Ability to operate and / or monitor the following as they apply to the Emergency Boration: Performance of letdown system during emergency boration

K/A IMPORTANCE: *RO* 3.1 *SRO* 3.2
10CFR55 CONTENT: *55.41(b) RO* 6 *55.43(b) SRO*

OBJECTIVE: CVCS-09

EXPLAIN the normal operation of the CVCS control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: SD-021
FRP-S.1

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number CVCS-09 008

JUSTIFICATION:

a. Plausible if misconception is that VCT is isolated from charging pump suction during emergency boration, but remains aligned.

b. Plausible since charging exceeds emergency boration flow and VCT level will lower, but makeup capability even with emergency boration flow is greater than the difference between charging and boration.

c. Plausible since charging exceeds emergency boration flow and VCT level will lower, but makeup capability is still available.

d. CORRECT Since charging exceeds emergency boration flow, VCT level will decrease. Automatic makeup will occur to cause VCT level to rise.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the effect of performing an emergency boration on the remainder of CVCS

REFERENCES SUPPLIED:

*7.

Given the following conditions:

- The unit is operating at 100% power.
- C-F-7, PRZR RELIEF TK HI PRESS, and C-G-7, PRZR Relief TK Hi LVL have alarmed.
- PRT level and pressure are slowly increasing, but there is NO appreciable increase in PRT temperature.
- NO other annunciators are in alarm.

Leakage past which ONE (1) of the following has caused the present PRT condition?

a. 1-RC-PCV-1455C, Pressurizer PORV.

b. 1-RC-SV-1551A, Pressurizer Safety valve.

c. 1-CH-RV-1209, Low Pressure L/D Line Relief leakby.

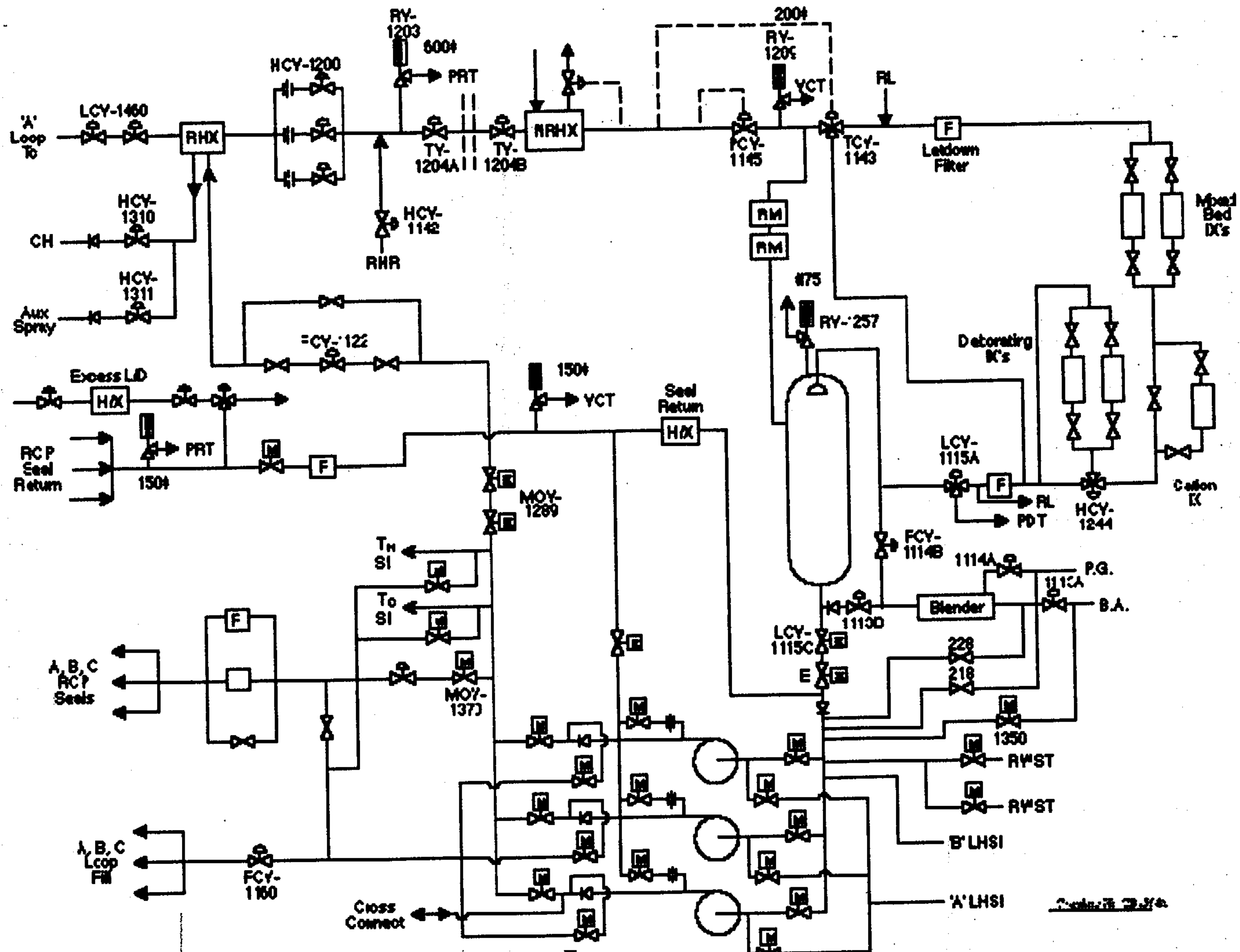
d. 1-CH-RV-1382, RCP #1 Seal Water Return Line Relief leakby.

ANSWER: d

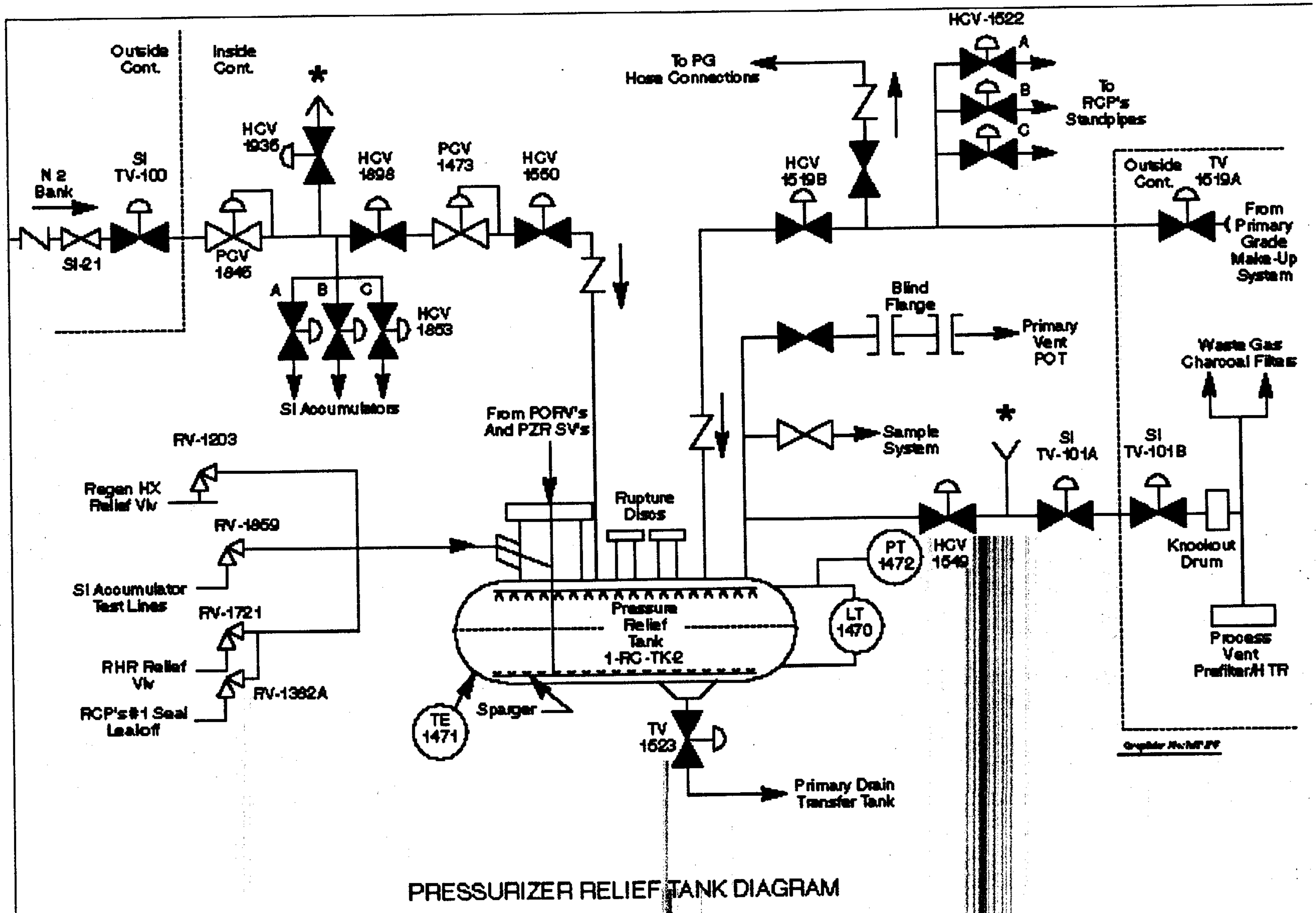
Reference: ND-88.1-H/T-3.4, ND-88.3-H/T-2.2
Difference between Surry and Robinson: Nomenclature (Mark Numbers) changed to Surry Specific. Leak sources remain the same.

Justification:

N/A



CHARGING AND LETDOWN SYSTEM DRAWING



PRESSURIZER RELIEF TANK DIAGRAM

QUESTION NUMBER: 7
TIER/GROUP: ***RO*** 2/3 ***SRO*** 2/3
K/A: 007A3.01

Ability to monitor automatic operation of the PRTS, including: Components which discharge to the PRT

K/A IMPORTANCE: ***RO*** 2.7 ***SRO*** 2.9
10CFR55 CONTENT: ***55.41(b) RO*** 3 ***55.43(b) SRO***

OBJECTIVE: PZR-14

EXPLAIN the effect on the PZR and PRT System due to selected failures

REFERENCES: APP-003

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number PZR-03 003

JUSTIFICATION:

a. Plausible since this is a discharge source to the PRT, but incorrect since no accompanying temperature alarms / changes have occurred.

b. Plausible since this is a discharge source to the PRT, but incorrect since no accompanying temperature alarms / changes have occurred.

c. Plausible since this is a discharge source to the PRT, but incorrect since no accompanying temperature alarms / changes have occurred.

d. **CORRECT** Discharges to the PRT and temperature is approximately the same as the normal PRT temperature.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Comparison of effect of inputs to PRT on PRT conditions

REFERENCES SUPPLIED:

*8.

Which ONE (1) of the following conditions would result in a reactor trip?

a. 1-MS-PT-1447, First Stage Turbine Pressure, fails low with power level at 22%.

b. NI-43, PR Channel N43, fails low with power level at 49%.

c. 1-MS-PT-1446, First Stage Turbine Pressure, fails high with power level at $1x10^{-8}$ amps.

d. NI-44, PR Channel N44, fails high with power level at at $1x10^{-8}$ amps.

ANSWER: c

Reference: N/A
Difference between Surry and Robinson: Full mark numbers given.

Justification:

N/A

QUESTION NUMBER: 8
TIER/GROUP: ***RO*** 2/3 ***SRO*** 2/3
K/A: 045K1.18

Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the RPS

K/A IMPORTANCE: ***RO*** 3.6 ***SRO*** 3.7
10CFR55 CONTENT: ***55.41(b) RO*** 7 ***55.43(b) SRO***

OBJECTIVE: MT-11

EXPLAIN the reactor trips associated with the MT System. Include purpose and setpoints.

REFERENCES: SD-011

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since P-7 blocks are changed at 10% equivalent power, but 1/2 above 10% enables turbine trip to reactor trip.

b. Plausible since P-7 blocks are changed at 10% power and P-10 provides an input to P-7, but 2/4 above 10% enables turbine trip to reactor trip.

c. **CORRECT** At this power level the turbine stop valves are closed. With 1/2 First Stage Pressure transmitters failing high, P-7 automatically unblocks the turbine trip to reactor trip signal.

d. Plausible since indicated power above P-7 would cause a reactor trip with the turbine stop valves closed, but coincidence for P-10 input to P-7 is 2/4 above 10% power.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Analysis of the effect of instrument failures on turbine trip to reactor trip circuits

REFERENCES SUPPLIED:

*9.

Which ONE (1) of the following describes why RCS subcooling must be greater than 30°F [85°F] prior to starting an RCP in FR-P.1, Response to Imminent Pressurized Thermal Shock Condition?

a. RCP restart may result in reduced SI flow to the core leading to an inadequate core cooling situation.

b. Inadequate subcooling corresponds to inadequate #1 RCP seal D/P using RCS Psat/Tsat relationships.

c. RCP restart during a SBLOCA may result in deeper core uncovery leading to an inadequate core cooling situation.

d. RCP restart with inadequate subcooling may result in rapid RCS depressurization, complicating the PTS concern.

ANSWER: c

Reference: ND-95.3-LP-46.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Increased RCS pressure is an expected response during RCP start in several evolutions (not this one). Increased RCS pressure reduces SI flow.

b. Plausible, since low subcooling is indicative of low pressure if temperature is high, however, no direct correlation between seal D/P and subcooling exists.

c. Correct Answer (ND-95.3-LP-46, page 24 (4)).

d. Again, RCS pressure decrease is an expected response. However, rapid depressurization aids in the PTS concern.

(1) Subcooling of 80°F ensures that adequate subcooling exists by providing a 50°F operating margin above the minimum subcooling value of 30°F.

(2) RVLIS indication ensures the existence of an adequate vessel inventory such that core cooling is ensured.

(a) With no RCPs running, a RVLIS Full Range reading of 63% is required. This level corresponds to a collapsed liquid level at the top of the core (including 4% allowance for channel accuracy).

(b) Since RCPs may be operating, RVLIS Dynamic Range indications corresponding to an average system void fraction of 25% were added.

c. If either of the termination criteria are not satisfied, then SI is required to ensure core cooling and should <u>**NOT**</u> be terminated. Most likely the cold leg/downcomer low temp condition is due to SI water mixing effects and an <u>RCP is started</u>, if possible, to alleviate this condition.

(1) An analysis of the effect of an RCP restart has been made to ensure the safety of this action relative to vessel integrity. For analysis conservatism, assumption was made that a small pre-existing flaw had grown and arrested at 75% of wall thickness before RCP start.

(2) Starting an RCP was shown not to result in any further flaw propagation or loss of vessel integrity. For a case where the flaw has not grown prior to RCP start, the subsequent heat-up of the downcomer region will <u>decrease</u> the possibility of flaw propagation.

(3) Therefore, in order to mix the cold incoming SI water and warm reactor coolant water and thereby decrease the likelihood of a PTS condition, an RCP is started, if possible. Whether an RCP is started or not, the next step performed (step 27), if SI is still required, provides guidance on subsequent cooldown restrictions.

(4) In order to attempt a RCP restart, an additional requirement of 30°F subcooling has been added to the other RCP support conditions.

(a) Of all transients considered in PTS, the SBLOCA transient may result in a condition where SI flow cannot be terminated. In various WOG reports, a range of SBLOCAs were identified where continued RCP operation or, conversely, untimely RCP restart, could result in increased RCS inventory loss. The loss of additional inventory could result in fuel cladding temps in excess of the design basis FSAR analysis. Therefore, from a SBLOCA standpoint, RCP restart at an inopportune time could result in a degraded core cooling scenario.

(b) Therefore, the additional requirement of RCS subcooling is required in order to assure that no potential RCS inventory aggravation will occur due to RCP restart.

d. Due to the less restrictive SI termination and reinitiation criteria in this guideline, the team should be especially **alert for any decrease in RCS subcooling or Rx vessel level that warrants SI reinitiation. (rk)**

QUESTION NUMBER: 9
TIER/GROUP: ***RO*** 1/1 ***SRO*** 1/1
K/A: WE08EK3.3

Knowledge of the reasons for the following responses as they apply to the (Pressurized Thermal Shock) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.

K/A IMPORTANCE: ***RO*** 3.7 ***SRO*** 3.8
10CFR55 CONTENT: ***55.41(b) RO*** 3 ***55.43(b) SRO***

OBJECTIVE: FRP-P.1-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in FRP-P.1 by explaining the basis of each.

REFERENCES: FRP-P.1

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number FRP-P.1-03 004

JUSTIFICATION:

a. Plausible since starting an RCP does restore pressure control using normal sprays, but the RCP is started to provide mixing for the SI water.

b. Plausible since during natural circ the SG pressures may vary due to different steaming rates, but cooldowns are not performed during the implementation of this procedure.

c. **CORRECT** Cold SI water flows through the cold leg to the downcomber with no RCPs running to create mixing. This could result in radical drops in temperature along the downcomber wall.

d. Plausible since cooling will be by forced flow, but SI is not terminated unless all conditions are met.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of background information in FRP-P.1

REFERENCES SUPPLIED:

*10.

Given the following plant conditions:

- The plant has experienced a reactor trip.
- The Unit SRO directs the RO to manually initiate Safety Injection.
- The RO inadvertently depresses ONE (1) Consequence Limiting Safeguards (CLS) pushbutton instead of the Safety Injection pushbuttons.

Which ONE (1) of the following identifies functions that will occur, if any?

a. No actions occur. Simultaneous pushing of BOTH pushbuttons is required.

b. Phase I Containment Isolation only.

c. Phase I and Phase II Containment isolation only.

d. Phase I, Phase II, and Phase III Containment isolation.

ANSWER: c

Reference: ND-91-LP-5 page 6, item k.
Difference between Surry and Robinson: Topic stays the same, system operation is different (Either CLS pushbuttons give a Hi CLS, which gives an SI (all Robinson answers correct).

__Justification:__

a. Plausible, since it requires pushing both CLS pushbuttons to initiate Hi-Hi CLS, which causes Phase I, II, and III isolation.

b. Plausible, since pushing one CLS button will initiate a Safety Injection signal causing Phase I isolation. However, a Hi CLS is also initiated causing Phase II isolation.

c. Correct Answer (see Reference).

d. Plausible, since Hi-Hi CLS initiation will cause Phase I, II, and III Containment isolation. However, Hi-Hi CLS requires BOTH pushbuttons to be pressed.

C. State the Technical Specifications associated with the Containment Spray System, including for SRO candidates only, the basis for these specifications.

D. Using a simplified one-line diagram, explain the operations of the Containment Spray System, including initiation signals, interlocks, instrumentation available, and Technical Specification limitations.

Presentation

Distribute all handouts. Refer to/display H/T-5.1, Objectives, and discuss with trainees.

A. Consequence Limiting Safeguard System

1. Purpose

a. The purpose of the CLS System is to provide containment isolation and depressurization in order to limit the release of radioactive material to the atmosphere in the event of an accident.

b. This purpose is accomplished by:

(1) Partial containment isolation (Phase II) and Safety Injection initiation backup signal when containment pressure reaches 17.7 psia (3 psig) (HI CLS).

(2) Containment Spray initiation and complete containment isolation (Phase III) when containment pressure reaches 23 psia (8.3 psig) (HI-HI CLS).

HI CLS items prior to pressure being <14.2 psia.

k. Manual initiations:

(1) HI CLS - Initiated when 1/2 benchboard pushbuttons depressed.

(2) HI-HI CLS - Initiated when 2/2 benchboard pushbuttons depressed simultaneously. (Pushing both buttons also will activate HI CLS.)

l. In the HI CLS train, the relays are normally energized. In the HI-HI CLS train, a 20 milliamp current flows through the circuit. This current is not large enough for actuation but is large enough to check for circuit continuity in the relays.

(1) If any of the energized relays fail in any HI CLS train, or continuity in the deenergized relays is interrupted in any HI-HI CLS train, a CLS SYSTEM COIL FAILURE alarm (B-A-4) annunciates. The annunciator response procedure lists the following as possible actuators:

(a) Loss of energized relay in HI CLS train,

(b) Loss of continuity in deenergized relay of HI-HI CLS train,

(c) HI-HI coil monitor light out,

(d) HI-HI CLS train DC fuse blown, or

(e) Train A or Train B reset pushbutton actuated.

(2) The annunciator response procedure lists the following operator

QUESTION NUMBER: 10

TIER/GROUP: ***RO*** 2/3 ***SRO*** 2/2

K/A: 103K4.06

Knowledge of containment system design feature(s) and/or interlock(s) which provide for the Containment isolation system

K/A IMPORTANCE: ***RO*** 3.1 ***SRO*** 3.7

10CFR55 CONTENT: ***55.41(b) RO*** 9 ***55.43(b) SRO***

OBJECTIVE: CSS-08

EXPLAIN the component operation associated with each switch position for the CSS switches and controls.

REFERENCES: SD-024
SD-006

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number CSS-08 003

JUSTIFICATION:

a. Plausible since Phase B occurring is correct, but Phase A does not occur.

b. Plausible since CVI occurring is correct, but Phase A does not occur.

c. CORRECT Manual actuation of Containment Spray results in Phase B and CVI occurring.

d. Plausible since Phase B and CVI occurring is correct, but Phase A does not occur.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of system actuations in response to manual actuation

REFERENCES SUPPLIED:

*11.

Given the following conditions:

- The unit is operating at 77% power.
- Condenser backpressure is 25.5 in - Hg and degrading slowly.
- A power reduction is in progress in an attempt to stabilize backpressure.
- NO cause has yet been identified.

Which ONE (1) of the following actions should be taken in accordance with AP-14.00, "Loss of Main Condenser Vacuum"?

a. Trip the reactor and go to E-0.

b. Trip the turbine and verify the plant stabilizes on the steam dumps at the point of adding heat.

c. Trip the turbine and verify the plant stabilizes on the steam dumps at approximately the current power level.

d. Continue the power reduction.

ANSWER: d

Reference: AP-14.00 (Caution prior to Step 1).
Difference between Surry and Robinson: Setpoints changed to Surry Specific.

Justification:

N/A

NUMBER	PROCEDURE TITLE	REVISION
1-AP-14.00	LOSS OF MAIN CONDENSER VACUUM	2
		PAGE 2 of 6

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: • To prevent Turbine damage from turbine stall flutter, Main Condenser vacuum must be:

- maintained greater than 26.5 in-Hg when Turbine power is less than or equal to 30%.
- maintained greater than 24.5 in-Hg when Turbine power is greater than 30%.

• If vacuum can NOT be recovered within five minutes based on the above parameters, the Turbine must be taken off line. The five minute limitation may be exceeded with Shift Supervisor approval if vacuum is recovering.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 1.	__CHECK TURBINE POWER - GREATER THAN 30%	GO TO Step 13.
* 2.	CHECK MAIN CONDENSER VACUUM - GREATER THAN 24.5 IN-HG • CN-PR-101A • CN-PR-101B	Do the following: a) Place the Condenser Hoggers in service IAW Attachment 1. b) Initiate a Turbine ramp IAW Attachment 2. c) IF vacuum can NOT be recovered, THEN do the following: 1) Trip the Reactor. 2) Initiate 1-E-0, REACTOR TRIP OR SAFETY INJECTION.

QUESTION NUMBER: 11
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: 051AA2.02

Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip

K/A IMPORTANCE: *RO* 3.9 *SRO* 4.1
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: AOP-012-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of a partial loss of condenser vacuum or a Circulating Water Pump trip as directed by AOP-012.

REFERENCES: AOP-012

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number AOP-012-03 010

JUSTIFICATION:

a. Plausible since at this power level a reactor trip would be required if a turbine trip was required, but a trip is not required until vacuum lowers to 10" Hg Abs.

b. Plausible if misconception that reactor trip is not required at this power level and vacuum calls for turbine trip, but trip is not required until vacuum lowers to 10" Hg Abs.

c. Plausible if misconception that reactor trip is not required at this power level and vacuum calls for turbine trip, but trip is not required until vacuum lowers to 10" Hg Abs.

d. **CORRECT** With vacuum better than 10" Hg Abs, efforts are continued to lower turbine load and determine the cause of the loss of vacuum. A trip is not yet required.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of required actions in response to loss of vacuum

REFERENCES SUPPLIED:

*12.

Given the following conditions:

- The plant is shutdown following a reactor trip.
- RCPs are all secured.
- The "B" Train ICCM fails
- "A" ICCM has been providing erratic indications.
- Primary Plant parameters indicate the following:

INSTRUMENT	PARAMETER	VALUE
1-RC-PI-1455	PZR Press Protection	1485 psig
1-RC-PI-1456	PZR Press Protection	1495 psig
1-RC-PI-1457	PZR Press Protection	1515 psig
1-RC-PI-1402	RCS WR Press	1485 psig
1-RC-PI-1403	RCS WR Press	1485 psig
1-RC-TI-1453	PZR Temp (Surge Line)	524°F
1-RC-TR-1454	PZR Temp (Vapor)	630°F
1-RC-TR-1413	RCS Hot Leg WR Temp	538°F
1-RC-TR-1423	RCS Hot Leg WR Temp	538°F
1-RC-TR-1433	RCS Hot Leg WR Temp	534°F
	Highest Five (5) CETCs	548°F
		544°F
		542°F
		542°F
		541°F

Which ONE (1) of the following identifies the valid subcooling indication for "A" ICCM?

a. 46°F.

b. 51°F.

c. 53°F.

d. 58°F.

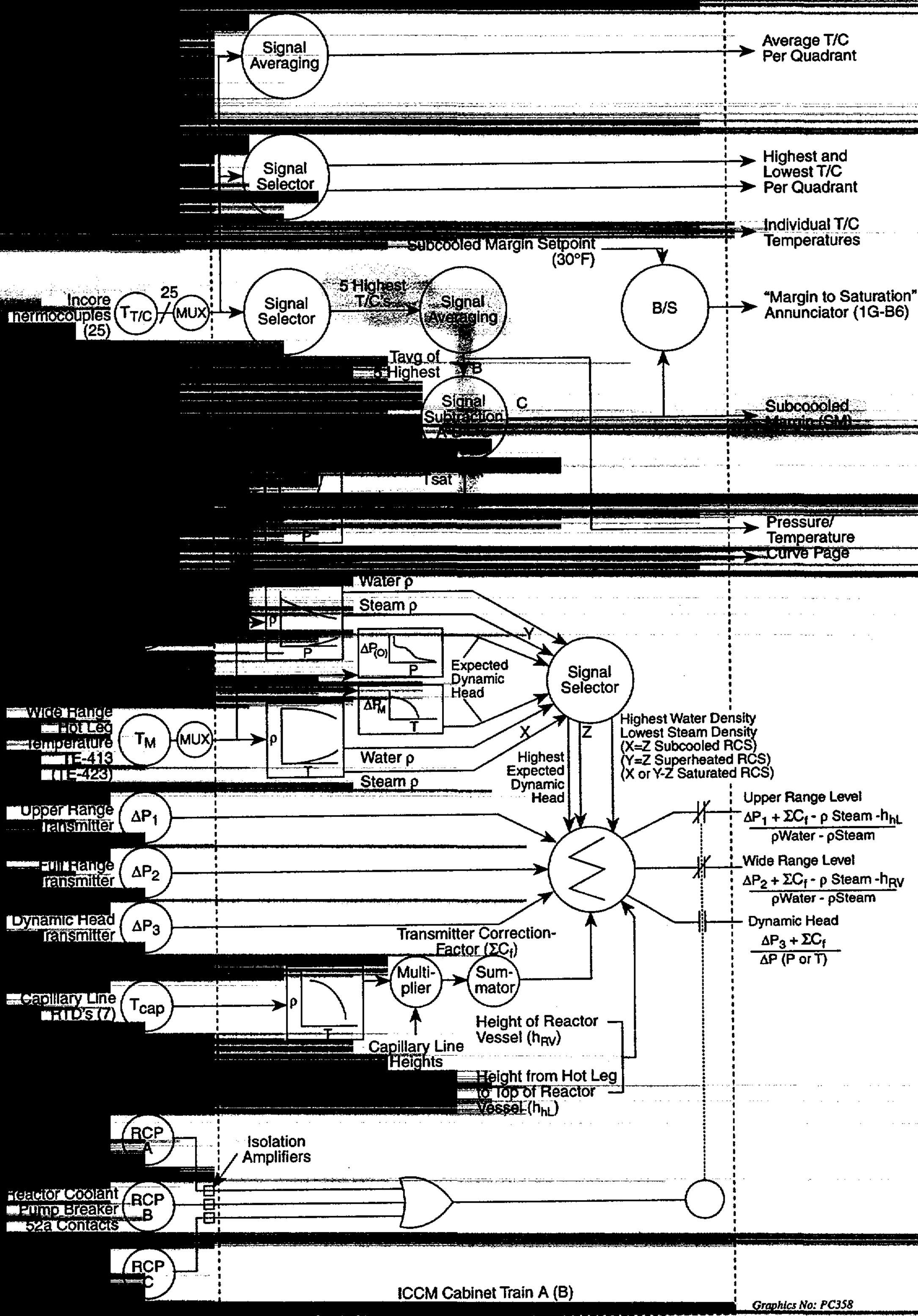
ANSWER: c

Reference: ND-93.4-H/T-3.7.
Difference between Surry and Robinson: Modified to Surry Specific.

Justification:

Answer changes based on how Surry ICCM determines subcooling, Robinson distractors remain good.

c. Correct Answer, since subcooling utilizes WR press and average of 5 highest CETCs.



CCM FUNCTIONAL BLOCK DIAGRAM

QUESTION NUMBER: 12
TIER/GROUP: ***RO*** 2/1 ***SRO*** 2/1
K/A: 017K4.01

Knowledge of ITM system design feature(s) and/or interlock(s) which provide for the following: Input to subcooling monitors

K/A IMPORTANCE: ***RO*** 3.4 ***SRO*** 3.7
10CFR55 CONTENT: ***55.41(b) RO*** 3 ***55.43(b) SRO***

OBJECTIVE: ICCM-10

EXPLAIN the operation of the ICCM.

REFERENCES: OP-307

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. **CORRECT** Using lowest valid pressure (1465 psig) and highest valid CET (548 °F), saturation temperature for this pressure is 594 °F, resulting in a margin to saturation of 46 °F.

b. Plausible since this is calculated value using lowest pressure and average CET, but highest CET, not average, is used.

c. Plausible since this is calculated value using lowest pressure and highest Thot, but highest CET, not Thot, is used.

d. Plausible since this is calculated value using lowest pressure and average Thot, but highest CET should be used.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Calculation of saturation margin using various indications

REFERENCES SUPPLIED:

*13.

Given the following conditions:

- A 25 year old male started working for the Operations Department at Surry on March 3rd of this year.
- He previously worked this year at North Anna as part of the Maintenance Department.
- His exposure for this year at the North Anna plant was 1200 mRem TEDE.
- He has received **NO** Dominion management exposure extensions and **NO** emergencies exist.

Which ONE (1) of the following is the **TOTAL ADDITIONAL** effective dose equivalent that the individual can receive before being denied RCA access (unless specifically authorized by the Supervisor Exposure Control and Instrumentation)?

a. 600 mRem

b. 800 mRem

c. 2600 mRem

d. 3800 mRem

ANSWER: c

Reference: VPAP-2101 pages 32-34.
Difference between Surry and Robinson: Changed to Surry admin limits. Change name of Power Stations and Company.

Justification:

a. Plausible, if candidate confuses quarter and yearly limits.

b. Plausible, if candidate confuses quarter and yearly limits without applying 200 mRem buffer.

c. Correct Answer.

d. Plausible, if candidate confuses federal limits with admin limits.

6.3.3 Administrative Dose Limits

NOTE: Dose limits in 6.3.3 do not apply to a Declared Pregnant Woman. Declared Pregnant Woman administrative dose control is addressed in 6.3.5.

NOTE: Dose limits in 6.3.3 are implemented by controls specified in 6.3.4.

Administrative dose limits are established to minimize the potential for exceeding federal limits. If a worker exceeds an administrative dose limit without exceeding a 10 CFR 20 or Technical Specifications (TS) limit, the event shall not be considered a violation of either 10 CFR 20 or TS. Exceeding administrative limits shall require a radiological incident investigation and a Plant Issue (i.e., Deviation) in accordance with VPAP-1501, Deviations. Investigation results shall be used to determine reportability and shall become Station records.

a. **Radiation Worker Quarterly Administrative Dose Limits**

Type	Radiation Worker Quarterly Administrative Dose Limit
Total Effective Dose Equivalent (TEDE)	2.0 rem/calendar quarter

b. **Radiation Worker Annual Administrative Dose Limits**

Type	Radiation Worker Annual Administrative Dose Limits
Total Effective Dose Equivalent (TEDE)	4.0 rem/calendar year
Lens of Eye (lens dose equivalent)	12.0 rem/calendar year
Skin (shallow dose equivalent)	40.0 rem/calendar year
Extremities (shallow dose equivalent)	40.0 rem/calendar year

c. **System Worker Annual Administrative Dose Limits**

Type	System Worker Annual Administrative Dose Limits
Total Effective Dose Equivalent (TEDE)	0.5 rem/calendar year

d. **Lifetime Administrative Dose Limit**

NOTE: The lifetime dose limit is considered only if a worker's TEDE, as indicated by Virginia Power records, exceeds 1.0 rem during a calendar year and is applicable during that calendar year. The 1.0 rem criterion will allow a worker to continue working if past exposures have caused that worker's dose (TEDE, rem) to exceed their age (in years) and will, in effect, limit the worker's dose to 1 rem per calendar year.

Type	Lifetime Administrative Dose Limit
Total Effective Dose Equivalent (TEDE)	1.0 rem for each year of worker's age

e. **Non-Radiation Workers**

Type	Non-Radiation Worker Annual Administrative Dose Limits
Total Effective Dose Equivalent (TEDE)	0.5 rem/calendar year

f. **Visitors**

Visitor total effective dose equivalent shall be limited to 0.05 rem/calendar year and 0.025 rem/calendar quarter.

6.3.4 **Administrative Dose Controls - General Requirements**

NOTE: An integral part of administrative dose controls is the control of access to RCAs. RCA access control is addressed in 6.6.1.

a. The following control is in place to provide reasonable assurance that a worker will not exceed administrative dose limits.

If a worker has a quarterly or annual dose within 200 mrem of an administrative dose limit, the worker will be denied RCA access unless specifically authorized by the Supervisor Exposure Control and Instrumentation.

EXAMPLE: If a radiation worker has more than 1.8 rem deep-dose equivalent (whole body gamma plus neutron dose) in a calendar quarter or more than 3.8 rem TEDE in a calendar year, then that worker will be denied RCA access unless a dose extension request is approved. System employees will be denied access at 0.30 rem TEDE any time during a calendar year.

b. Request:

Type	Administrative Dose Limits
Total Effective Dose Equivalent (TEDE)	4.75 rem/year
Lens of Eye (lens dose equivalent)	14.0 rem/year
Skin (shallow dose equivalent)	45.0 rem/year
Extremities (shallow dose equivalent)	45.0 rem/year

c. An extension request shall be acknowledged by the affected worker and approved by:

- Department Manager (or Manager cognizant of worker duties)
- Manager Radiological Protection
- Site Vice President or Director Nuclear Station Operations & Maintenance or Director Nuclear Station Safety & Licensing

QUESTION NUMBER: 13
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.3.1

Knowledge of 10 CFR:20 and related facility radiation control requirements.

K/A IMPORTANCE: *RO* 2.6 *SRO* 3.0
10CFR55 CONTENT: *55.41(b) RO* 12 *55.43(b) SRO*

OBJECTIVE: 10CFR20-03

Identify the Dose Limits for adults including:
a. Occupational Dose Limits
b. Public Dose Limits

REFERENCES: NGGM-PM-002

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number 10CFR20 008

JUSTIFICATION:

a. Plausible if misconception is that administrative limit is 1500 mRem, but limit is 2000 mRem.

b. **CORRECT** Total exposure for the year for all work performed at CP&L plants is 2000 mRem. Harris is a CP&L plant.

c. Plausible since this would be correct exposure at Robinson if previous exposure was at a utility other than a CP&L plant, but Harris exposure counts toward CP&L limit.

d. Plausible since limit is 4000 mRem if previous exposure was at a utility other than a CP&L plant, but Harris exposure counts toward CP&L limit and additional CP&L limit of 2000 mRem would be imposed.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Calculation of exposure limits based on previous exposure

REFERENCES SUPPLIED:

*14.

Given the following conditions:

- Unit 1 is in a refueling outage.
- Robert Wells (Electrical Supervisor) has come to shift seeking a temporary release for 1-FW-P-1A, "A" Main Feed Pump. This temporary release is to verify interlocks with 1-FW-MOV-150A, "A" MFP Discharge valve.
- Luther Farinholt (Mechanical Supervisor) is the only other individual besides Robert Wells on the Craft Supervisor Tracking Sheet.

Which ONE (1) of the following individuals has the responsibility of notifying Luther Farinholt of the temporary release?

a. Unit 1 SRO.

b. Robert Wells.

c. Operator assigned to perform the temporary release.

d. Shift Clerk.

ANSWER: b

Reference: VPAP-1402, section 6.5.5
Difference between Surry and Robinson: Significantly Modified Question.

Justification:

a. Component is a Unit 1 component. The Unit SRO and RO are required to be made aware for the clearance but are not responsible for the administration of the process.

b. Correct Answer.

c. This operator performs manipulations associated with this tagout.

d. Shift Clerk performs a majority of the administrative tasks with tagouts.

6.5.5 Temporary Releases of Tag-Outs for Breaker Testing

NOTE: A Temporary Release is used to remove a Tag-Out on a breaker to allow it to be moved from the disconnect position to the test position and back to the disconnect position after testing is completed. The Temporary Release should normally be in effect less than one shift.

a. If Electrical Maintenance or Control Operations needs to test a breaker that has a Danger Tag on it and the Tag-Out cannot be cleared, the requestor shall submit a Temporary Release (Attachment 3) to the Shift Supervisor.

1. If a Temporary Release is required, the individual requesting the Temporary Release shall notify affected craft supervisors. The Shift Supervisor or Testing Supervisor (SRO) shall determine which craft supervisors must be notified of the Temporary Release, and determine which Work Orders shall be placed on hold, by reviewing the scope of work for each Work Order covered by the Tag-Out.

2. If Operations personnel determine that multiple supervisors are required to be notified, the supervisor requesting the Temporary Release shall obtain approval signatures of the other individuals on the Temporary Release (Attachment 3).

3. The cognizant Electrical Maintenance or Control Operations craft supervisors requesting the Temporary Release shall ensure that applicable Work Orders are placed on hold in accordance with VPAP-2002, Work Requests and Work Order Tasks.

Craft Supervisor Tracking Sheet
Master Tag-Out

OPAP-0010 - Attachment 3

1. System or Component

2. Master Tag-Out Number

Craft Supervisor Name	Department	Sheet Number for Craft Supervisor	Shift Supervisor Verification that Craft Supervisor Authorized Removal (initials)

QUESTION NUMBER: 14
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.2.13

Knowledge of tagging and clearance procedures.

K/A IMPORTANCE: *RO* 3.6 *SRO* 3.8
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: OMM-005-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in OMM-005 by explaining the basis of each.

REFERENCES: OPS-NGGC-1301

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number OMM-005-03 006

JUSTIFICATION:

a. Plausible since 1/2 clearance holders is available and the CRSS is a licensed SRO, but the CRSS is not authorized to approve removal of this clearance.

b. CORRECT If the original clearance holder is not available, the removal of tags requires the approval of the Alternate Clearance Holder or the clearance holder's supervisor. A temporary lift should reinstall the same clearance.

c. Plausible since 1/2 clearance holders is available and the CRSS is a licensed SRO, but the CRSS is not authorized to approve removal of this clearance.

d. If the original clearance holder is not available, the removal of tags requires the approval of the Alternate Clearance Holder or the clearance holder's supervisor, however a temporary lift should reinstall the same clearance.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of administrative requirements regarding clearance removals

REFERENCES SUPPLIED:

*15.

Given the following conditions:

- Fuel is in the vessel; refueling has not taken place.
- RCS temperature is 120°F.
- It is 30 days after the shutdown.
- Pressurizer level is at 22%.
- RHR cooling is lost.

Given the supplied references, which ONE (1) of the following identifies how much time remains before boiling begins occurring in the RCS?

a. 5 minutes

b. 18 minutes

c. 5 hours

d. 18 hours

ANSWER: b

Reference: DRP-003, Attachment 7, Core Heatup Times for Surry (Supplied Reference)
Difference between Surry and Robinson: Clarify stem. Change distractors and answer to Surry Specific (decay heat curves different).

<u>Justification:</u>

a. If days used vs. hours on time after S/D.

b. Correct Answer. (30 days) x (24 hours) = 720 hours. Use curve.

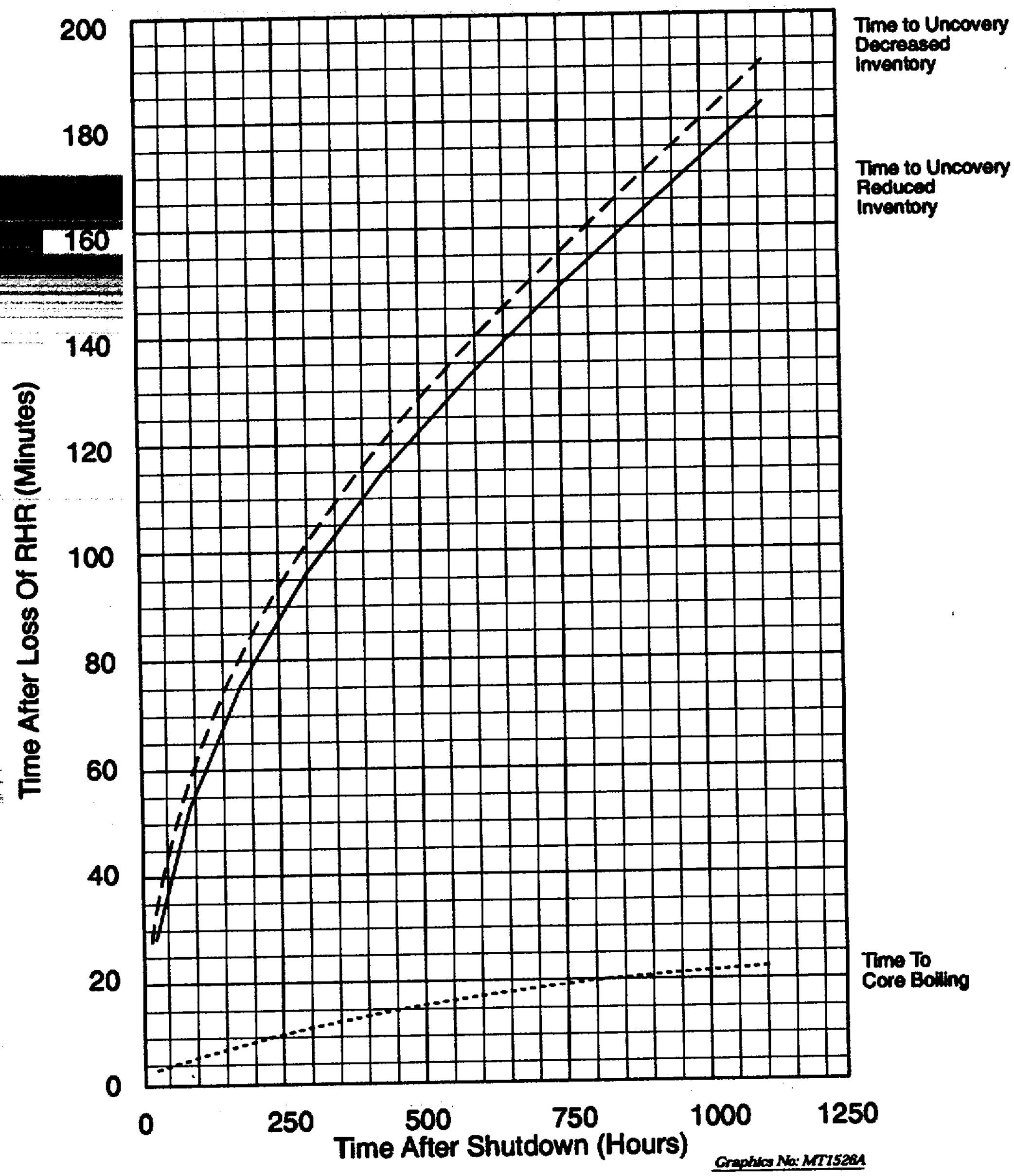
c. If days used on x axis and hours on y.

d. If hours determined vs. minutes on y axis.

ATTACHMENT 7

(Page 2 of 2)

CORE HEATUP TIMES FOR SURRY



CORE HEATUP TIMES

QUESTION NUMBER: 15
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: 025AK1.01

Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation

K/A IMPORTANCE: *RO* 3.9 *SRO* 4.3
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: OMM-046-04

DEMONSTRATE the use of OMM-046 in maintaining the Key Safety Functions.

REFERENCES: OMM-046
Plant Curve 7.19

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number OMM-046-04 009

JUSTIFICATION:

a. Plausible since correct curve is used, but uses 100 hour shutdown line instead of 10 day shutdown.

b. CORRECT Using Curve 7.19, the intersection of the 10 day shutdown line and 120 °F, the time to boiling is 22 minutes.

c. Plausible since correct curve is used, but uses 20 day shutdown line instead of 10 day shutdown.

d. Plausible since correct curve is used, but uses 40 day shutdown line instead of 10 day shutdown.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Application of given data to plant curves to determine time to boiling

REFERENCES SUPPLIED: Plant Curves 7.19, 7.20, 7.21

*16.

Given the following plant conditions:

- Unit is operating at 100% power.
- P-250 Computer failed.

Which ONE (1) of the following is <u>NOT</u> a log that is required to be handwritten as a result of this failure?

a. Average Power History Log.

b. RCP Bearing Temperature Log.

c. Charging Pump Bearing Temperature Log.

d. Average Delta Flux History Log.

ANSWER: b

Reference: AP-20.02, 4-6, 22-23.
Difference between Surry and Robinson: NEW Surry Question.

<u>Justification</u>:

a. Plausible, since trainee must recall which readings must be recorded by hand and which readings are done by swapping computer leads to a recorder. This one is recorded by hand.

b. Correct Answer. These readings are obtained by swapping leads from the P-250 to a recorder.

c. Plausible, since trainee must recall which readings must be recorded by hand and which readings are done by swapping computer leads to a recorder. This one is recorded by hand.

d. Plausible, since trainee must recall which readings must be recorded by hand and which readings are done by swapping computer leads to a recorder. This one is recorded by hand.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	__CHECK FOR LOSS OF TYPEWRITER AS INDICATED BY <u>MESSAGE ON PROGCONS</u> LIGHT - LIT <u>AND</u> <u>ONE</u> OF THE FOLLOWING: • LOG T/W FAILED - LIT <u>OR</u> • TREND T/W FAILED - LIT <u>OR</u> • ALARM T/W FAILED - LIT	GO TO Step 3.
2.	__GO TO ATTACHMENT 1	

<u>NOTE</u>: If shift average power has already been printed out IAW the controlling calorimetric procedure when the P-250 becomes inoperable, ()-OPT-RX-007, SHIFT AVERAGE POWER CALCULATION, should not be performed for that shift.

3. __INITIATE ()-OPT-RX-007, SHIFT AVERAGE POWER CALCULATION, AS NECESSARY

<u>NOTE</u>:
- If ΔFlux is out of band, penalty minutes must be computed manually.
- A timer should be used to ensure readings are taken on time.

4. __INITIATE AVERAGE POWER AND AVERAGE ΔFLUX HISTORY SHEET

5. __RECORD AVERAGE POWER HOURLY

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	___RECORD ΔFLUX IN ACCORDANCE WITH TECH SPEC 3.12.B.4:	
	• Hourly for the first 24 hours the P-250 is out of service	
	• Half-hourly after the first 24 hours until P-250 is restored	
7.	___MAINTAIN REACTOR POWER LESS THAN OR EQUAL TO 100 PERCENT USING AN AVERAGE OF THE POWER RANGE INDICATIONS	
8.	___LOG ALL IRPI AND GROUP STEP COUNTER READINGS AFTER EVERY 9 STEPS OF ROD MOTION	
9.	___CHECK P-250 - BEING REMOVED FROM SERVICE FOR MAINTENANCE	GO TO Step 11.
10.	___GO TO STEP 18	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: Swapping leads should be performed carefully to prevent contact between the pigtail of the leads and any metal surface to prevent tripping the 48v power supply.

* *

22. __SWAP RCP BEARING TEMPERATURE INPUTS FROM THE P-250 TO CHART RECORDER TR-( )-448:

    a) Open rear door of the computer cabinet containing the RCP leads

    b) Unscrew and remove the X and W leads from terminals that supply input to the computer

    c) Connect and screw in the X and W leads to terminals that supply input to the chart recorder

    d) Energize RCP TEMP Recorder TR-( )-448

    e) Check TR-( )-448 for proper operation

23. __DIRECT THIRD LICENSE TO INITIATE LOGGING OF CHARGING PUMP BEARING TEMPERATURES AT APPROXIMATELY ONE HOUR INTERVALS

QUESTION NUMBER: 16
TIER/GROUP: ***RO*** 3 ***SRO***
K/A: 2.1.18

Ability to make accurate, clear and concise logs, records, status boards, and reports.

K/A IMPORTANCE: ***RO*** 2.9 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: OMM-001-11-02

EXPLAIN the requirements for maintaining operations records and logs in accordance with OMM-001-11

REFERENCES: OMM-001-11

SOURCE: ***New*** ☒ ***Significantly Modified*** ☐ ***Direct*** ☐

Bank Number NEW

JUSTIFICATION:

a. Plausible since start and completion of OSTs are required entries, test data is not required.

b. Plausible since entries into TS LCOs actions are important information, but only entered by CRSS or SSO to ensure accuracy.

c. Plausible since this effects shift manning requirements, but not a required entry.

d. **CORRECT** This is a required log entry per OMM-001-11.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of logkeeping requirements for the reactor operator

REFERENCES SUPPLIED:

*17.

Given the following plant conditions:

- Unit 1 is at CSD - 140°F and atmospheric pressure.
- All conditions for starting an RCP IAW 1-OP-RC-001, "Starting and Running Any RCP," have been satisfied except for raising RCS pressure.

Which ONE (1) of the following describes the minimum RCS pressure required to start an RCP IAW 1-OP-RC-001?

a. Any RCS pressure which supports a minimum #1 seal return flow of greater than 3 gpm.

b. 200 psig

c. 210 psig

d. 300 psig

ANSWER: d

Reference: OP-RC-001, step 5.1.1
Difference between Surry and Robinson: NEW Surry Question. Surry has removed the #1 Seal Bypass line.

Justification:

a. Plausible, since seal return flow is a critical parameter to ensure proper seal operation.

b. Plausible, since 200 psid is the minimum ΔP for #1 seal.

c. Plausible, since 210 psid is the procedurally controlled minimum #1 seal ΔP for securing an RCP IAW EOPs.

d. Correct Answer. 1-OP-RC-001 requires 300 psig on PI-1-403.

Init Verif

5.0 INSTRUCTIONS

5.1 Starting a Coupled Reactor Coolant Pump

___ 5.1.1 Verify RCS pressure is greater than 300 psig as indicated on PI-1-403 and greater than 280 psig as indicated on 1-RC-PI-1458, RCS PRESS NAR RANGE.

___ 5.1.2 Initiate performance of 0-OSP-RC-001, RCS and PRZR Heatup/Cooldown Verification.

___ 5.1.3 Check the Reactor Coolant Pump to be started. Notify Security at least 15 minutes before 1-RC-P-1A is started. IF required, THEN start the Security Emergency Diesel IAW OP-6.3.1. (√)

( ) 1-RC-P-1A

( ) 1-RC-P-1B

( ) 1-RC-P-1C

NOTE: The shafts of all three RCPs should be manually turned before starting the first RCP.

___ 5.1.4 IF this is the first RCP to be started after Seal Injection is returned to service, THEN perform the following substeps. Otherwise, enter N/A. List any RCPs not available for shaft rotation in the Remarks section of the cover sheet.

a. Verify RCP No. 1 Seal Inj Flow is greater than 6.5 gpm and less than 13 gpm for each of the following. (√)

( ) 1-CH-FI-1130A, RCP A SEAL WTR INJ FLOW

( ) 1-CH-FI-1127A, RCP B SEAL WTR INJ FLOW

( ) 1-CH-FI-1124A, RCP C SEAL WTR INJ FLOW

QUESTION NUMBER: 17
TIER/GROUP: *RO* 2/1 *SRO*
K/A: 003 2.1.32

Ability to explain and apply all system limits and precautions (Reactor Coolant Pump).

K/A IMPORTANCE:	***RO***	3.4	***SRO***	
10CFR55 CONTENT:	***55.41(b) RO***	3	***55.43(b) SRO***	

OBJECTIVE: RCS-09

EXPLAIN the normal operation of the Reactor Coolant System control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: OP-101

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since 1000 psig is a trigger pressure, but pressure must be below 1000 psig, not above.

b. Plausible since 350 °F is used for many applications, such as RHR system operations and Mode changes, but has no effect on the operation of this valve.

c. **CORRECT** Required conditions are RCS pressure between 100 and 1000 psig, all seal leakoff valves open, any #1 seal leakoff flow < 1 gpm, all seal injection flows > 6 gpm. Only the seal injection flow requirement is not met.

d. Plausible since 1 gpm leakoff is a trigger value, but at least one leakoff flow must be below 1 gpm, not all above.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Application of RCP precautions and limitations to determine required action

REFERENCES SUPPLIED:

*18.

Given the following conditions:

- A Reactor Trip and SI have occurred from an unisolable main steam line break on SG "A".
- E-0, "Reactor Trip or Safety Injection," has been completed and the team has completed E-2, "Faulted Steam Generator Isolation."
- SG "A" has been isolated per E-2, "Faulted Steam Generator Isolation," and is dry.
- RCS temperature has been stabilized by dumping steam via the S/G PORV from the intact SGs following the SG "A" dryout.
- The team has transitioned to ES-1.1, "SI Termination."
- SI flowpaths have been secured, normal charging aligned, and letdown placed in service.

Which ONE (1) of the following would be the **FIRST** indication to the operators that a 250 gpm tube leak has subsequently developed in SG "A"?

a. Main Steamline Radiation Monitor for "A" S/G.

b. RCS and "A" S/G pressures equalize.

c. Pressurizer level decreasing.

d. SG "A" level increasing.

ANSWER: c

Reference: N/A
Difference between Surry and Robinson: Intent kept the same. Distractor (b) changed per ES-401-9. Also created conditions so SI was terminated, otherwise pressurizer level would continue to increase (SI flow)

Justification:

N/A

QUESTION NUMBER: 18
TIER/GROUP: *RO* 1/2 *SRO*
K/A: 037AA1.11

Ability to operate and / or monitor the following as they apply to the Steam Generator Tube Leak: PZR level indicator

K/A IMPORTANCE: *RO* 3.4 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 5 *55.43(b) SRO*

OBJECTIVE: PATH-1-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in PATH-1 by explaining the basis of each.

REFERENCES: PATH-1-BD
EPP-16

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number PATH-1-03 016

JUSTIFICATION:

a. Plausible since this would provide indication during power operations, but following a reactor trip the N-16 detectors on the steam lines would not be effective.

b. Plausible since this would provide indication during power operations, but following a reactor trip and safety injection blowdown would be isolated.

c. **CORRECT** Pressurizer level would decrease regardless of which SG had a tube rupture. Due to the plant conditions, none of the other 'normal' indications of a tube rupture would be available.

d. Plausible since this would provide indication if the SG were not faulted, but any leakage to the faulted SG will immediately flash to steam so no level increase would be noted.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the effectiveness of diagnostic indications during abnormal conditions

REFERENCES SUPPLIED:

*19.

While performing 1-OPT-RX-003, "Reactor Power Calorimetric Using Feed Flow and P-250 Computer Points (Manual)," which ONE (1) of the following will result in **ACTUAL** power being **HIGHER THAN INDICATED** power?

a. SG Blowdown is secured prior to starting the data collection.

b. MDAFW Pump "A" is operating with flow being delivered to a SG.

c. Indicated feedwater temperature used is lower than actual.

d. Indicated feedwater flow used is higher than actual.

ANSWER: b

Reference: N/A
Difference between Surry and Robinson: Procedure number/title changed to Surry Specific.

Justification:

N/A

QUESTION NUMBER: 19
TIER/GROUP: ***RO*** 2/1 ***SRO***
K/A: 015K5.04

Knowledge of the operational implications of the following concepts as they apply to the NIS: Factors affecting accuracy and reliability of calorimetric calibrations

K/A IMPORTANCE: ***RO*** 2.6 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 6 ***55.43(b) SRO***

OBJECTIVE: NI-10

EXPLAIN the operation of the Nuclear Instrumentation System.

REFERENCES: OST-012

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number RNP-RO-2000 015

JUSTIFICATION:

a. Plausible since blowdown is a consideration in the calorimetric. Has no effect provided no changes are made to blowdown during the data collection period.

b. **CORRECT** AFW flow is not accounted for in the calorimetric. The amount of heat actually required to raise AFW temperature to saturation would be ignored, thereby causing calculated power (and indicated after adjustment) to be lower than actual.

c. Plausible since feed temperature is a consideration in the calorimetric. If indicated feed temperature was lower than actual, the calculation (and indicated power) would require more heat to raise temperature, so it would be higher than actual.

d. Plausible since feed flow is a consideration in the calorimetric. If indicated feed flow was higher than actual, more heat would be required to raise the additional feed flow to saturation, so calculated (indicated) would be higher than actual.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 4

Analysis of the effects of various inputs to the calorimetric calibration

REFERENCES SUPPLIED:

*20.

Given the following conditions:

- Refueling Operations are scheduled to commence.
- RCS Boron Concentration is currently 2175 ppm.

Which ONE (1) of the following describes the Tech Spec required RCS boron concentration for refueling operations?

a. Boron concentration is adequate.

b. Boron concentration must be increased by a minimum of 75 ppm.

c. Boron concentration must be increased by a minimum of 125 ppm.

d. Boron concentration must be increased by a minimum of 175 ppm.

ANSWER: c

Reference: TS-3.10.9.b
Difference between Surry and Robinson: Surry Tech Spec required minimum is 2300 ppm; current concentration changed to make question Surry Specific.

Justification:

N/A

6. At least one residual heat removal pump and heat exchanger shall be operable to circulate reactor coolant. The residual heat removal loop may be removed from operation for up to 1 hour per 8-hour period during the performance of core alterations or reactor vessel surveillance inspections.

7. Two residual heat removal pumps and heat exchangers shall be operable to circulate reactor coolant when the water level above the top of the reactor pressure vessel flange is less than 23 feet.

8. At least 23 feet of water shall be maintained over the top of the reactor pressure vessel flange during movement of fuel assemblies.

9. With the reactor vessel head unbolted or removed, any filled portions of the Reactor Coolant System and the refueling canal shall be maintained at a boron concentration which is:

   a. Sufficient to maintain K-effective equal to 0.95 or less, and

   b. Greater than or equal to 2300 ppm and shall be checked by sampling at least once every 72 hours.

10. Direct communication between the Main Control Room and the refueling cavity manipulator crane shall be available whenever changes in core geometry are taking place.

11. No movement of irradiated fuel in the reactor core shall be accomplished until the reactor has been subcritical for a period of at least 100 hours.

QUESTION NUMBER: 20
TIER/GROUP: *RO* 3 *SRO*
K/A: 2.2.26

Knowledge of refueling administrative requirements.

K/A IMPORTANCE:	*RO*	2.5	*SRO*	
10CFR55 CONTENT:	*55.41(b) RO*	10	*55.43(b) SRO*	

OBJECTIVE: FH-12

STATE the Technical Specification Limitations and explain the bases for the FH System.

REFERENCES: TS 3.9.1
COLR 2.8

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number FH-12 003

JUSTIFICATION:

a. Plausible if misconception regarding required boron concentration as this is a reasonably high value, but actual required concentration is 1950 ppm.

b. Plausible if misconception regarding required boron concentration as this is a reasonably high value, but actual required concentration is 1950 ppm.

c. **CORRECT** Required boron concentration for refueling is 1950 ppm, so a boration is required to raise boron concentration an additional 125 ppm.

d. Plausible since this would meet required boron concentration, but minimum required is 1950 ppm.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 2

Knowledge of required boron concentration for refueling operations

REFERENCES SUPPLIED:

*21.

Given the following conditions:

- A reactor shutdown is in progress.
- Annunciator G-D-3, NIS Intermediate Range Channel 1 Loss of Compensating Voltage" is lit.
- N-35 indicates stable at 6.0×10^{-10} amps
- N-36 indicates stable at 1.0×10^{-11} amps
- Gammametrics Source range, 1-NI-NFI-190A1, indicates stable at 80 counts.
- Gammametrics Source range, 1-NI-NFI-1270A1, indicates stable at 90 counts.

Which ONE (1) of the following describes the actions required by FR-S.2, Response to Loss of Core Shutdown, to obtain Source Range N-31 and N-32 indication?

a. Push **ONLY** the "Train A Source Range Trip- reset, 1/N 39A" pushbutton.

b. Push **ONLY** the "Train A Intermediate Rng Trip- block, 1/N 38A" pushbutton.

c. Push **BOTH** the "Train A Intermediate Rng Trip- block, 1/N 38A" AND the "Train B Intermediate Rng Trip- block, 1/N 38B" pushbuttons.

d. Push **BOTH** the "Train A Source Range Trip- reset, 1/N 39A" AND the "Train B Source Range Trip- reset, 1/N 39B" pushbuttons.

ANSWER: d

Reference: FR-S.2, step 1 RNO.
Difference between Surry and Robinson: Modified for Surry Specific nomenclature and procedural guidance.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: If adverse CTMT conditions have been exceeded, the Gamma-Metrics Excore Neutron Monitor system (Source and Wide Ranges) should be used to monitor neutron flux for the duration of the event. 4

1. __CHECK INTERMEDIATE RANGE FLUX:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a) Flux - DECREASING	a) Check intermediate range channels for undercompensation. IF undercompensated, THEN manually energize source range detectors. IF NOT, THEN emergency borate RCS until flux less than $5x10^{-11}$ amps.
b) Flux - LESS THAN $5x10^{-11}$ AMPS	b) Continue to monitor flux. WHEN flux is less than $5x10^{-11}$ amps, THEN do Steps 1c and 1d.
c) Verify source range detectors - ENERGIZED	c) Manually energize source range detectors by depressing SOURCE RANGE TRIP - RESET pushbuttons: • TR A, 1/N 39A • TR B, 1/N 39B
d) Transfer NR-1-45 to source range scale	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. __CHECK SOURCE RANGE CHANNELS - ZERO OR NEGATIVE STARTUP RATE [Gamma-Metrics Source Range Power - STABLE OR DECREASING]	Emergency borate until source range startup rate negative or zero. IF Adverse Containment conditions have been exceeded, THEN borate until Gamma-Metrics Source Range power level is stable or decreasing. 4

QUESTION NUMBER: 21
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: 033AA2.11

Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Loss of compensating voltage

K/A IMPORTANCE: *RO* 3.1 *SRO* 3.4
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: NI-08

EXPLAIN the component operation associated with each switch position for the Nuclear Instrumentation System switches and controls.

REFERENCES: APP-005
GP-006

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number NI-08 003

JUSTIFICATION:

a. Plausible since failed IR channel is related to Train A, but both defeat buttons must be pushed.

b. Plausible since failed IR channel is related to Train A, but both defeat buttons must be pushed.

c. Plausible since both buttons must be pushed, but buttons to be pushed are P-6 defeat not trip logic defeat.

d. **CORRECT** Even though only one IR is undercompensated, the circuitry requires that both defeat buttons be pushed to energize the SR instruments.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of NIS system interlocks and controls

REFERENCES SUPPLIED:

*22.

Given the following conditions:

- The unit is operating at 100% power.
- NO scheduled releases are in progress.
- A small leak develops on an inservice letdown radiation monitor (1-CH-RI-118).
- All ventilation systems are in a normal configuration.

Which ONE of the following would alert the operators of the accidental liquid release in progress?

a. Decon Building radiation monitor, 1-RM-RI-151.

b. Vent Vent 1 (Turbine Building Vent Stack) Gas radiation monitor, 1-VG-R1-104.

c. RC letdown HI radiation monitor, 1-CH-RI-118.

d. Process vent gas radiation monitor, 1-GW-RI-102.

ANSWER: d

Reference: ND-92.4-H/T-1.3
Difference between Surry and Robinson: Modified to Surry.

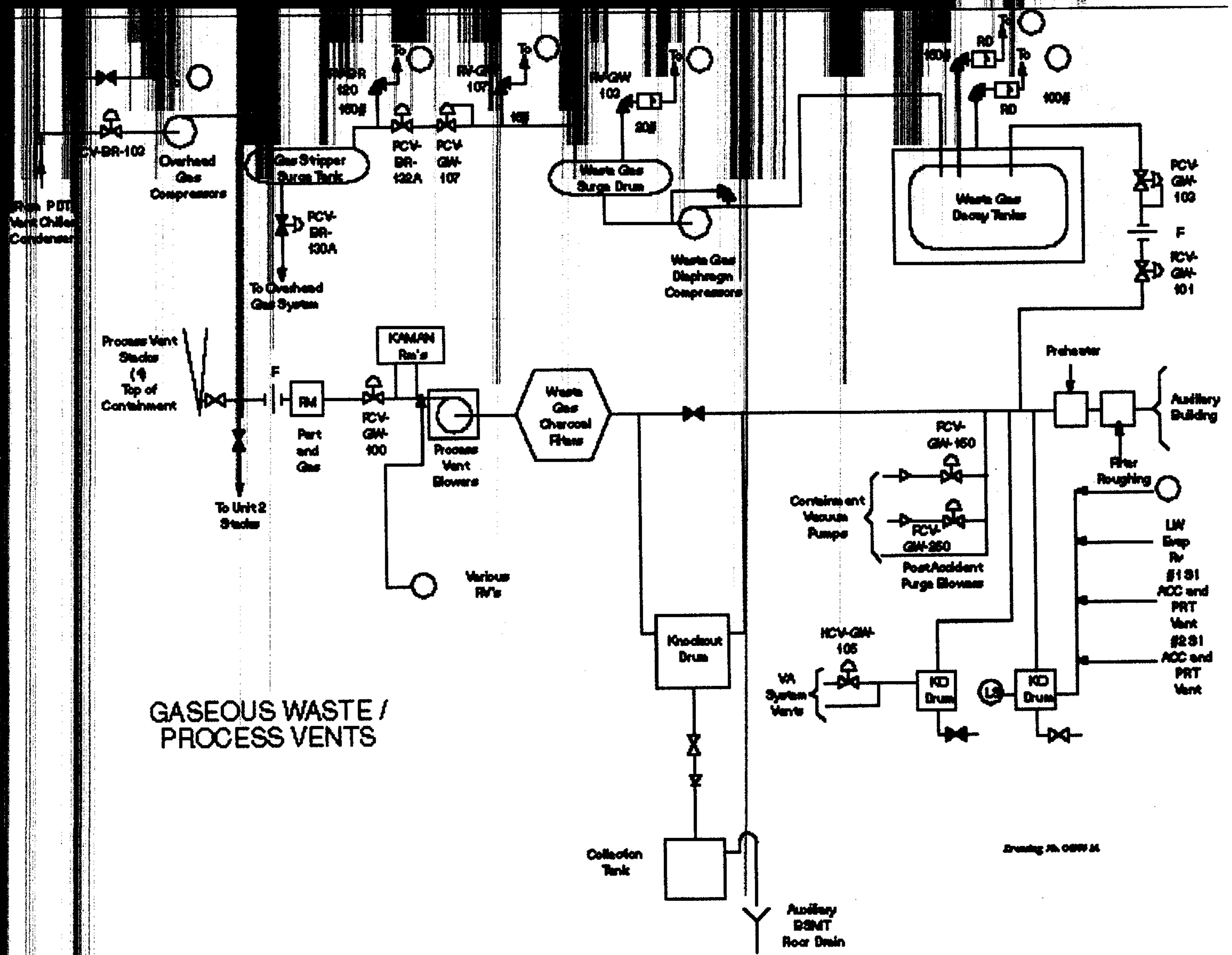
Justification:

a. Plausible, if the operator believes the letdown rad monitor leak would be sensed in the Decon Building due to ventilated exhaust flows.

b. Vent Vent 2 is an actual indication. The candidate must know the Aux Building must be ventilated through Vent Stack 2.

c. Plausible, since this is the faulty (leaking) RM.

d. Correct Answer. Difficult because the dilution air is obtained from the area around the letdown radiation monitor. Dilution air not commonly considered as part of the release volume.



GASEOUS WASTE / PROCESS VENTS

QUESTION NUMBER: 22
TIER/GROUP: *RO* 1/2 *SRO* 1/1
K/A: 059AK2.02

Knowledge of the interrelations between the Accidental Liquid Radwaste and Radioactive-gas monitors

K/A IMPORTANCE: *RO* 2.7 *SRO* 2.7
10CFR55 CONTENT: *55.41(b) RO* 11 *55.43(b) SRO*

OBJECTIVE: RM-14

EXPLAIN the effect on the RM System due to selected failures.

REFERENCES: AOP-005
SD-019

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number RM-01 003

JUSTIFICATION:

a. Plausible since the PASS Panel is in the general vicinity of WCT "A". The liquid from the leak will be collected in a sump and will not spill out to the PASS Panel area.

b. Plausible since the Letdown Line Area is in the general vicinity of WCT "A". The liquid from the leak will be collected in a sump and will not spill out to the Letdown Line area.

c. Plausible since the Charging pump room is in the general vicinity of WCT "A". The liquid from the leak will be collected in a sump and will not spill out to the Charging Pump room.

d. CORRECT The liquid form the leak will be collected in a sump but the gas that comes out of solution will be exhausted past R-14C by the Auxiliary building exhaust.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of the proximity of radiation monitors to leakage source

REFERENCES SUPPLIED:

*23.

Given the following conditions:

- The Control Room has filled with dense smoke from a Main Control Room fire on Unit 1.
- The reactor has been tripped manually by operators.
- The Control Room has been evacuated due to the dense smoke.

Which ONE (1) of the following identifies the procedure(s) that will be used to stabilize Unit 1 conditions after Main Control Room evacuation?

a. 1-E-0, "Reactor Trip Safety Injection."

b. 0-AP-48.00, "Fire Protection – Operations Response."

c. 0-AP-20.00, "Main Control Room Inaccessibility."

d. 0-FCA-1.00, "Limiting MCR Fire."

ANSWER: d

Reference: AP-48.00, AP-20.00, FCA-1.00
Difference between Surry and Robinson: Procedure nomenclature modified.

Justification:

a. E-0 a direct entry procedure and commonly implemented for reactor trips.

b. AP-48.00 is an applicable procedure for this event, however it gives no direction for unit stabilization.

c. AP-20.00 is only utilized for evacuation from the control for NON-Fire conditions.

d. FCA-1.00, Correct Answer, implemented to ensure Appendix "R" considerations are implemented (i.e., component separation performed).

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- Battle lanterns are located in the Appendix R locker.
- Actuation of the beepers will alert the Security Fire Team.

[1] __CALL OUT THE FIRE BRIGADE USING GAI-TRONICS

a) Sound the fire alarm for 15 seconds

b) Make the following announcement - "FIRE, FIRE, FIRE, AT (give location)"

c) Repeat the announcement

d) Sound the fire alarm for 15 seconds

e) Repeat the announcement

Response Not Obtained:

Do the following:

1) IF Gaitronics inoperable, THEN initiate 0-FCA-10.00, ESTABLISHING COMMUNICATIONS.

2) GO TO Step 3.

NOTE: Step 2 should be performed to ensure that Fire Brigade members in high noise areas are contacted.

2. __CONTACT PERSONNEL WITH BEEPERS:

a) Dial 8-730-3030

b) Listen for ringing followed by a long tone

c) Dial group call number (5354)

d) Listen for ringing tone followed by three short beeps

e) Enter numeric message 66

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	__DETERMINE IF FIRE IN MCR	<u>IF</u> smoke is <u>NOT</u> entering the MCR <u>THEN</u> GO TO Step 7. <u>IF</u> smoke entering the MCR, <u>THEN</u> verify or perform the following actions based on source of smoke. a) Close the MCR door. (use sliding bolt to secure door if necessary) b) Close the MCR door louvers. c) Close the manual smoke dampers: • Unit 1, one damper • Unit 2, two dampers d) Wear breathing apparatus as necessary. e) GO TO Step 5.
4.	__TRY TO PREVENT MCR EVACUATION: a) Terminate the hazard	
	b) Secure Control Room AHUs at local switch: • 1-VS-AC-1 • 1-VS-AC-2 • 2-VS-AC-8 • 2-VS-AC-9	b) Locally open breaker(s): • 1-VS-AC-1, 1H1-1-4A1 • 1-VS-AC-2, 1J1-1-3A2 • 2-VS-AC-8, 2H1-1-4B2 • 2-VS-AC-9, 2J1-1-3A2
	c) Wear breathing apparatus as necessary	
	d) Secure MCR ventilation: 1) Stop 1-VS-F-15 2) Close 1-VS-MOD-103C and 1-VS-MOD-103D	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: • MCR evacuation due to a fire is addressed by 0-FCA-1.00, LIMITING MCR FIRE.

• Alarms on 1-VSS-02A-1A or 1-VSS-02A-1B are addressed by 0-AP-20.01, MAIN CONTROL ROOM OXYGEN MONITOR - ALARM OR MALFUNCTION.

• Operators should observe posted signs limiting the use of portable radios.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[1]	__DETERMINE IF FIRE IN MCR	GO TO Step 3.
[2]	__GO TO 0-AP-48.00, FIRE PROTECTION - OPERATIONS RESPONSE	
[3]	__TRY TO PREVENT MCR EVACUATION: • Terminate the hazard • Close smoke dampers as necessary • Wear breathing apparatus as necessary • Ventilate with portable fans as necessary • Dump one bank of MCR air bottles or align emergency supply ventilation as necessary	
[4]	__DETERMINE IF MCR EVACUATION - NECESSARY	Do the following: a) Notify OM on call. b) Terminate 0-AP-20.00, MAIN CONTROL ROOM INACCESSIBILITY.

VIRGINIA POWER
SURRY POWER STATION

FIRE CONTINGENCY ACTION

NUMBER	PROCEDURE TITLE	REVISION
0-FCA-1.00	LIMITING MCR FIRE	28
		PAGE
	(With 17 Attachments)	1 of 29

PURPOSE

To provide guidance to Operations personnel for response to the consequences of a limiting fire in the Main Control Room.

ENTRY CONDITIONS

Transition from 0-AP-48.00, Fire Protection - Operations Response

APPROVAL RECOMMENDED	APPROVED	DATE
REVIEWED	CHAIRMAN STATION NUCLEAR SAFETY AND OPERATING COMMITTEE	

QUESTION NUMBER: 23
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: 068 2.4.11

Knowledge of abnormal condition procedures (Cont Room Evac).

K/A IMPORTANCE: *RO* 3.4 *SRO* 3.6
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: AOP-004-02

RECOGNIZE the selected entry level conditions of AOP-004.

REFERENCES: AOP-004

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number AOP-004-02 001

JUSTIFICATION:

a. Plausible since a reactor trip is performed in accordance with AOP-004, but the EOP network is not implemented in the event of a control room evacuation.

b. Plausible since entry may be directed to DSP-002 by AOP-004, but not used initially.

c. **CORRECT** Entry conditions to AOP-004 are met due to requiring evacuation due to life-threatening dense smoke.

d. Plausible since GP-006 is used for normal shutdowns, but actions taken outside the control room are outside the scope of GP-006.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 2

Knowledge of entry requirements / purpose for abnormal procedures

REFERENCES SUPPLIED:

*24.

Given the following conditions:

- The unit is operating at 100% power.
- 1-OPT-RX-005 "Control Rod Assembly Partial Movement," is being performed.
- Annunciator G-A-6, ROD CONT SYSTEM URGENT FAILURE, alarms just as Control Bank "C" rods are being withdrawn.

Which ONE (1) of the following describes the required operator action?

a.
- This is an expected alarm.
- Continue withdrawing Control Bank "C' rods.

b.
- Immediately trip the reactor.
- Initiate 1-E-0, "Reactor Trip or Safety Injection."

c.
- Place the ROD BANK SELECTOR switch in Manual.
- Do NOT move rods until cause of alarm determined.

d.
- Place the ROD BANK SELECTOR switch in Manual.
- Restore Tave and Tref by adjusting rods to pre-test value.

ANSWER: c

Reference: ARP G-A-6, AP-1.00, Steps 13 and 14.
Difference between Surry and Robinson: Procedures and mark number nomenclature changed to Surry Specific. Answer changed to reference Surry procedural guidance.

Justification:

c. Correct Answer. ARP directs AP-1.00, and AP-1.00 directs rods to manual and restricts movement.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	__CHECK OFF-LATCH-HOLD SWITCH - IN HOLD	GO TO Step 3.
2.	__RETURN TO PROCEDURE IN EFFECT	
3.	__LOCALLY VERIFY URGENT FAILURE ALARM - LIT • Rod Control Logic Cabinet • Rod Control Power Cabinets	Do the following: a) Initiate a Work Request. b) GO TO Step 6.
4.	__INITIATE A HAND WRITTEN URGENT WORK ORDER	
5.	__INITIATE 0-AP-1.00, ROD CONTROL SYSTEM MALFUNCTION	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED	
5.	__CHECK ONLY ONE ROD AFFECTED	Trip Reactor and GO TO ()-E-0, REACTOR TRIP OR SAFETY INJECTION.	6
6.	__CHECK REACTOR POWER - GREATER THAN 25%	Trip Reactor and GO TO ()-E-0, REACTOR TRIP OR SAFETY INJECTION.	6
7.	__CHECK UNIT CONDITIONS - STABLE	Trip Reactor and GO TO ()-E-0, REACTOR TRIP OR SAFETY INJECTION.	6
8.	__PLACE ROD CONTROL IN MANUAL		
9.	__REDUCE REACTOR POWER TO LESS THAN OR EQUAL TO 70% WITHIN 1 HOUR		
10.	__CHECK REACTOR AND TURBINE POWER - MATCHED AND STABLE	Use Rod Control in MANUAL and Turbine Controls as necessary to control power at less than or equal to 70%. <u>IF</u> power can <u>NOT</u> be controlled, <u>THEN</u> trip Reactor <u>AND</u> GO TO ()-E-0, REACTOR TRIP OR SAFETY INJECTION.	
11.	__RECORD THE TIME THE ROD WAS DROPPED: • ____________		
12.	__GO TO 0-AP-1.01, CONTROL ROD MISALIGNMENT, STEP 4		
13.	__CHECK FOR ROD CONTROL URGENT FAILURE: • Annunciator ()G-A6, ROD CONT SYS URGENT FAILURE - LIT	GO TO Step 16.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	__TRANSFER ROD CONTROL:	
	a) Put ROD CONT MODE SEL switch in MANUAL	
	b) Do NOT move rods	
15.	__IDENTIFY AFFECTED ROD CONTROL CABINET:	
	a) Send Operator to locally check cabinets	
	b) Check failure - NOT IN LOGIC CABINET	b) Do <u>NOT</u> move rods. GO TO Step 18.
	c) Check failure - NOT IN POWER CABINET 1BD OR 2BD	c) Do <u>NOT</u> move rods. GO TO Step 18.
	d) Operate D bank rods as necessary in BANK SELECT	
	e) GO TO Step 18	
16.	__CHECK FOR FAILURE OF AUTO ROD CONTROL: • Temperature deviation - GREATER THAN 1.5°F • Rod motion with less than 1.5 °F temperature deviation • Speed demand and no rod motion • Direction demand and no rod motion • Rods step in wrong direction • Operator observation of any other abnormality	GO TO Step 21.

QUESTION NUMBER: 24
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 001K3.01

Knowledge of the effect that a loss or malfunction of the CRDS will have on the CVCS

K/A IMPORTANCE: *RO* 2.9 *SRO* 3.0
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: AOP-001-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of steps related to dropped rod, misaligned rod, immovable rod, IRPI failure as directed in AOP-001

REFERENCES: AOP-001

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since this is an action that would be taken if a dropped rod recovery were being performed due to this being an expected alarm, but it is not expected and rods will not move.

b. Plausible since this is an action that would be taken if multiple rods were dropped, but an urgent failure does not indicate that any rods are dropped.

c. Plausible since turbine load adjustments to restore Tavg are permissible, but turbine load should be lowered, not raised.

d. CORRECT Rod bank selector is to be placed in Manual and Tavg restored by adjusting boron concentration (dilution) or turbine load (load reduction).

DIFFICULTY:
Comprehensive/Analysis [X] *Knowledge/Recall* [ ] *Rating* 3

Analysis of conditions during rod control surveillance to determine required actions

REFERENCES SUPPLIED:

*25.

During an accident condition on Unit One, the Balance of plant operator questions the validity of a pressure indication causing a Main Control Room annunciator. He notes there is a black diamond next to the mark number on the bakelite label.

Which ONE (1) of the following identifies the significance of this "Black Diamond"?

a. A maintenance rule risk significant component.

b. Environmentally qualified.

c. A Technical Specification Table 3.7 item.

d. A Regulatory Guideline 1.97 indication.

ANSWER: d

Reference: None found
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since the black diamonds are next to significant safety-related indicators.

b. Plausible, since many (majority) of the indicators are located inside the Containment, and are subject to adverse environmental conditions.

c. Plausible, since the black diamonds are next to significant safety-related indicators.

d. Correct Answer.

QUESTION NUMBER: 25
TIER/GROUP: ***RO*** 3 ***SRO*** 3
K/A: 2.4.45

Ability to prioritize and interpret the significance of each annunciator or alarm.

K/A IMPORTANCE: ***RO*** 3.3 ***SRO*** 3.6
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: OMM-001-11-02

EXPLAIN the requirements for maintaining operations records and logs in accordance with OMM-001-11

REFERENCES: OMM-001-11

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number OMM-001-??-04 001

JUSTIFICATION:

a. Plausible since the instrument is in an unusual configuration, but blue stickers are reserved for instruments with an identified unacceptable deviation.

b. Plausible since identifying these instruments is vital to post-accident response, but blue stickers are reserved for instruments with an identified unacceptable deviation.

c. Plausible since identifying these instruments is vital to post-accident response, but blue stickers are reserved for instruments with an identified unacceptable deviation.

d. **CORRECT** The blue sticker is used to designate an instrument which has an unacceptable deviation identified.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of administrative requirements for identifying out of service indicators

REFERENCES SUPPLIED:

*26.

Given the following conditions:

- The Fuel Handling group reports a dropped spent fuel assembly in the Spent Fuel Pool.
- A valid High Radiation alarm has been acknowledged for 1-RM-153, Fuel Pit Bridge.
- The operating team has entered AP-22.00, "Fuel Handling Abnormal Conditions."

Which ONE (1) of the following actions is required to maintain the Main Control Room environment acceptable?

a. Place the Fuel Building on filtered exhaust.

b. Secure all Main Control Room supply and exhaust air paths.

c. Isolate the Main Control Room supply and exhaust air paths and dump one bottled air bank.

d. Dump both Main Control bottled air banks while maintaining MCR exhaust paths.

ANSWER: c

Reference: 0-AP-22.00, Fuel Handling Abnormal Conditions
Difference between Surry and Robinson: Modified Question due to differences in ventilation arrangement.

Justification:

a. Plausible, since activity source is from the Fuel Building.

b. Plausible, since this isolates the Control Room Ventilation System but does not maintain the Control Room at a positive pressure.

c. Correct Answer. Control Room ventilation is secured and positive pressure is maintained by dumping air bottles.

d. Plausible, since air bottles are dumped but the exhaust path should be isolated.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[1]	__CHECK FUEL REPAIR - IN PROGRESS	GO TO Step 4.
[2]	__CHECK LOCAL RADIATION CONDITIONS - NORMAL	GO TO Step 4.
[3]	__GO TO STEP 18	
[4]	__STOP FUEL HANDLING OPERATIONS	
[5]	__EVACUATE THE AFFECTED AREA • Containment OR • Fuel Building	
[6]	__SECURE NORMAL MCR VENTILATION a) Close 1-VS-MOD-103C b) Close 1-VS-MOD-103D c) Verify stopped or stop 1-VS-F-15 d) Verify stopped or stop 1-VS-AC-4	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[7]	__DUMP MCR BOTTLED AIR:	
	a) Close 1-VS-MOD-103B (Dumps Unit 1 Cable Vault air bottles)	
	b) Set timer for 60 minutes	
	c) Check positive pressure of 0.05 inches - BEING MAINTAINED • PDI-VS-110 • PDI-VS-101 • PDI-VS-200 • PDI-VS-201	c) Close 1-VS-MOD-103A. (Dumps MER 3 air bottles)
	d) Check all Main Station Batteries - FRESHENING CHARGE IN PROGRESS	d) GO TO Step 8.
	e) Notify Electrical Department that Battery Room must be monitored for explosive concentration	
* 8.	__CHECK FUEL HANDLING ACCIDENT - IN PROGRESS FOR ONE HOUR (WHEN TIMER GOES OFF)	Do the following: a) <u>WHEN</u> Fuel Handling accident has been in progress for one hour (when timer goes off), <u>THEN</u> immediately perform Step 9. b) GO TO Step 10.

QUESTION NUMBER: 26
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: 061AK3.02

Knowledge of the reasons for the following responses as they apply to the Area Radiation Monitoring (ARM) System Alarms: Guidance contained in alarm response for ARM system

K/A IMPORTANCE: *RO* 3.4 *SRO* 3.6
10CFR55 CONTENT: *55.41(b) RO* 8 *55.43(b) SRO*

OBJECTIVE: AOP-005-03

EXPLAIN the basis of selected steps, cautions, and notes in AOP-005.

REFERENCES: AOP-005

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number AOP-005-03 005

JUSTIFICATION:

a. **CORRECT** Ensures CR pressure is higher than AB pressure to ensure air flow is out of the CR and into the AB.

b. Plausible since it would be desirable to clean up airborne contaminants, but contaminants are prevented from entering the CR due to the high pressure.

c. Plausible if misconception that AB is maintained at higher pressure, but CR is maintained at higher pressure than AB.

d. Plausible since it would be desirable to maintain low levels of airborne radiation in the CR, but contaminants are prevented from entering the CR due to the high pressure.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of the basis for actions taken in response to a radiation alarm

REFERENCES SUPPLIED:

*27.

Given the following conditions:

- A large break (DBA) LOCA has occurred.
- 2-ECA-1.1, "Loss of Emergency Coolant Recirculation," is being implemented.
- One HHSI Pump is running.
- No LHSI pumps are available.
- Time after trip and SI is 1 hour.
- SI **CANNOT** be terminated due to insufficient subcooling.

Given the supplied references, which ONE (1) of the following states the **MINIMUM** SI flow for these conditions?

a. 560 gpm.

b. 385 gpm.

c. 210 gpm.

d. 200 gpm.

ANSWER: c

Reference: 2-ECA-1.1, Loss of Emergency Coolant Recirculation, Attachment 2.
Difference between Surry and Robinson: Changed to Surry Specific curve

Justification:

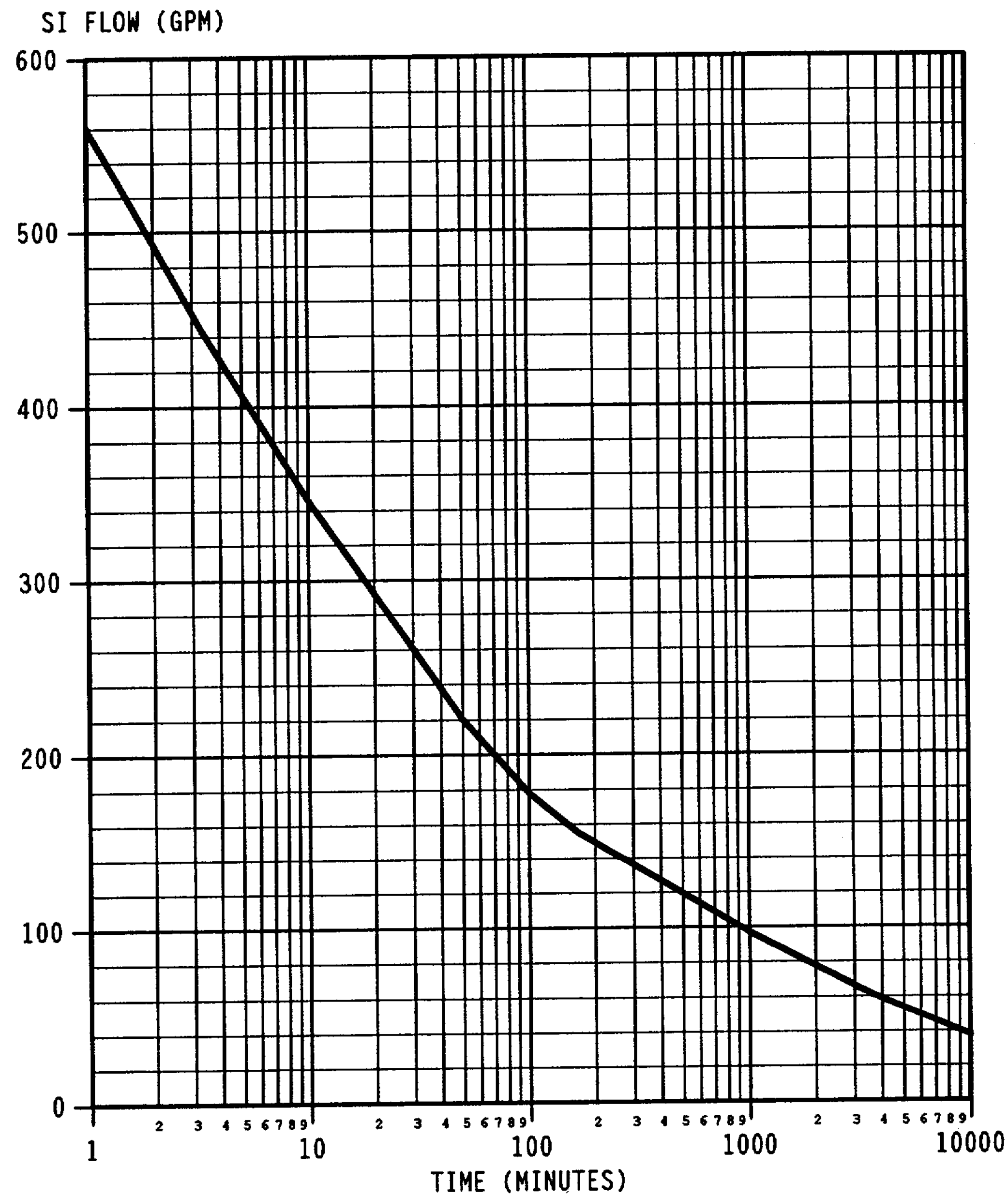
a. 560 use 1 minute on curve vs. 1 hour.

b. Uses 6 minutes (6E1) vs. 60E10.

c. Correct Answer.

d. Pick nearest line (flow too low to be acceptable).

NUMBER 2-ECA-1.1	ATTACHMENT TITLE MINIMUM SI FLOWRATE FOR DECAY HEAT REMOVAL VERSUS TIME FROM REACTOR TRIP	REVISION 16
ATTACHMENT 2		PAGE 1 of 1



QUESTION NUMBER: 27
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: WE11EK2.2

Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the systems.

K/A IMPORTANCE: *RO* 3.9 *SRO* 4.3
10CFR55 CONTENT: *55.41(b) RO* 8 *55.43(b) SRO*

OBJECTIVE: EPP-015-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of steps related to EPP-15.

REFERENCES: EPP-15

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number EPP-015-08 001

JUSTIFICATION:

a. Plausible since determined flow is correct, but flow should be established with SI pump, not RHR pump.

b. Plausible if 200 minute line is incorrectly used, but actual flow should be maintained above 260 gpm.

c. **CORRECT** Using EPP-15, Attachment 1, intersection of 20 minute line with curve identifies minimum required flow as 260 gpm. The RHR pumps are both stopped under these conditions.

d. Plausible if 200 minute line is incorrectly used, but actual flow should be maintained above 260 gpm.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Application of given data to plant curves to determine SI flow requirements

REFERENCES SUPPLIED: EPP-15, Attachment 1

*28.

Given the following conditions:

- The unit is operating at 24% power during a plant startup.
- Rods are being withdrawn to raise RCS temperature.
- When the IN-HOLD-OUT lever is released, rods continue to step outward.

Which ONE (1) of the following actions should be taken?

a. Place the ROD BANK SELECTOR switch in Automatic and verify rod motion stops.

b. Place the ROD BANK SELECTOR switch into an individual control bank position and verify rod motion stops.

c. Manually trip the reactor and go to E-0, "Reactor Trip or Safety Injection."

d. Place the IN-HOLD-OUT lever in the "IN" position and verify rods step in or stop.

ANSWER: c

Reference: AP-1.00, Rod Control System Malfunction.
Difference between Surry and Robinson: Changed correct answer to (c) and changed distractors (b) and (d).

Justification:

a. Plausible, since this action may stop rod movement but is not IAW AP-1.00.

b. Rods already in Manual. Changed to use another position on selector switch. Plausible, since this action may stop rod movement but is not IAW AP-1.00.

c. Correct Answer, IAW AP-1.00, Steps 1 and 2.

d. Changed distractor to another action relating to manipulation of Rod Control System. Plausible, since this action may stop rod movement but is not IAW AP-1.00.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: The minimum temperature for criticality is 522 °F. If Tave decreases below this temperature, Tech Spec 3.1.e must be reviewed.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[1]	__CHECK FOR EITHER OF THE FOLLOWING: • Continuous rod withdrawal • Continuous rod insertion	GO TO Step 4.
[2]	__STOP ROD MOTION: a) Put ROD CONT MODE SEL switch in MANUAL	
	b) Verify rod motion - STOPPED	b) Trip Reactor and GO TO ()-E-0, REACTOR TRIP OR SAFETY INJECTION.
3.	GO TO STEP 13	
4.	__CHECK IF ANY ROD DROPPED: • Annunciator ()G-H2, RPI ROD BOTTOM ≤ 20 STEPS - LIT OR • Annunciator ()G-H1, NIS DROPPED ROD FLUX DECREASE ≥ 5% PER 2 SEC - LIT OR • Rod Bottom Lights - ANY LIT	IF deviation between any IRPI and associated Step Counter greater than or equal to 8 steps, THEN GO TO 0-AP-1.02, INDIVIDUAL ROD POSITION INDICATORS. IF deviation between all IRPIs and associated Step Counters less than 8 steps, THEN do the following: a) IF any IRPI indicating erratically, THEN notify Instrument Department. b) GO TO Step 13.

QUESTION NUMBER: 28
TIER/GROUP: *RO* 1/2 *SRO* 1/1
K/A: 001AA2.03

Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Proper actions to be taken if automatic safety functions have not taken place

K/A IMPORTANCE: *RO* 4.5 *SRO* 4.8
10CFR55 CONTENT: *55.41(b) RO* 6 *55.43(b) SRO*

OBJECTIVE: AOP-001-05

STATE the immediate action steps of AOP-001

REFERENCES: AOP-001

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number NEW

JUSTIFICATION:

a. CORRECT Automatic rod withdrawal is physically disabled, so placing the switch in Automatic should stop all rod withdrawal.

b. Plausible since automatic rod control is capable above 15% power, but only for automatic rod insertion as automatic rod withdrawal is physically disabled.

c. Plausible since a reactor trip would be required if below 15% or if the correct actions failed to stop rod motion, but IR trip would have been blocked by this point.

d. Plausible since a reactor trip would be required if below 15% or if the correct actions failed to stop rod motion, but PR trip would have been blocked by this point.

DIFFICULTY:
Comprehensive/Analysis [ ] *Knowledge/Recall* [X] *Rating* 3

Knowledge of immediate operator actions for continuous rod motion

REFERENCES SUPPLIED:

*29.

A Unit 1 Containment Purge is in progress.

Which ONE (1) of the following will automatically terminate the purge on a high radiation signal?

a. 1-RM-RI-162, Manipulator Crane.

b. 1-GW-RI-101, Process Vent Particulate.

c. 1-VG-RI-104, Vent Vent 1 GAS.

d. 1-VG-RI-109, Vent Vent Particulate.

ANSWER: a

Reference: Annunciator 1-RM-K8, 1-RM-RI-162 High.
Difference between Surry and Robinson: Changed to Surry Specific Radiation Monitors.

Justification:

a. Correct Answer.

b. Plausible, since this radiation monitor provides an automatic isolation function but not for Containment purge.

c. Plausible, since Containment purge exhausts through the Vent-Vent line but automatic isolation is not provided by the radiation monitor.

d. Plausible, since Containment purge exhausts through the Vent-Vent line but automatic isolation is not provided by the radiation monitor.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: One bank of MCR Air Bottles must be dumped immediately IAW 0-AP-22.00, 0-AP-50.00, or 1-E-0 upon receiving a valid RM alarm caused by a Fuel Handling accident. 4

* *

<u>NOTE</u>:
- If high alarm has actuated, the automatic funtions associated with that monitor should be verified or performed.
- When HP has surveyed the area and declared radiation levels normal, the components that were realigned due to monitor failure may be returned to normal and activities in the affected area may continue.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	__VERIFY ALARM - READING ON MONITOR OR CHART RECORDER GREATER THAN OR EQUAL TO HIGH SETPOINT • 1-RM-RI-162 • 1-RM-RR-100A, Pen 2	Do the following: a) Increase surveillance on the following monitors: • 1-RM-RI-163 • 1-RM-RI-159 • 1-RM-RI-160 b) Evaluate entry into 0-AP-10.13, LOSS OF MAIN CONTROL ROOM ANNUNCIATORS. c) Initiate a Work Request. d) GO TO Step 12.
2.	__EVACUATE CTMT AS NECESSARY	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	__VERIFY CTMT PURGE SYS - ISOLATED	
	a) CTMT PURGE SUP - CLOSED • 1-VS-MOV-100A • 1-VS-MOV-100B • 1-VS-MOV-100C • 1-VS-MOV-100D	a) Manually close valves.
	b) CTMT PURGE SUP fans - STOPPED • 1-VS-F-4A • 1-VS-F-4B	b) Manually put fans in STOP.
	c) CTMT PURGE BYP valve - CLOSED • 1-VS-MOV-101	c) Manually close 1-VS-MOV-101.
4.	__VERIFY CTMT IA SYS ALIGNMENT: • 1-IA-TV-101A - CLOSED • 1-IA-TV-101B - CLOSED	Manually align valves.

QUESTION NUMBER: 29
TIER/GROUP: ***RO*** 2/2 ***SRO*** 2/2
K/A: 073A4.01

Ability to manually operate and/or monitor in the control room: Effluent release

K/A IMPORTANCE: ***RO*** 3.9 ***SRO*** 3.9
10CFR55 CONTENT: ***55.41(b) RO*** 9 ***55.43(b) SRO***

OBJECTIVE: RM-09

EXPLAIN the normal operation of the RM control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: AOP-005
SD-019

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number RM-09 003

JUSTIFICATION:

a. **CORRECT** On high radiation level automatically closes CV purge supply and exhaust, as well as the pressure and vacuum relief valves.

b. Plausible since R-14A monitors vent exhaust and CV purge exhaust is monitored by this rad monitor, but no auto actions are associated with R-14A.

c. Plausible since R-14A monitors vent exhaust and CV purge exhaust is monitored by this rad monitor, but auto actions associated with R-14C are to isolate waste gas tank release.

d. Plausible since this would detect a containment high radiation condition, but only if leakage into the cooling water also existed and there are no automatic actions for this monitor.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of automatic actions associated with radiation monitors

REFERENCES SUPPLIED:

*30.

Given the following conditions:

- Reactor power is 35%.
- All control systems are in automatic.
- Pressurizer level transmitter 2-RC-LT-2459 is selected to the upper control channel.
- A small leak develops across the differential pressure bellows for 2-RC-LT-2459, resulting in pressure equalizing across the bellows.

Assuming **NO** operator actions, which **ONE (1)** of the following describes the initial instrumentation and plant response to this leak?

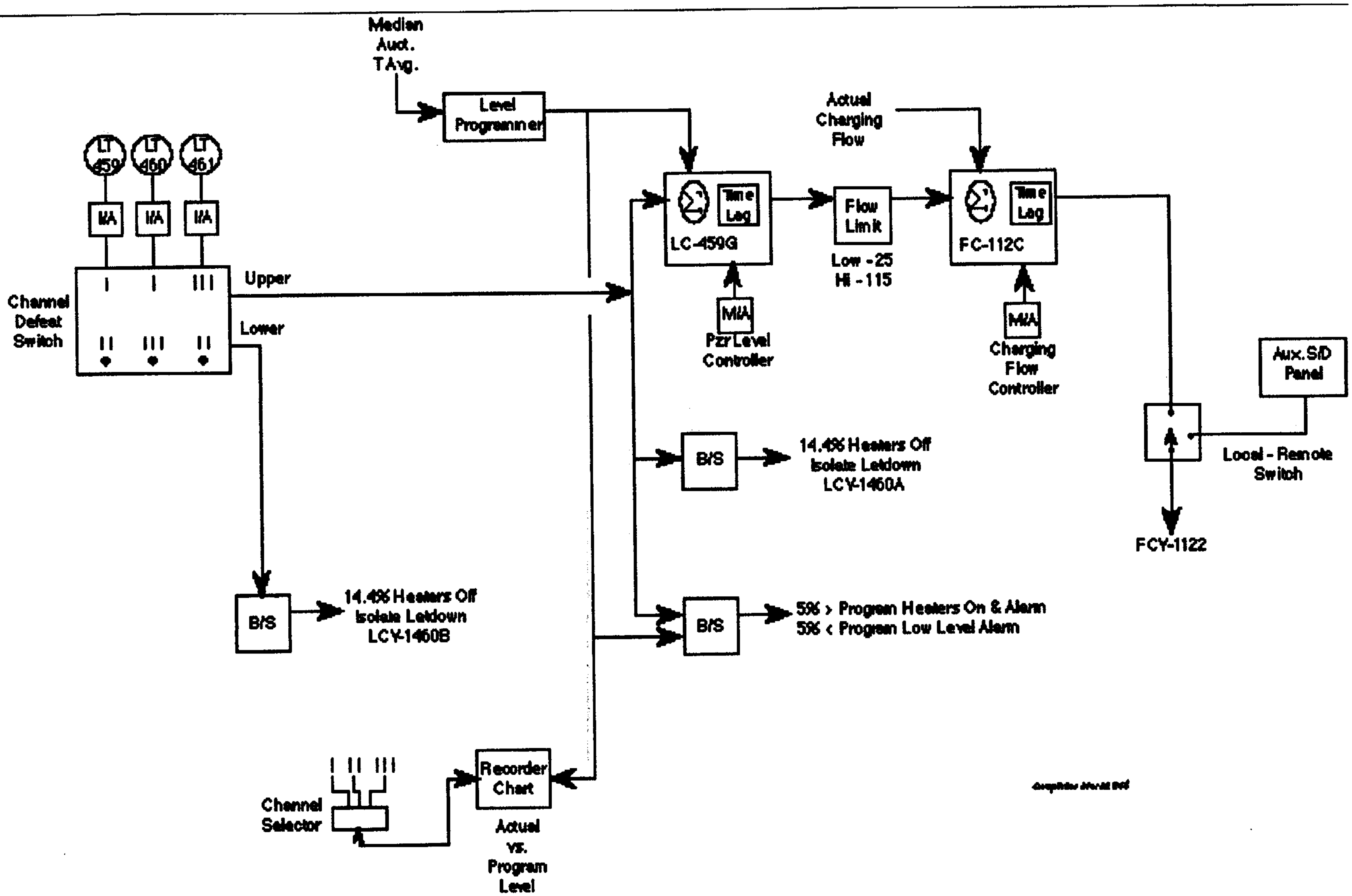
	2-RC-LI-459 PZR LVL	**2-RC-LI-460 PZR LVL**
a.	Increases	Increases
b.	Increases	Decreases
c.	Decreases	Increases
d.	Decreases	Decreases

ANSWER: b

Reference: ND-93.3-H/T-7.5 and ND-93.1-LP-1, page 29.
Difference between Surry and Robinson: Changed for Surry Specific Transmitter numbers and labeling.

Justification:

N/A



PZR LEVEL CONTROL

(4) Wet leg Closed Tank

Refer to/display H/T-1.18, Differential Pressure Level Detectors (Cont.).

(a) A wet leg utilizes the same principle as the dry leg except that when D/P is zero, the tank is full.

(b) The output from the D/P transmitter is directly proportional to the head on the high side and indirectly proportional to the head on the low side.

1) The overall output is equal to the head of the high side minus the head of the low side.

2) The temperature and pressures of the reference (low) and variable (high) must be considered in order to determine the output.

(c) The wet leg can have a fixed column of water that is filled from an outside source, or for a system that operates in a steam environment, a condensing pot is used.

(d) In a condensing pot system, an unlagged pot is used to condense some of the steam and keep the reference leg full. Some places that they are used are on the Steam Generators, Pressurizer, and Feed Heaters.

Refer to/display H/T-1.19, Wet and Dry Leg D/P Cell Worksheet.

QUESTION NUMBER: 30
TIER/GROUP: ***RO*** 1/3 ***SRO*** 1/3
K/A: 028AK1.01

Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leak abnormalities

K/A IMPORTANCE: ***RO*** 2.8 ***SRO*** 3.1
10CFR55 CONTENT: ***55.41(b) RO*** 7 ***55.43(b) SRO***

OBJECTIVE: CVCS-09

EXPLAIN the effect on the CVCS due to selected failures.

REFERENCES: SD-059
Pressurizer LP

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number CVCS-09 019

JUSTIFICATION:

a. Plausible since indicated level on the failed instrument will increase, but actual pressurizer level will lower.

b. **CORRECT** Pressure equalizing across the cell would indicate that water level in the pressurizer is equal to the height of the reference leg. Since this would indicate a high level, charging pump speed would lower, and actual level would lower.

c. Plausible if misconception is that indicated level decreases as differential pressure decrease, but indicated level will increase.

d. Plausible if misconception is that indicated level decreases as differential pressure decrease, but indicated level will increase.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 4

Analysis of pressurizer level malfunction to determine indicated and actual plant response

REFERENCES SUPPLIED:

*31.

Given the following conditions:

- All systems are in automatic.
- At 100% power, 1-FCV-CN-107 fails open.
- Alarms H-G-5/6/7, STM GEN A/B/C level errors annunciate.
- All SG narrow range levels are decreasing.

Which ONE (1) of the following actions is required per AP-21.00, "Loss of Main Feedwater Flow?"

a. Take manual control of main feed reg. valves and increase flow.

b. Trip the reactor and perform E-0, "Reactor Trip or Safety Injection."

c. Start the 3rd condensate pump and reduce turbine load using the limiter.

d. Perform a rapid load reduction per AP-23.00, "Rapid Load Reduction."

ANSWER: c

Reference: 1-AP-21.00, Loss of Main Feedwater Flow.
Difference between Surry and Robinson: New Question

Justification:

a. Plausible, since this action would increase S/G levels if enough condensate flow was available, but this action is not IAW AP-21.00.

b. Plausible, since this is the required action at 100% power if only one main feed pump is running.

c. Correct Answer, IAW AP-21.00.

d. Plausible, since a load reduction is required but not IAW AP-23.00.

NUMBER	PROCEDURE TITLE	REVISION
1-AP-21.00	LOSS OF MAIN FEEDWATER FLOW	5
		PAGE 2 of 4

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[1]	__CHECK MAIN FEED PUMPS - ONLY ONE RUNNING	IF no Main Feed Pumps running, THEN manually trip the Reactor AND GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION. ~~IF two Main Feed Pumps running, THEN GO TO Step 4.~~
[2]	__CHECK REACTOR POWER - GREATER THAN 85%	IF Reactor power less than or equal to 65%, THEN do the following: a) Adjust turbine load to equalize steam flow and feed flow as necessary. b) GO TO Step 17. IF Reactor power greater than 65%, THEN GO TO Step 4.
[3]	__MANUALLY TRIP THE REACTOR AND GO TO 1-E-0, REACTOR TRIP OR SAFETY INJECTION	
[4]	__START A THIRD CONDENSATE PUMP	
[5]	__REDUCE TURBINE LOAD TO MATCH STEAM FLOW WITH FEED FLOW	Reduce Turbine load using Turbine Manual.
6.	__CHECK CONDENSATE POLISHING BLDG - BYPASSED • MOV-CP-100 - Open	Open MOV-CP-100.

QUESTION NUMBER: 31
TIER/GROUP: ***RO*** 2/1 ***SRO*** 2/1
K/A: 056K1.03

Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW

K/A IMPORTANCE: ***RO*** 2.6 ***SRO*** 2.6
10CFR55 CONTENT: ***55.41(b) RO*** 4 ***55.43(b) SRO***

OBJECTIVE: AOP-010-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in AOP-010 by explaining the basis of each.

REFERENCES: SD-027
APP-007
AOP-010

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number AOP-010-03 002

JUSTIFICATION:

a. Plausible since this power level is below the trip requirement for one condensate and one feed pump, but power is to be reduced to less than 50%.

b. Plausible since this would be the correct action if only one feed pump tripped, but power is to be reduced to less than 50% with both a condensate and feed pump trip.

c. **CORRECT** Under these conditions, a trip of one condensate pump will cause a trip of one FW pump. Maximum allowable power level for one condensate and one feed pump is 50%. A trip is not required since power is below 70%.

d. Plausible since this action would be required if power level was above 70%, but a trip is not required at this level.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Application of given conditions to determine response required to remain within condensate limitations

REFERENCES SUPPLIED:

*32.

The following information is available:

INDICATOR	PRE-EVENT VALUE	POST-EVENT VALUE
CTMT Temp 1-LM-TI-100-1	90°F	105°F
CTMT Temp 1-LM-TI-100-2	92°F	107°F
CTMT Press 1-LM-PI-101A	10 psia	19.8 psia
CTMT Press 1-LM-PI-101B	10.2 psia	19.9 psia

Given the attached references, which ONE (1) of the following approximates the required "B" electric hydrogen recombiner power setting?

a. 51 KW

b. 41 KW

c. 34 KW

d. 26 KW

ANSWER: a

Reference: FR-I.3, Attachments 5 and 6.
Difference between Surry and Robinson: New Question

Justification:

a. Correct Answer.

b. Correct Cp, incorrect recombiner.

c. Incorrect Cp, correct recombiner.

d. Incorrect Cp, incorrect recombiner.

* *

CAUTION: Emergency Diesel Generator loading must not exceed 2675 KW before the Hydrogen Recombiner is energized.

* *

PLACING RECOMBINERS IN SERVICE

NOTE: Heater temperature as determined by any thermocouple should not exceed 1400°F.

__ 1. Turn the POWER OUT switch to ON.

__ 2. Record present CTMT pressure. ________PSIA

__ 3. Record pre-LOCA CTMT temperature. ________°F

__ 4. Determine the Pressure Factor (C_p) IAW Attachment 6.

__ 5. Calculate the Recombiner power setting using the following:

_______(C_p) x 34.8 KW = ______ (1A required power setting)

_______(C_p) x 43.4 KW = ______ (1B required power setting)

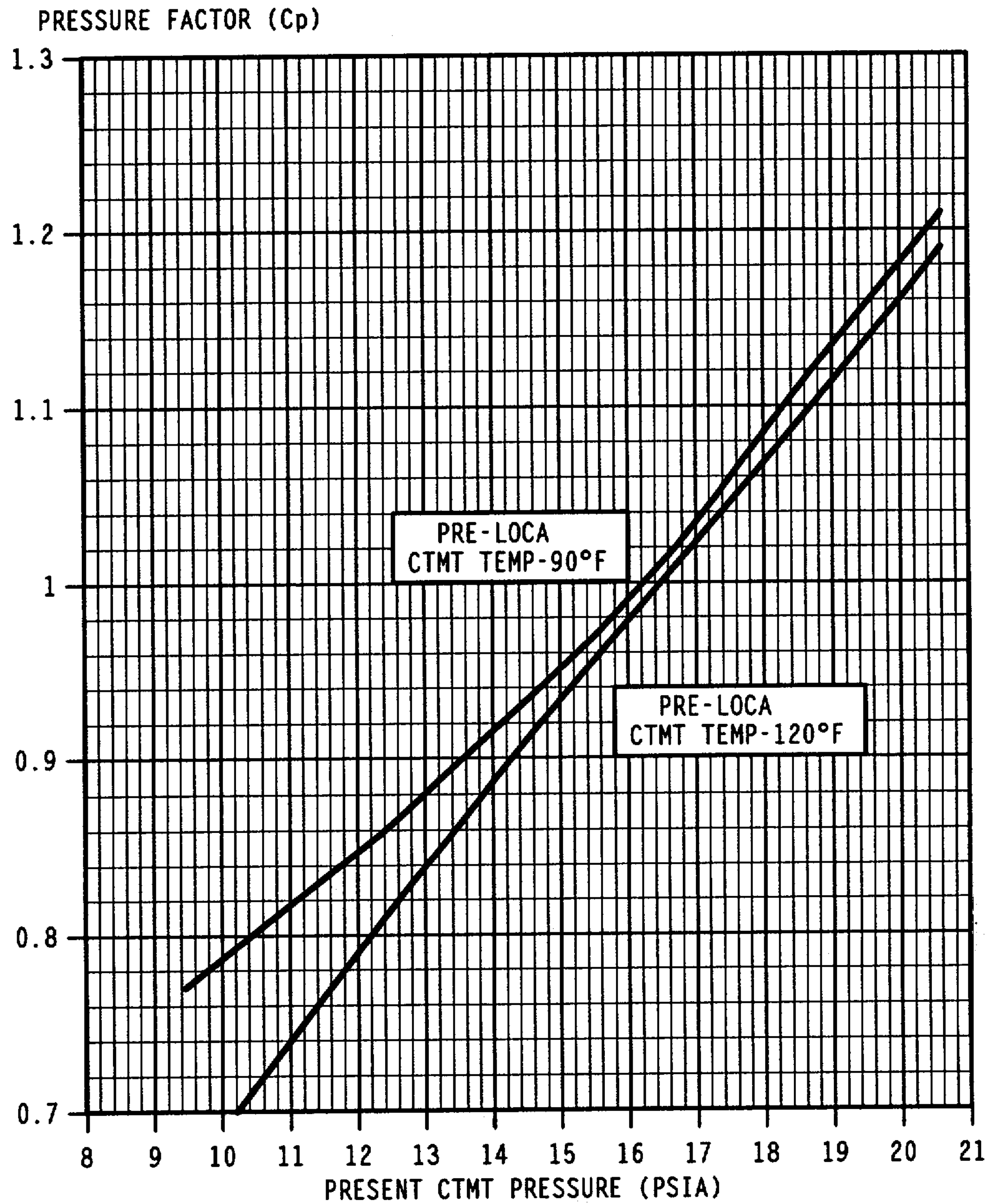
__ 6. Adjust the POWER ADJUST pot clockwise until 5 KW is obtained on the POWER OUT meter. Hold 5 KW for ten minutes.

__ 7. Adjust the POWER ADJUST pot until 10 KW is obtained on the POWER OUT meter. Hold 10 KW for ten minutes.

__ 8. Adjust the POWER ADJUST pot until 20 KW is obtained on the POWER OUT meter. Hold 20 KW for five minutes.

__ 9. Adjust the POWER ADJUST pot to obtain the required power setting calculated in Step 5. Allow the Recombiner to stabilize for 2 hours.

__10. Monitor the temperature of the three thermocouples. Adjust the POWER ADJUST pot to maintain an average thermocouple reading within a range of 1150°F to 1200°F. (An adjustment of 4 KW will result in a temperature change of approximately 75 °F.)



PRESSURE FACTOR (Cp)
1.3
1.2
1.1
1
0.9
0.8
0.7
PRE-LOCA
CTMT TEMP-90°F
PRE-LOCA
CTMT TEMP-120°F
8
9
10
11
12
13
14
15
16
17
18
19
20
21
PRESENT CTMT PRESSURE (PSIA)

QUESTION NUMBER: 32
TIER/GROUP: ***RO*** 2/3 ***SRO*** 2/2
K/A: 028A1.02

Ability to predict and/or monitor changes in parameter (to prevent exceeding design limits) associated with operating the HRPS controls including: Containment pressure

K/A IMPORTANCE: ***RO*** 3.4 ***SRO*** 3.7
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: CVHVAC-09

EXPLAIN the normal operation of the CV HVAC, PACV and H^2 Reombiner control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: OP-922
Plant Curve 7.6
Plant Curve 7.16

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number CVHVAC-09 009

JUSTIFICATION:

a. **CORRECT** Using Curve 7.16, determine intersection of 90 day line as 0.25 scfm. Performing calculation, determine required vent flow rate is 240 scfm. Using Curve 7.6, determine intersection of 240 scfm and PACV-B to be 0.9 psig.

b. Plausible since performed correct until using Curve 7.6 and uses PACV-A instead of PACV-B, which is the preferred method.

c. Plausible if misread Curve 7.16 as 0.5 instead of 0.25. Calculation would then result in 480 scfm. Using PACV-B on Curve 7.6 would result in this response.

d. Plausible if misread Curve 7.16 as 0.5 instead of 0.25. Calculation would then result in 480 scfm. Then using PACV-A on Curve 7.6 would result in this response.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 4

Calculation of containment pressure requirements based on application of given conditions to use of plant curves

REFERENCES SUPPLIED: Plant Curves 7.6 and 7.16

*33.

Which ONE (1) of the following shift manning configurations is NOT allowed in accordance with OPAP-0001, "Operations Department Responsibilities and Authorities," minimum shift requirements, with both units at 100% power?

	SS	SRO	RO	AO	STA
a.	1	1	3	9	1
b.	1	3	4	4	2
c.	1	1	4	7	1
d.	1	2	6	3	2

ANSWER: b

Reference: OPAP-0001, page 15 of 36.
Difference between Surry and Robinson: New Question

Justification:

a. Plausible since normal manning is 4 ROs minimum.

b. Correct answer (See attached reference), Must have 9 bodies to fulfill RO/AO and Fire team.

c. Plausible since normal manning is 2 SROs minimum.

d. Plausible since 4 AO is listed on the minimum manning, however, RO can fulfill this position.

1. **Minimum Shift Requirements [1][Commitment 3.2.2] [2 3]**

North Anna Minimum Requirements	
With either or Both Units in Mode 1, 2, 3, or 4	With both Units in Mode 5 or 6 (or defueled)
SS-1	SS-1
SRO-1	SRO-0
RO-3	RO-3
AO-4	AO-2
STA-1	STA-1
Communicator-2[c]	Communicator-2[c]
Fire Brigade-5[a]	Fire Brigade-5[a]
First Aid-2[b]	First Aid-2[b]

Surry Minimum Requirements	
One or Two Unit Operation	Two Units in Cold Shutdown or Refueling
SS-1	SS-1
SRO-1	SRO-0
RO-3	RO-2
AO-4	AO-4
STA-1	STA-0
Communicator-2[c]	Communicator-2[c]
Fire Brigade-5[a,c]	Fire Brigade-5[a,c]
First Aid-2[b]	First Aid-2[b]

1. a. 3 from Operations (1 must be qualified Scene Leader) and 2 from Security, the operators are not included in the RO/AO manning.
2. b. Coordinated by Security.
3. c. May have other duties.

2. **Normal Shift Requirements. [Commitment 3.2.2]** [1 2 3 4 5]

North Anna Normal Requirements
With either or Both Units in Mode 1, 2, 3, 4, 5, 6, or defueled
SS-1
SRO-2
RO-4[c]
AO-4
STA-1
Communicator-2[d]
Fire Brigade-5[a]
First Aid-2[b]

Surry Normal Requirements	
One or Two Unit Operation	Two Units in Cold Shutdown or Refueling
SS-1	SS-1
SRO-2	SRO-2
RO-4[c]	RO-4[c]
AO-7[e]	AO-7[e]
STA-1	STA-0
Communicator-2[d]	Communicator-2[d]
Fire Brigade-5[a]	Fire Brigade-5[a]
First Aid-2[b]	First Aid-2[b]

d. The completion of surveillances and other shift routines assigned to the shift.

e. On-shift training of personnel is conducted as scheduled.

f. Identification of Station deficiencies and initiation of corrective actions.

g. Only properly certified and qualified personnel are staffing the shift.

h. Shift Team members understand the need for maintaining radiation exposures ALARA.

---

1. a. 3 from Operations (1 must be qualified Scene Leader) and 2 from Security, the operators are not included in the RO/AO manning (North Anna), and may have other duties.
2. b. Coordinated by Security.
3. c. Fourth RO may have other duties.
4. d. May have other duties in addition to being a communicator.
5. e. Total includes Communicators, Fire Brigade, and First Aid as applicable.

QUESTION NUMBER: 33
TIER/GROUP: ***RO*** 3 ***SRO*** 3
K/A: 2.4.26

Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.

K/A IMPORTANCE: ***RO*** 2.9 ***SRO*** 3.3
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: OMM-002-03

DISCUSS each section of OMM-002, when possible, using the information given in each section of the procedure.

REFERENCES: OMM-002

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number OMM-002-03 002

JUSTIFICATION:

a. Plausible since function is to be on-shift fire protection expert, but leader must be a licensed operator.

b. **CORRECT** Normally the WCC SRO fills this position, although any licensed operator can serve as leader if qualified.

c. Plausible since this position acts as an advisor to the leader during any fire on Unit 1, but leader must be a licensed operator.

d. Plausible since this position will provide guidance for the radiological considerations associated with a fire in an RCA, but leader must be a licensed operator.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of administrative requirements for makeup of fire brigade

REFERENCES SUPPLIED:

SHORT TERM, ? [redacted]

*34.

Given the following conditions:

- Unit 1 is operating at 100% power.
- Annunciator B-E-6, "IA LO HDR PRESS/1A COMPR 1 TRBL," has just illuminated.
- All station-related air controls and components are available with controllers/controls in auto.
- Unit 1 Instrument air pressure currently reads 79 psig and slowly decreasing.
- Assume all automatic actions have occurred and all components are functioning as designed

Which ONE (1) of the following has <u>NOT</u> automatically performed an action to assist in maintaining air pressure?

a. 1-SA-SOV-175, Service air isolation, automatically closes.

b. Unit 2 Service Air Compressor auto-started.

c. 1-IA-D-1, "Unit 1 Instrument Air Dryer," bypassed.

d. Unit 1 Instrument Air Compressor auto-started.

ANSWER: a

Reference: ND-92.1-LP-1, pages 8, 9, 10, 22, and 24.
Difference between Surry and Robinson: New Question.

<u>Justification:</u>

a. Plausible since this isolates a large portion on non-vital/non-instrument air. However, this action is required to be manually performed.

b. Plausible since this has a Unit 2 mark number. However, Service air systems are crosstied.

c. Plausible since this occurs when pressure is low and determination must be made whether pressure is low enough.

d. Plausible since this occurs when pressure is low and determination must be made whether pressure is low enough.

(3) Into the service air header through a solenoid operated isolation valve (1- SA-SOV-124/2-SA- SOV-175).

(a) The service air header is cross connected to the other unit's service air header at several points in the plant.

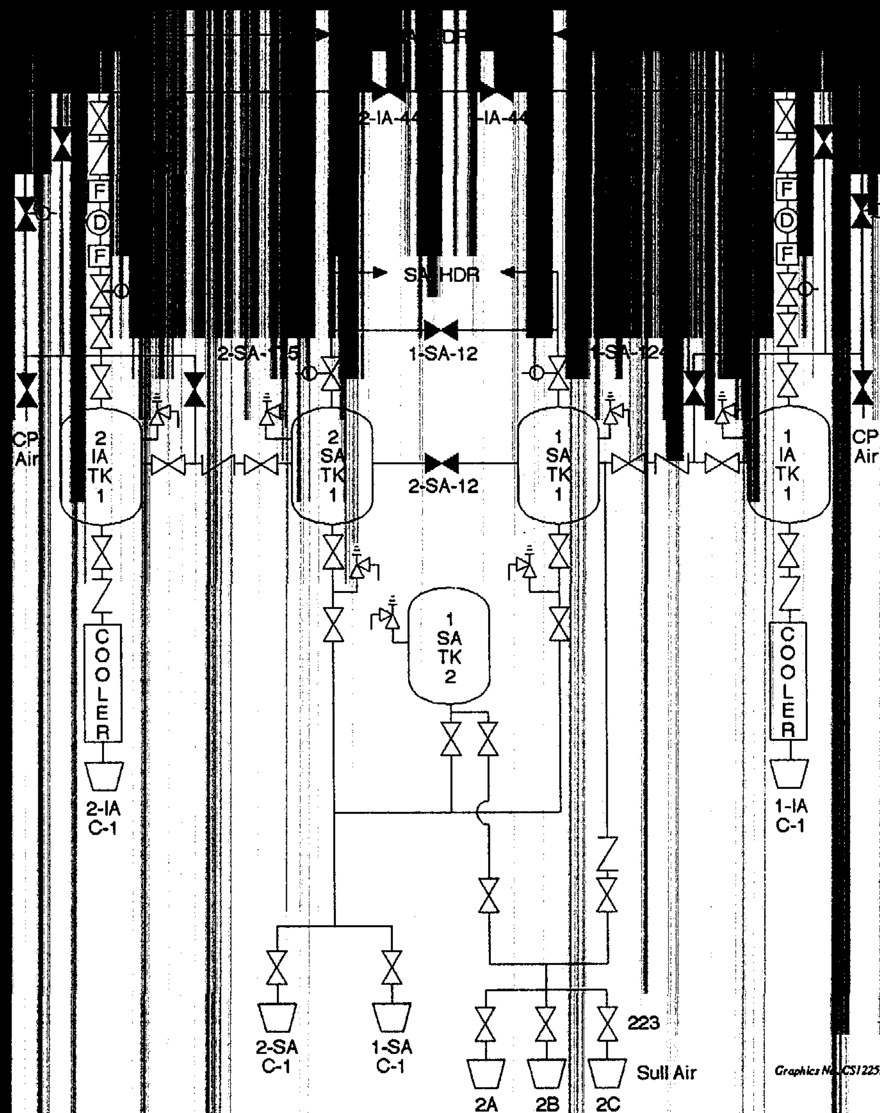
(b) The service air header supplies air connections at various places throughout the plant.

(c) Service air receiver outlet header isolation valve - Allows isolation of service air from nonessential uses (air operated tools) in the event instrument air pressure decreases uncontrollably; saves service air for the Instrument Air System. Switch located on vertical board 1-1 and 2-1.

d. Service air supply to the containment is made through two normally locked closed isolation valves. The valves (1-IA-446, 447 OR 2-IA-703,704) are locked closed to ensure containment integrity as required when the RCS temperature is >200°F. A 4 hour clock will be entered if these valves are opened at power. Valves are procedurally controlled under Administrative Control (closure in 40 seconds) when they must be opened to support operations within the containment. 1-OP-IA-006 can be used to ensure all requirements are met.

2. Components

a. Service Air Compressors



SERVICE AND INSTRUMENT AIR SIMPLIFIED DIAGRAM

d. Air receivers

(1) Used to store air and act as a surge volume for the system, and have local pressure indication.

(2) SA and IA receivers are rated at 280 cubic feet, SA-TK-2 rated at 678.6 cubic feet.

3. Instrumentation and Controls

a. Service air compressors

(1) An instrument panel and control and indication panel are provided on each compressor for monitoring and operating the compressor.

(2) Amber lights are provided for alarm indication of compressor trips.

(3) Reset/Start Pushbutton - Resets any of the automatic shutdowns and is used to start the compressor.

(4) Stop pushbutton.

(5) Each compressor has a disconnect switch (1/2-SA-DS-1), located on the fire wall east of the compressors, used to isolate power to the compressor locally.

(6) Lead/Lag control switch, located east of the compressors, is a two position switch used to control which of the two compressors is controlling system pressure. "Position 1" selects 1-SA-C-1 as the lead

b. Blue and Gray compressors - These compressors have a control panel which provides indications necessary for compressor operation. These compressors are very rarely used.

Have the trainees refer to AIA-1.1, Blue/Grey for Compressor Indications and Controls, for Blue/Gray compressor controls.

c. Pressure indication in Control Room of service air header pressure: located on vertical board 1-1 and 2-1.

4. Alarms

Have the trainees refer to AIA-1.2, Station Air System Alarms, for the following discussion.

A "Service Air Compressor 1 Trouble" Alarm (1B-E5) annunciates when any of the following conditions occur:

a. Compressor motor overload

b. High oil temperature – 176°F

c. Low oil pressure - 20 psig (22 second time delay on start-up) - Low oil pressure is bypassed for 15 seconds on a startup to allow compressor motor to reach operating speed.

d. L.P. stage outlet high air temperature – 425°F

e. H.P. stage outlet high air temperature – 425°F

f. High intercooler air temperature – 190°F

g. Loss of power

h. Emergency backup running (lag compressor start) - Whenever the lag compressor starts, the service air annunciator will alarm and will not clear until the lag compressor runs unloaded for 15 minutes, and shuts down. The annunciator alarms on Unit 1 if 1-SA-C-1 is in LEAD and 2-SA-C-1 starts in LAG. Alarms on Unit 2 if 2-SA-C-1 is in LEAD, and 1-SA-C-1 auto starts in LAG.

B. Instrument Air System

1. Flowpaths

a. Supplies 110 psig oil free, dry compressed air for operation of control valves in various areas of the plant.

b. Provides a backup source of air to the Containment Instrument Air System.

c. [illegible]

FAILURE/ONLINE PRESSURE (U2) - caused by chamber pressure being high during regeneration or chamber pressure low during standby. If this condition exists, the chamber status will not change, i.e., the inservice chamber will remain inservice and the standby chamber will remain in standby.

[illegible] bypass - caused by instrument air header [illegible]

[illegible] valve will close and the bypass will open to prevent a loss of instrument [illegible] Thus, if the control system regulating the dryer chambers fails in a configuration that causes isolation of instrument air flow, the dryer complex will bypass to maintain instrument air pressure. If bypass initiates, a local reset button is depressed to restore flow through the dryer.

c. Loss of instrument air system pressure

(1) Most air operated valves in the plant do not require 100 psig air to stay fully open.

(2) Most valves require 40 psig of air pressure to go to the non-fail position. Each valve is provided with a regulator that supplies the valve with the required air pressure.

(3) Critical valves (valves that may cause plant shutdown) on loss of air:

(a) Feed reg valves (require 40 psig to stay fully open).

(b) Main steam trip valves (shut when air pressure drops to less than 35 psig).

QUESTION NUMBER: 34
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 079K1.01

Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: IAS

K/A IMPORTANCE: *RO* 3.0 *SRO* 3.1
10CFR55 CONTENT: *55.41(b) RO* 4 *55.43(b) SRO*

OBJECTIVE: AIR-14

EXPLAIN the effect on the Instrument and Station Air System due to selected failures.

REFERENCES: AOP-017

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number AIR-03 007

JUSTIFICATION:

a. Plausible because SA-5 is opened in AOP-017 as an RNO, but it is must be done manually.

b. Plausible because SA-220 & 221 are opened in AOP-017, but they must be done manually.

c. Plausible because SA-5 is opened in AOP-017 as an RNO, but it does not go through the IA aftercoolers and separators.

d. CORRECT The preferred method is to open SA-220, SA-221 and verify open IA-18. This will allow the Service Air to pass through a filter to remove contaminants prior to passing into oil free Instrument Air Header.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of IA / SA system automatic actions

REFERENCES SUPPLIED:

*35.

Given the following conditions:

- The unit was operating at 100% with bank D rods at 218 steps when a failure of UPS 1A1 inverter occurred. The static switch does not swap.
- NO reactor trip occurred.
- Rods **CANNOT** be withdrawn.

Which ONE (1) of the following is preventing rod motion?

a. Power range high flux rod stop

b. Intermediate range high flux rod stop

c. Overtemperature ΔT rod stop

d. Overpower ΔT rod stop

ANSWER: a

Reference: ND-93.2-H/T-3.4 and ND-93.3-LP-16, page 4.
Difference between Surry and Robinson: Changed to Surry Electrical lineup and loss of Vital Bus I.

Justification:

a. Correct Answer. Loss of Vital Bus I causes loss of power to PR channel 1, which causes PR high flux rod stop.

b. Plausible, since IR is powered from Vital Bus I and has a high flux rod stop but it is blocked at 100% power.

c. Plausible, since OTΔT can prevent rod withdrawal, but coincidence is 2 out of 3.

d. Plausible, since OPΔT can prevent rod withdrawal, but coincidence is 2 out of 3.

Presentation

A. Permissives

Distribute all handouts. Refer to/display H/T-16.1, Objectives, and review with trainees

Distribute AIA-16.1, Permissives Worksheet.

1. **PERMISSIVE P-1**

   a. This permissive is the <u>AUTO and MANUAL Rod Stops</u>.

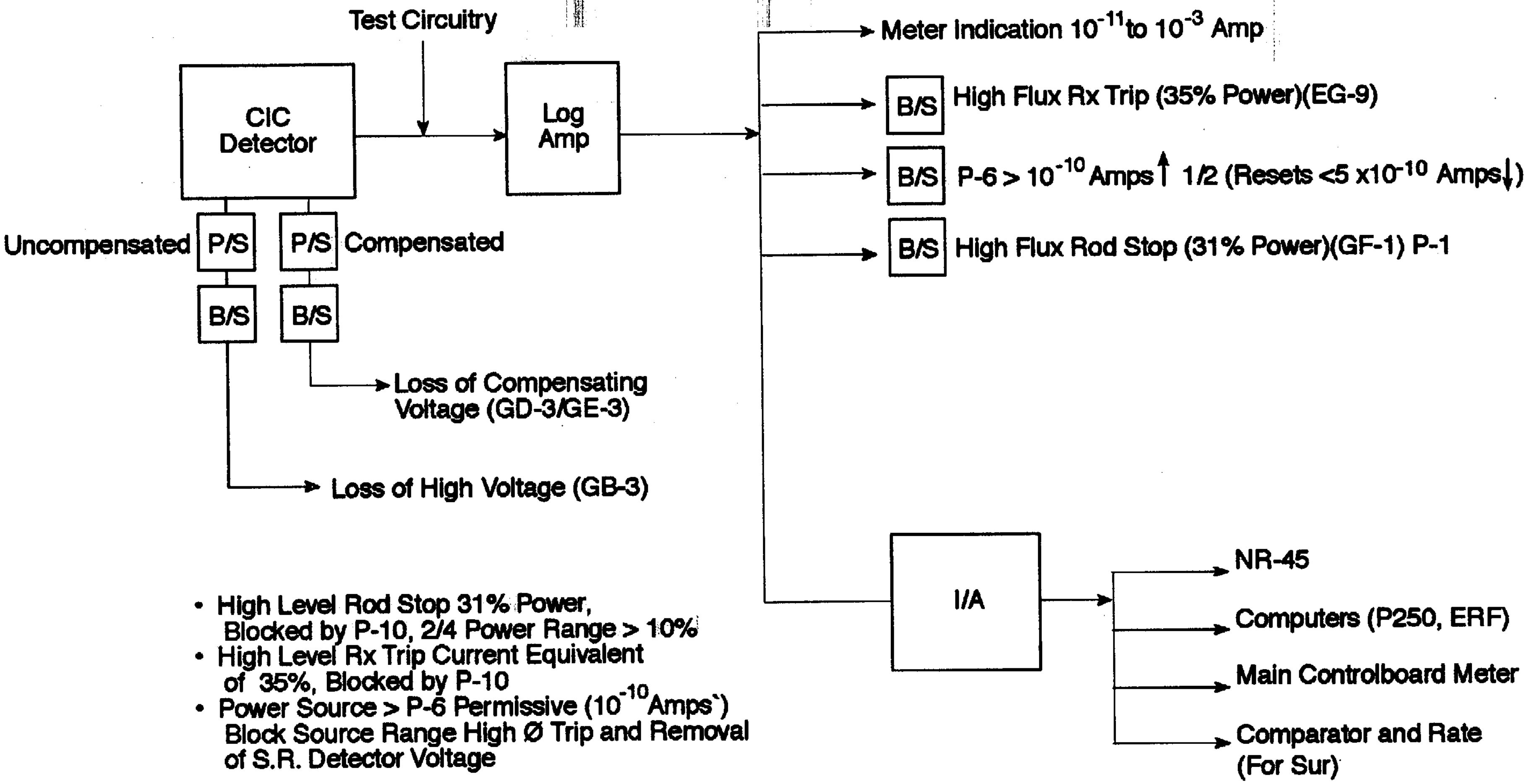
   b. It blocks AUTO and MANUAL rod withdrawal when activated.

   c. It is activated when any <u>one</u> of the following occur:

      - 1/2 IR amps > 31% power equiv
      - [illegible]
      - 2/3 OPDT @ runback setpoint
      - 2/3 OTDT @ runback setpoint

2. **PERMISSIVE P-2**

   a. <u>This permissive blocks AUTO rod withdrawal</u> **only**.



Graphic No. - SV214A

IR DETECTOR CIRCUIT

QUESTION NUMBER: 35
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: 057AA2.20

Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: Interlocks in effect on loss of ac vital electrical instrument bus that must be bypassed to restore normal equipment operation

K/A IMPORTANCE: *RO* 3.6 *SRO* 3.9
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: NI-06

LIST power supplies for the major components of the Nuclear Instrumentation System as listed in the EDPs.

REFERENCES: AOP-024

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number NI-09 009

JUSTIFICATION:

a. CORRECT Loss of power to PR channel 3 causes 1/4 overpower rod stop actuation.

b. Plausible since IR channels can prevent rod withdrawal, but IR channels not powered by IB 3.

c. Plausible since OT ΔT can prevent rod withdrawal, but does not actuate on power loss and coincidence is 2/4.

d. Plausible since OP ΔT can prevent rod withdrawal, but does not actuate on power loss and coincidence is 2/4.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the effect of the loss of a single instrument bus on rod control

REFERENCES SUPPLIED:

*36.

Given the following plant conditions:

- A SI occurred on Unit 1 due to a SBLOCA.
- The team has completed 1-E-0, "Reactor Trip or Safety Injection."
- The team transitioned to 1-E-1, Loss of Reactor or Secondary Coolant."
- Containment pressure is 13.2 psia and slowly increasing.

Which ONE (1) of the following would prevent terminating SI when the SI termination criteria step is performed?

a. RCS subcooling is 40°F and slowly decreasing.

b. S/G level is 25% and slowly increasing.

c. RCS pressure is 1890 psig and slowly decreasing.

d. Pressurizer level is 30% and slowly decreasing.

ANSWER: c

Reference: 1-E-1, Loss of Reactor or Secondary Coolant.
Difference between Surry and Robinson: New Question

Justification:

a. Plausible, since subcooling is SI termination criteria, but the value and trend listed will allow SI termination.

b. Plausible, since S/G level is a SI termination criterion, but the value and trend listed will allow SI termination.

c. Correct Answer. Trend listed will prevent SI termination.

d. Plausible, since pressurizer level is a SI termination criterion but the value and trend listed will allow SI termination.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
* 6.	__CHECK IF SI FLOW SHOULD BE REDUCED:	
	a) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]	a) GO TO Step 7.
	b) Secondary heat sink: • Total feed flow to INTACT SGs - GREATER THAN 350 GPM [450 GPM] OR • Narrow range level in at least one intact SG - GREATER THAN 11% [22%]	b) GO TO Step 7.
	c) RCS pressure - STABLE OR INCREASING	c) GO TO Step 7.
	d) PRZR level - GREATER THAN 22% [43%]	d) Try to stabilize RCS pressure with normal PRZR spray. GO TO Step 7.
	e) GO TO 1-ES-1.1, SI TERMINATION	
* 7.	__CHECK IF HI HI CLS INITIATED: • RS pump(s) - RUNNING OR • Any Hi Hi CLS annunciator - LIT	GO TO Step 13.

QUESTION NUMBER: 36
TIER/GROUP: *RO* 1/2 *SRO*
K/A: WE02EK3.2

Knowledge of the reasons for the following responses as they apply to the (SI Termination) Normal, abnormal and emergency operating procedures associated with (SI Termination).

K/A IMPORTANCE: *RO* 3.3 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: EPP-007-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in EPP-7 by explaining the basis of each.

REFERENCES: EPP-007

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number EPP-007-03 011

JUSTIFICATION:

a. Plausible if misconception of required values for RVLIS or pressurizer level, but neither are adequate for RCP start.

b. Plausible since RVLIS is addressed for conditions for starting an RCP, but must be > 100% or require adequate pressurizer level and subcooling.

c. CORRECT Required conditions for starting an RCP are RVLIS > 100% or both Pressurizer Level > 74% and Subcooling > 59 °F. Subcooling is met, but pressurizer level must be raised.

d. Plausible since subcooling is addressed for conditions for starting an RCP, but subcooling conditions are already met.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of required actions to ensure RCP start requirements are met

REFERENCES SUPPLIED:

*37.

Given the following conditions:

- Unit 2 is in mid-loop operation to repair a S/G primary manway leak.
- The RCS is vented by two Pressurizer Safety Valves being removed.
- RCS level is 12.5 feet in the Standpipe and rising very slowly.
- RHR pump "A" is in service at 3500 gpm.
- The operator notices that RHR flow and pump discharge pressure are oscillating.

Which ONE (1) of the following actions would tend to stabilize RHR flow and pressure?

a. Start the RHR pump "B" at 3500 gpm.

b. Lower charging flow to stabilize RCS level.

c. Lower "A" RHR pump flow.

d. Open the RV head vents.

ANSWER: c

Reference: AP-27.00, Loss of Decay Heat Removal Capability.
Difference between Surry and Robinson: Changed to Surry methods for venting RCS during outages and Surry Specific values for RCS level and RHR flow.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	__CHECK RHR PUMP - VORTEXING • Flow indication on 2-RH-FI-2605 - OSCILLATING • Amperage indication - OSCILLATING	GO TO Step 12.

* *

CAUTION: RCS temperature may increase if RHR flow rate is less than required based on time after shutdown. (Attachment 1)

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	__REDUCE RHR FLOW TO STOP VORTEXING • Use 2-RH-FCV-2605 in MANUAL OR • Use 2-RH-HCV-2758	
8.	__CHECK RHR PUMP - STILL VORTEXING	GO TO Step 12.
9.	__CHECK RCS LEVEL - WITHIN ACCEPTABLE REGION • 2-RC-LI-200A (Attachment 2) OR • 2-RC-LR-205 (Attachment 3)	Restore RCS level to Acceptable Region of Attachment 2 or 3.

QUESTION NUMBER: 37
TIER/GROUP: ***RO*** 2/3 ***SRO***
K/A: 005K3.01

Knowledge of the effect that a loss or malfunction of the RHRS will have on RCS

K/A IMPORTANCE: ***RO*** 3.9 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 3 ***55.43(b) SRO***

OBJECTIVE: AOP-020-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of RHR events as directed in AOP-020.

REFERENCES: AOP-020

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number AOP-020-08 005

JUSTIFICATION:

a. Plausible if misconception that oscillations are due to inadequate heat removal, but oscillations are due to cavitation.

b. Plausible since RCS level is increasing, but level tends to increase as air enters RHR system.

c. CORRECT Cavitation is occurring due to too high a flow rate for the given level. Flow is to be reduced to 1500 gpm to eliminate cavitation.

d. Plausible if misconception that oscillations are due to voiding in head region, but oscillations are due to cavitation.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Analysis of conditions to determine response to RHR cavitation

REFERENCES SUPPLIED:

*38.

Given the following conditions:

- Unit 1 is operating at 100% power.
- #3 EDG is tagged out to repair a leaking oil fitting.
- A tornado touches down in the switchyard.
- The transient resulting from the destruction causes a trip of the Main Generator.
- "A" and "C" Reserve Station Transformers are destroyed by debris generated by the tornado.
- #1 EDG is unable to start due to a faulty air lineup.
- After the initial transient, it is noted that **BOTH** of the Reactor Trip breaker indications are RED.

Which ONE (1) of the following describes the required operator action(s)?

a. Enter FR-S.1, "Response to Nuclear Power Generation / ATWS," due to the ATWS.

b. Enter E-0, "Reactor Trip or Safety Injection," due to the turbine trip and then FR-S.1 due to the ATWS.

c. Enter ECA-0.0, "Loss of All AC Power," due to the electrical conditions.

d. Enter FR-S.1 due to the ATWS, then ECA-0.0 due to the electrical conditions.

ANSWER: c

Reference: ECA-0.0, Loss of All AC Power.
Difference between Surry and Robinson: Changed to Surry Specific electrical lineup and procedure titles.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: CSF Status Trees should be monitored for information only. FRs should NOT be implemented.

[1] __VERIFY REACTOR TRIP:

a) Manually trip reactor

b) Check the following:

- Reactor trip and bypass breakers - OPEN
- Neutron Flux - DECREASING

[2] __VERIFY TURBINE TRIP:

a) Manually trip the turbine

b) Close MSTVs

QUESTION NUMBER: 38
TIER/GROUP: *RO* 1/1 *SRO*
K/A: 055 2.4.1

Knowledge of EOP entry conditions and immediate action steps (Station Blackout).

K/A IMPORTANCE: *RO* 4.3 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: EPP-001-02

RECOGNIZE the selected entry-level conditions of EPP-001.

REFERENCES: EPP-001

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number EPP-001-02 005

JUSTIFICATION:

a. Plausible since there is an ATWS and Subcriticality is the highest order CSFST, but EPP-1 states that CSFSTs are for information only and EPP-1 should not be exited to implement any FRPs.

b. Plausible since a reactor trip signal would have been generated, but EPP-1 states that CSFSTs are for information only and EPP-1 should not be exited to implement any FRPs.

c. CORRECT Loss of all AC power overrides and EPP-1 states that CSFSTs are for information only and EPP-1 should not be exited to implement any FRPs.

d. Plausible since there is an ATWS and Subcriticality is the highest order CSFST, but EPP-1 states that CSFSTs are for information only and EPP-1 should not be exited to implement any FRPs.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of hierarchy between loss of all AC and subcriticality

REFERENCES SUPPLIED:

*39.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- A pipe break in the Component Cooling (CC) System in the Auxiliary Building results in a loss of CC requiring implementation of AP-15.00, "Loss of Component Cooling."

Which ONE (1) of the following will require the Reactor Operator to manually trip Unit 1?

a. Efforts to restore CC flow have failed.

b. 0-VSP-D7, CC Surge Tank Low Level annunciator alarms and surge tank level is decreasing.

c. Auxiliary Building radiation monitors are alarming due to the high activity in the CC System.

d. Efforts to establish makeup to the CC System were not successful within five (5) minutes.

ANSWER: a

Reference: AP-15.00, Loss of Component Cooling.
Difference between Surry and Robinson: New Question

Justification:

a. Correct Answer, IAW AP-15.00, Loss of Component Cooling.

b. Plausible, since decreasing level will result in a loss of CC, which requires a reactor trip, but this does not occur until the CC pumps cavitate.

c. Plausible, since tripping the reactor will allow the operator to secure the CC pumps minimizing system leakage and radioactivity released.

d. Plausible, since failure to establish makeup will result in loss of the CC System, but trip criteria is based on restoring CC flow and not makeup.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

<u>CAUTION</u>: If Unit is on RHR, 1-AP-27.00, LOSS OF DECAY HEAT REMOVAL CAPABILITY, should be implemented.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	___EFFORTS TO RESTORE CC FLOW HAVE FAILED: a) Trip the Reactor AND initiate 1-E-0, REACTOR TRIP OR SAFETY INJECTION b) Stop the RCPs AND initiate 1-AP-39.00, NATURAL CIRCULATION OF RCS	
2.	___SECURE LETDOWN BY CLOSING: • 1-CH-HCV-1200A • 1-CH-HCV-1200B • 1-CH-HCV-1200C	Close the following valves: • 1-CH-LCV-1460A <u>OR</u> • 1-CH-LCV-1460B
3.	___SECURE EXCESS LETDOWN IAW 1-OP-CH-006, SHIFTING LETDOWN	
4.	___CONTROL RCP SEAL WATER INJECTION FLOW AT OR NEAR 6 GPM	
5.	___CONTROL PRZR LEVEL GREATER THAN 22%	
6.	___CHECK RCS TEMPERATURE - STABLE AT HSD OR INCREASING	Return to Step 5.

QUESTION NUMBER: 39
TIER/GROUP: ***RO*** 1/1 ***SRO***
K/A: 026AA1.05

Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: The CCWS surge tank, including level control and level alarms, and radiation alarm

K/A IMPORTANCE: ***RO*** 3.1 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 4 ***55.43(b) SRO***

OBJECTIVE: CCW-08

EXPLAIN the component operation associated with each switch position for the CCW System switches and controls.

REFERENCES: OP-306
SD-013

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number CCW-07 002

JUSTIFICATION:

a. Plausible since level will continue to rise, but the valve will not continue to stroke closed and the tank will overflow.

b. Plausible since it is expected that level will stabilize when the valve is closed, but the valve will not continue to stroke closed and the tank will overflow.

c. Plausible since level will continue to rise, but the valve does not have any automatic close features.

d. **CORRECT** The makeup valve is a throttle valve. Momentarily placing it in the close position will only throttle it closed slightly. Makeup will continue and the tank will overflow.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of the operation of the CCW makeup system

REFERENCES SUPPLIED:

*40.

Given the following conditions:

- RCS pressure is 1805 psig and slowly decreasing.
- All Main Steam Trip Valves are open.
- Tavg is 537°F and decreasing.
- Steam Generator pressures and Steam Flows are:

SG	PRESSURE	STEAM FLOW
"A"	615 psig and decreasing	1.7×10^6 lbm/hr
"B"	745 psig and stable	0.05×10^6 lbm/hr
"C"	740 psig and stable	0.05×10^6 lbm/hr

Which ONE (1) of the following Safety Injection signals would be actuated?

a. Header to Line ΔP.

b. Low Pressurizer Pressure.

c. High Steam Line Flow with Low Tave.

d. High Steam Line Flow with Low Steam Line Pressure.

ANSWER: a

Reference: ND-91-LP-3
Difference between Surry and Robinson: Changed value for "A" S/G pressure. Surry HDR/Line Setpoint is ≥ 120 psid.

Justification:

N/A

4. LOW PRESSURIZER PRESSURE Initiation

a. The purpose of the Low Pressurizer Pressure SI signal is to provide protection for either a LOCA or a Steam Line Break.

Refer to/display H/T-3.4, SI Low Pressurizer Pressure.

b. This signal is initiated by 2/3 Pressurizer Pressure Protection channels sensing a low pressure of ≤ 1775 psig.

c. If 2/3 channels sense this low pressure and the signal is <u>not</u> blocked, then SI will be actuated.

5. [illegible]

a. The purpose of the Header to Line Dp SI signal is to provide protection for a Steam Line Break located between the MS NRVs and the Steam Generator.

Refer to/display H/T-3.5, High Steam Line Differential Pressure.

b. [illegible]

c. The coincidence is when 2/3 Steam Header Pressures are greater than 2/3 Steam Line pressures in 1/3 Steam Lines.

QUESTION NUMBER: 40
TIER/GROUP: ***RO*** 2/1 ***SRO***
K/A: 013A2.02

Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences: Excess steam demand

K/A IMPORTANCE: ***RO*** 4.3 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 8 ***55.43(b) SRO***

OBJECTIVE: ESF-05

DESCRIBE the performance and design attributes of the major ESFAS components.

REFERENCES: SD-006
APP-004

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number ESF-04 006

JUSTIFICATION:

a. **CORRECT** A single steamline pressure being 100 psid lower than the header pressure will result in a safety injection.

b. Plausible since this is below the low pressure reactor trip, but is still above the low pressure safety injection.

c. Plausible since high steam flow coincident with low Tave results in a safety injection signal, but only if on 2/3 steam lines.

d. Plausible since high steam flow condition exists, but steamline pressure is above low pressure setpoint.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of safety injection actuation setpoints

REFERENCES SUPPLIED:

*41.

Hi Hi CLS will actuate when <u>(1)</u> out of <u>(2)</u> containment pressure channels increase to 23 psia. Hi Hi CLS can be reset when <u>(3)</u> channels decrease to <u>(4)</u> psia.

Which ONE (1) of the following sets of parameters completes the coincidence and setpoint for Hi Hi CLS?

	(1)	(2)	(3)	(4)
a.	2	3	3	17.7
b.	3	4	2	14.2
c.	2	4	3	14.7
d.	3	3	2	14.7

ANSWER: b

Reference: ND-91-LP-5, page 5.
Difference between Surry and Robinson: New Question, Surry has different system.

Justification:

a. Plausible, if misconception that coincidence is 2 out of 3 instead of 3 out of 4.

b. Correct Answer.

c. Plausible, if misconception that coincidence is 2 out of 4 instead of 3 out of 4 and reset is atmospheric pressure.

d. Plausible, if misconception that coincidence is 3 out of 3 instead of 3 out of 4 and reset is atmospheric pressure.

multiplying relays (MRs) energized. The matrix formed by the energized relays maintain the output relays in CLS train A and train B energized.

f. When containment total pressure reaches 17.7 psia (3.0 psig), the A/D switch opens and deenergizes the MRs.

The alarm CLS HIGH CONTAINMENT PRESSURE CHANNEL 1 (E-E-1) annunciates. If this pressure is sensed on three out of four channels, the "3/4 matrix 1A/1B" is deenergized and the CLS HIGH TRAIN A and/or TRAIN B alarm (B-B-4 and B-B-5) annunciate. Along with the alarm, all of the output relays are deenergized and the HI CLS functions for that train actuate.

g. The output of PT-LM-100A is also sent to another A/D converter. This converter is associated with the HI-HI CLS subsystem. Under normal conditions this comparator switch is <u>open</u> and the associated relays are <u>de-energized</u>.

h. If containment pressure rises to 23.0 psia (8.3 psig), the CLS HIGH-HIGH CONTAINMENT PRESSURE CHANNEL 1 alarm annunciates (E-A-1). If 3/4 channels rise to 23.0 psia, the "3/4 matrix 2A/2B" is <u>energized</u> and the CLS HIGH-HIGH TRAIN A and/or TRAIN B alarm (B-C-4 and B-C-5) annunciate.

i. CLS HI and HI-HI can be manually reset when 2/4 channels go below 14.2 psia (-0.5 psig). The CLS TRAIN A (B) RESET PERMISSIVE annunciator alarms (BD4 & 5) when 2/4 channels reach 14.2 psia. The CLS reset pushbuttons must be simultaneously depressed after receipt of this alarm in order to enable securing of CLS functions.

j. In order to be able to reset HI-HI CLS functions, both HI and HI-HI CLS must be reset (reset both when <14.2 psia). In other words, cannot reset HI-

QUESTION NUMBER: 41
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 026A1.01

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure

K/A IMPORTANCE: *RO* 3.9 *SRO* 4.2
10CFR55 CONTENT: *55.41(b) RO* 8 *55.43(b) SRO*

OBJECTIVE: CSS-09

EXPLAIN the normal operation of the CSS control systems. Include function, instrumentation, interlocks, annunciators, and set points.

REFERENCES: SD-024

SOURCE: *New* ☒ *Significantly Modified* ☐ *Direct* ☐

Bank Number NEW

JUSTIFICATION:

a. CORRECT Two-of-three high pressure conditions on both sets of pressure transmitters are required to generate a Containment Spray signal. Bistables are energized to actuate so only one set will generate the required signal.

b. Plausible since the minimum coincidence is met for a single train of pressure transmitters, but require both sets tripped to generate a signal. Bistables are energized to actuate so only one set will generate the required signal.

c. Plausible since the minimum coincidence is met for a single train of pressure transmitters, but require both sets tripped to generate a signal. Bistables are energized to actuate so only one set will generate the required signal.

d. Plausible since the minimum coincidence is met for a single train of pressure transmitters, but require both sets tripped to generate a signal. Bistables are energized to actuate so only one set will generate the required signal.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Analysis of failures on Containment Spray actuation signal

REFERENCES SUPPLIED:

*42.

Given the following conditions:

- The unit is operating at 100% power.
- Normal letdown is in service.
- Pressurizer level control is in automatic.
- Leakage past the hydrogen pressure regulator to the VCT causes pressure in the VCT to increase.

Which ONE (1) of the following describes the effect on RCP seal flow?

	No. 1 SEAL LEAKOFF FLOW	No. 2 SEAL LEAKOFF FLOW
a.	Increases	Increases
b.	Decreases	Decreases
c.	Decreases	Increases
d.	Increases	Decreases

ANSWER: c

Reference: N/A
Difference between Surry and Robinson: Minor grammar changes.

Justification:

N/A

QUESTION NUMBER: 42
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 003A2.05

Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) use procedures to correct, control, or mitigate the consequences: Effects of VCT pressure on RCP seal leakoff flows

K/A IMPORTANCE: *RO* 2.5 *SRO* 2.8
10CFR55 CONTENT: *55.41(b) RO* 3 *55.43(b) SRO*

OBJECTIVE: CVCS-14

EXPLAIN the effect on the CVCS due to selected failures.

REFERENCES: SD-001
APP-003

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number CVCS-14 010

JUSTIFICATION:

a. Plausible since a change in VCT pressure will affect the RCP seal leakoff flows, but #1 seal leakoff flow will decrease.

b. Plausible since a change in VCT pressure will affect the RCP seal leakoff flows, but #2 seal leakoff flow will increase.

c. CORRECT Raising VCT pressure causes pressure against the #1 seal flow to increase, increasing pressure between the #1 and 2 seals and d/p across the #2 seal, causing #2 seal flow to increase. #1 seal flow decreases slightly due to more pressure in the VCT.

d. Plausible since a change in VCT pressure will affect the RCP seal leakoff flows, but #1 seal leakoff flow will decrease and #2 seal leakoff flow will increase.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the relationship between VCT pressure and RCP seal flows

REFERENCES SUPPLIED:

*43.

Given the following conditions:

- A reactor trip occurred from 20% power as a result of a low-low level in "A" SG.
- Coincident with the reactor trip, "H" bus de-energized and was subsequently energized by the #1 EDG.
- Twenty (20) seconds following the trip, SG levels have decreased to a minimum value of:

SG	LEVEL
"A"	12%
"B"	28%
"C"	26%

Which ONE (1) of the following describes the expected condition of the Auxiliary Feedwater pumps 20 seconds following the trip?

	MDAFW PUMP "A"	MDAFW PUMP "B"	SDAFW PUMP
a.	Running	Running	Off
b.	Off	Running	Running
c.	Off	Running	Off
d.	Off	Off	Running

ANSWER: a

Reference: ND-89.3-LP-4, page 10, ND-90.3-H/T-7.5 Page 1 of 4
Difference between Surry and Robinson: Changed for Surry electrical lineup, added information that current SG levels are at a minimum.

Justification:

a. Correct Answer. MDAFW pumps running due to low level in 1 out of 3 S/Gs. TDAFW pump requires 2 out of 3 S/Gs.

b. Plausible, if misconception exists that "A" MDAFW pump is blocked due to momentary loss of power to "H" bus and that TDAFW pump starts on low level in 1 out of 3 S/Gs.

c. Plausible, if misconception exists that "A" MDAFW pump is blocked due to momentary loss of power to "H" bus.

d. Plausible, if misconception exists that EDG sequencing is active for a momentary loss of power to "H" bus.

AFW-P-2

- LO-LO LEVEL 2/3 ch<17% NR IN ANY 2/3 S/Gs
- LOSS OF VOLTAGE ON 2/3 4160V STATION SERVICE BUSES
- AMSAC INITIATION ON 2/3 CH <13% IN ANY 2/3 S/Gs AND BOTH 1ST STAGE PRESSURES >37%

NOTE: After the AMSAC signal is initiated, the AFW pumps will continue to run until the AMSAC signal is manually reset.

AFW-3A,3B

- LO-LO LEVEL 2/3 ch <17% NR IN ANY S/G
- LOSS OF VOLTAGE ON 2/2 RSS (X-FER BUSES) for affected unit
- ANY SI SIGNAL (AFTER 50 SEC T.D.)
- 1/2 MFP BKRS OPEN ON BOTH MFPs
- AMSAC INITIATION

g. In the event an undervoltage condition occurs on a 4160v emergency bus after an SI or Hi-Hi CLS event has been initiated, the respective motor driven AFW pump will trip, and the automatic and manual start signals will be momentarily blocked (10 sec. for an SI; 140 sec. for a Hi-Hi CLS). The pump will auto-start again after the blocking signal is removed (times-out). This load sequencing will stagger the emergency loads starting on EDG, thus preventing an overload condition.

h. The turbine driven AFW pump will remain running after an AUTO START, even if the AUTO START signals clear, until the operator places the control switches for both PCV-MS-102 A & B to OPEN/RESET then returns them to the close position.

LOAD SEQUENCING

	AFW	IRS	ORS	58 A/B FAN	Pzr Htrs
Loss of Offsite Power				30 sec	180 sec
Safety Injection signal with a Loss of Offsite power	10 sec			30 sec	180 sec
Hi-Hi CLS with a Loss of Offsite Power	140 sec	20 sec	10 sec	30 sec	180 sec

Notes:

a. All loads trip off and are locked out during the duration of the Load Sequencing Signal. If power is available and start permissives are met, or a start signal is present, when the Load Sequencing timer times out, the load will automatically restart.

b. If the Hi-Hi CLS signal is reset while the Load Sequencing timer is timing, the ORS and IRS will restart when the Load Sequencing timer times out. The pumps must be manually secured.

c. The 58 A and B fans will be affected by the Load Sequencing timers if the Load Sequencing signal is generated on the bus which is powering the fan. In other words, if the Load Sequencing is generated on the fans' alternate power source and the fan is powered from its normal source, the fan is not affected.

d. The AFW pumps have an auto start signal generated on a 2/2 transfer bus UV signal (blackout). This auto start signal is blocked for the duration of the Load Sequencing signal.

QUESTION NUMBER: 43
TIER/GROUP: ***RO*** 2/1 ***SRO*** 2/1
K/A: 013A4.03

Ability to manually operate and/or monitor in the control room: ESFAS initiation

K/A IMPORTANCE: ***RO*** 4.5 ***SRO*** 4.7
10CFR55 CONTENT: ***55.41(b) RO*** 4 ***55.43(b) SRO***

OBJECTIVE: AFW-10

EXPLAIN the operation of the AFW System.

REFERENCES: SD-042
APP-004

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since this would be the expected condition if the EDG were not carrying the bus, but the auto start on low-low level is blocked for 'A' pump.

b. Plausible since this is the expected condition of the MDAFW pumps, but the SDAFW pump requires 2/3 low-low levels or a loss of both E-1 and E-2 to start.

c. **CORRECT** Both MDAFW pumps would normally start on low-low level, but the 'A' pump low-low level start is blocked and it will start at 39.5 seconds by the sequencer. The SDAFW pump requires 2/3 low-low levels to start.

d. Plausible since the EDG carrying the bus blocks the auto start on low-low level, but only the affected MDAFW pump.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Analysis of effect of loss of power on automatic operation of AFW pumps

REFERENCES SUPPLIED:

*44.

Given the following conditions:

- The plant is operating at 50% power.
- All control systems are operating in automatic.
- The First Stage Pressure Channel Selector switch is aligned to the PT-447 position.
- First Stage Pressure Transmitter PT-446 fails low.

Which ONE (1) of the following plant responses is expected?

a. Feedwater Regulating Valves throttle closed.

b. Control Rods step inward.

c. Automatic rod control is blocked.

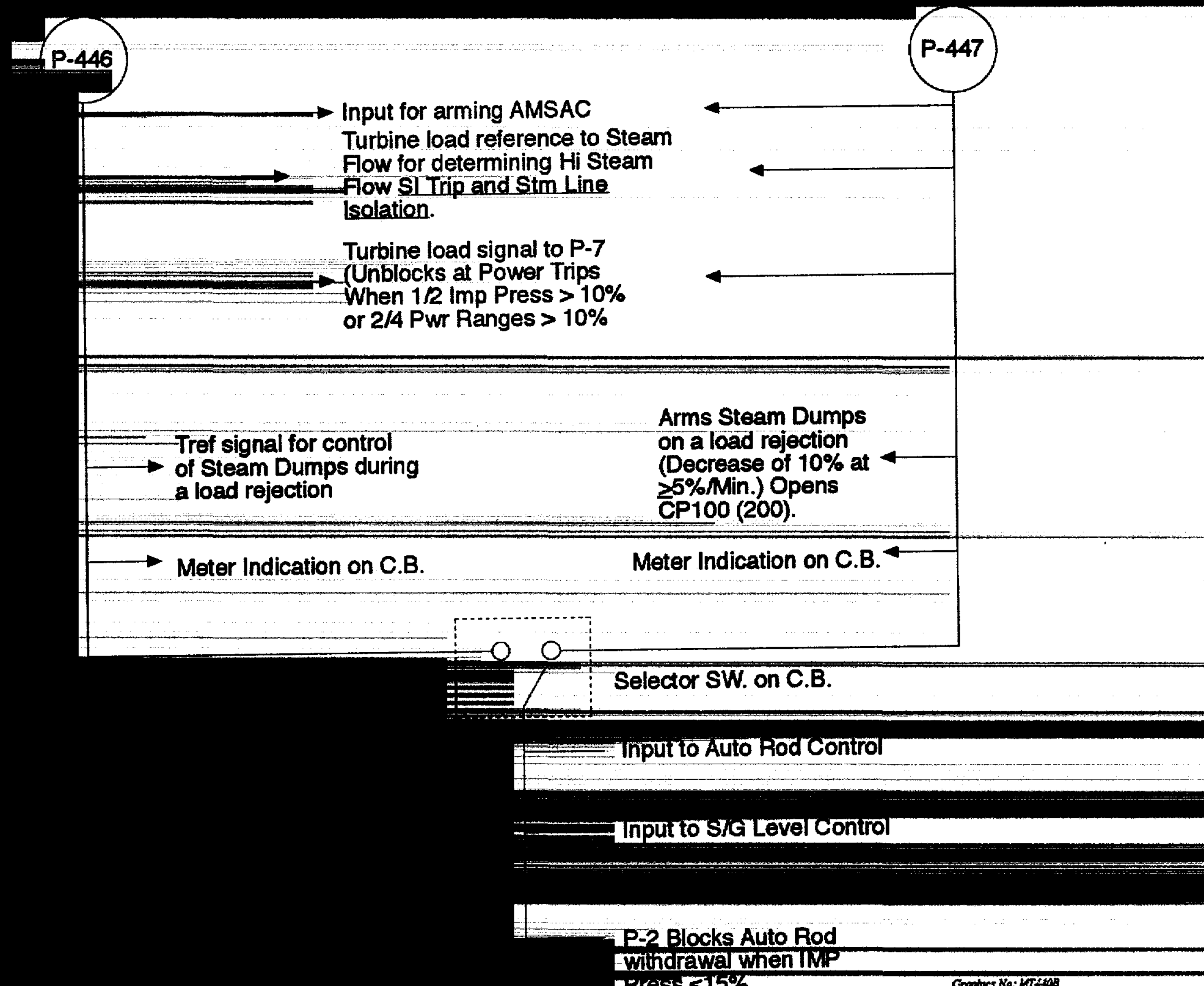
d. Steam Dumps have a demand signal.

ANSWER: d

Reference: ND-93.3-H/T-9.2
Difference between Surry and Robinson: N/A

Justification:

N/A



TURBINE IMPULSE PRESSURE SIGNALS

QUESTION NUMBER: 44
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 035K4.01

Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the S/G level control

K/A IMPORTANCE: *RO* 3.6 *SRO* 3.8
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: SG-08

EXPLAIN the component operation associated with each switch position for the Steam Generator System switches and controls.

REFERENCES: SD-033

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number MT-08 003

JUSTIFICATION:

a. Plausible since this would be the response if PT-446 were selected, but with PT-447 selected there is no response in feed water.

b. Plausible since this would be the response if PT-446 were selected, but with PT-447 selected there is no response in rod control.

c. Plausible since this would be the response if PT-446 were selected, but with PT-447 selected there is no response in rod control.

d. CORRECT The Tref signal for steam dumps is provided only by PT-446 (not selectable). With a low failure, Tavg would be higher than Tref, creating a steam dump demand. Dumps remain closed unless armed.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of instrument alignment to determine effect of first stage pressure failure

REFERENCES SUPPLIED:

*45.

Given the following conditions:

- Spent fuel water temperature is 102°F.
- Fuel Building room temperature is 89°F.

Which ONE (1) of the following describes the Main Control Room spent fuel pool temperature indication if pool level drops 3 feet?

a. Temperature increases due to less water mass to absorb the spent fuel decay heat.

b. Temperature increases off-scale high due to RTD failure mode.

c. Temperature decreases off-scale low due to RTD failure mode.

d. Temperature decreases to approximately room temperature due to uncovering the RTD.

ANSWER: d

Reference: ND-92.5-LP-6, page 6.
Difference between Surry and Robinson: New Question

Justification:

a. Plausible, since actual SFP temperature would increase but the RTD becomes uncovered and will not indicate SFP temperature.

b. Plausible, since RTD becomes uncovered and a misconception exists that the RTD would fail high.

c. Plausible, since RTD becomes uncovered and a misconception exists that the RTD would fail low.

d. Correct Answer. When level drops 3 feet, the RTD is uncovered and will read room temperature.

g. SFP temperature is indicated on both units vertical boards. A resistance [illegible] In addition to indication, it provides for HI (140°) and Hi-Hi (170°) temperature alarms in the Control Room.

B. Spent Fuel Pit Systems

1. Spent Fuel Pit Cooling System

Refer to/display H/T-6.4, SFP Cooling and Purification, and use with the following information.

a. The Spent Fuel Pit Cooling System removes the decay heat from the fuel stored in the SFP.

b. The system consists of two pumps, two heat exchangers, a suction chest, and connecting piping.

c. The heat sink for the coolers is CC which can come from either unit's CC header.

d. The normal lineup is with pump 1-FC-P-1A lined up through cooler 1-FC-E-1A and 1-FC-P-1B through 1-FC-E-1B. A normally shut discharge cross-connect may be utilized to cross lineup pumps and coolers.

e. The pumps take a suction on the west end and discharge on the east end of the SFP. The suction is 20 ft. above the top of the fuel stored in the pit. This ensures that in the event of a pipe rupture, the water level will not drop below this level and will maintain both cooling and shielding of the fuel.

QUESTION NUMBER: 45
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 033K3.03

Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: Spent fuel temperature

K/A IMPORTANCE: *RO* 3.0 *SRO* 3.3
10CFR55 CONTENT: *55.41(b) RO* 4 *55.43(b) SRO*

OBJECTIVE: SFP-09

EXPLAIN the normal operation of the spent fuel pit and purification system control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: OP-910

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number SFP-09 003

JUSTIFICATION:

a. Plausible since many systems heat up on recirc, but flow would continue through the SFP HX resulting in a lowering temperature.

b. Plausible since this would create a flow resistance and cause the water to heat up, but this would be offset by the increased heat removal from the SFP HX.

c. **CORRECT** The normal method of control is using CC-775, but if throttled to max position the SFP pump must be stopped to stop flow through the HX.

d. Plausible since this would provide additional pump heat, but this would be offset by the increased heat removal from the SFP HX.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of procedural requirements to adjust SFP temperature

REFERENCES SUPPLIED:

*46.

With the reactor critical at $7x10^{-6}$ amps, the vital bus breaker supplying N-35, Intermediate Range NI, trips.

Which ONE (1) of the following describes the effect on control rods?

a. Reactor trip due to 1/2 Intermediate range bistables greater than 35%.

b. Rods step in due to power core power mismatch.

c. Auto rod withdrawal is blocked but manual withdrawal is not affected.

d. No effect.

ANSWER: a

Reference: ND-93.2-H/T-3.4
Difference between Surry and Robinson: New Question

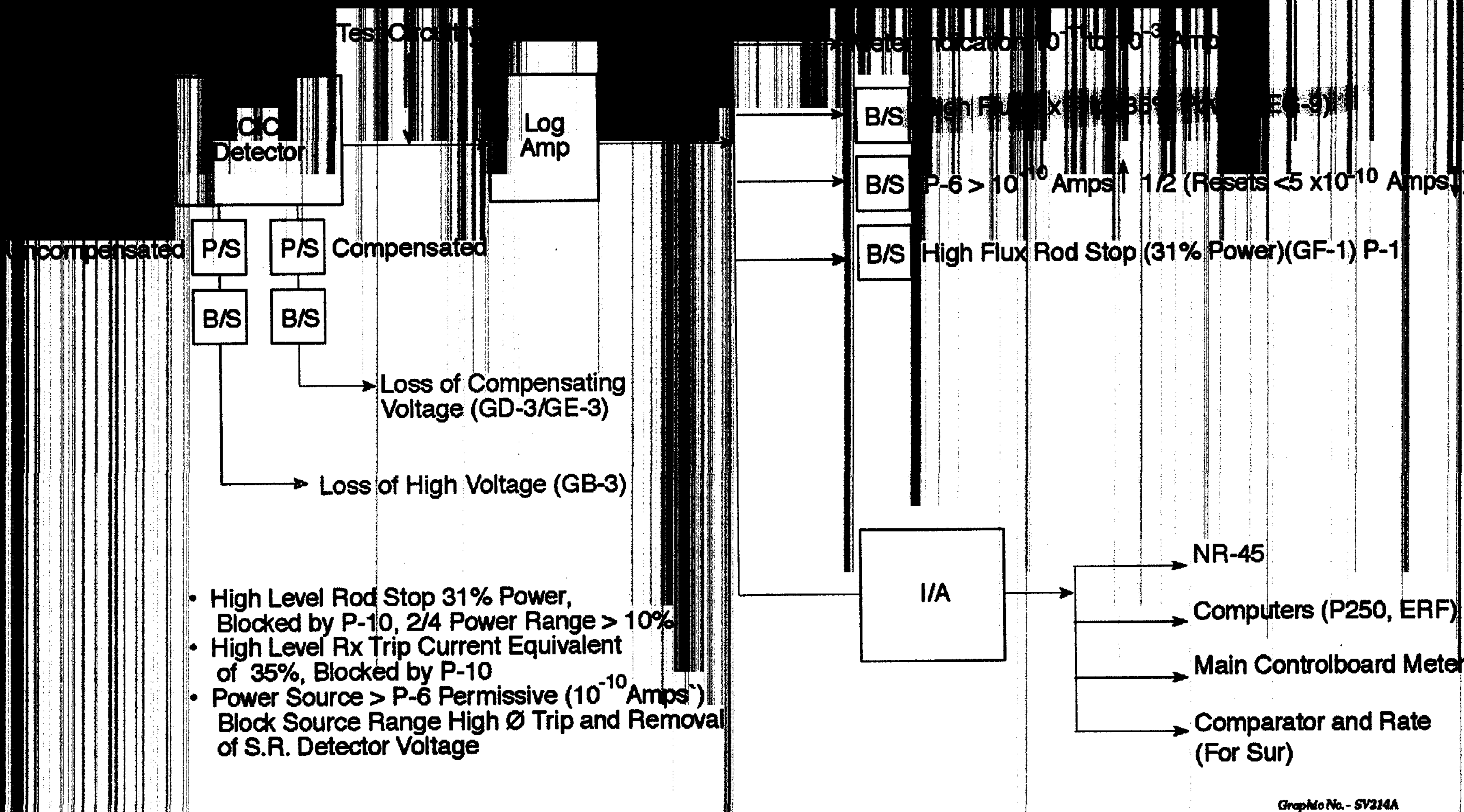
Justification:

a. Correct Answer. Loss of power trips bistables and 1 out of 2 IR channels failed will give high flux trip.

b. Plausible, if misconception exists that IR Nuclear Instruments provide input to rod control power mismatch circuit.

c. Plausible, since Hi output from IR channel blocks auto rod withdrawal but it also blocks manual rod withdrawal.

d. Plausible, if misconception exists that the IR protection outputs are blocked at this power level.



IR DETECTOR CIRCUIT

QUESTION NUMBER: 46
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 015K6.04

Knowledge of the effect of a loss or malfunction on the following will have on the NIS: Bistables and logic circuits

K/A IMPORTANCE: *RO* 3.1 *SRO* 3.2
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: NIS-14

EXPLAIN the effect on the Nuclear Instrumentation System due to selected failures.

REFERENCES: SD-010

SOURCE: *New* ☒ *Significantly Modified* ☐ *Direct* ☐

Bank Number NEW

JUSTIFICATION:

a. Plausible since the switch is placed in bypass, but control power is required to maintain the bypass condition.

b. Plausible since all other PR NIS actuations require a 2/4 coincidence, but the dropped rod runback / rod stop is 1/4.

c. **CORRECT** Even though the switch is in bypass, control power is required to maintain the bypass condition. The runback lasts for 9 seconds and will not recur until the signal is reset.

d. Plausible since a runback will occur, but the runback will be continuous for 9 seconds. The cyclic runback is caused by OT and OP ΔT signals.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 4

Analysis of effect of failure on rod drop runback circuitry

REFERENCES SUPPLIED:

*47.

Given the following conditions:

- 1-SI-P-1A, "A" LHSI pump is tagged out for seal replacement.
- A LOCA has occurred inside Containment.
- Following the Safety injection, "J" bus power was lost and <u>NOT</u> restored (fault on the bus).
- The team has progressed through E-0, E-1, and is currently in ECA-1.1," Loss of Emergency Coolant Recirculation," due to no LHSI pumps running.
- Containment pressure is currently 32 psia and slowly decreasing.

Using the supplied reference and the conditions above, which ONE (1) of the following identifies the CS and RS spray configurations the operating team is capable of establishing to meet the CS requirements?

a. 2 CS pumps and 2 RS pumps.

b. 2 CS pumps and 1 RS pump.

c. 1 CS pump and 2 RS pumps.

d. 1 CS pump and 3 RS pumps.

ANSWER: c

Reference: 1-ECA-1.1, Loss of Emergency Coolant Recirculation, page 9.
Difference between Surry and Robinson: New Question

<u>Justification:</u>

a. Plausible, if misconception exists and the chart is misinterpreted.

b. Plausible, if misconception exists and the wrong block of the chart is used.

c. Correct Answer. Loss of "J" bus leaves only 2 RS pumps running. With Containment pressure at 32 psia and 2 RS pumps running, 1 CS pump is required.

d. Plausible, if misconception exists that more than 2 RS pumps are available.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*10.	__CHECK RWST LEVEL - GREATER THAN 3%	GO TO Step 30.

NOTE: Any pumps taking suction from the RWST must be stopped before level decreases to 3%.

11. __DETERMINE CS REQUIREMENTS:

a) Determine number of CS pumps required:

CONTAINMENT PRESSURE	RS PUMPS RUNNING	CS PUMPS REQUIRED
GREATER THAN 60 PSIA	—	2
BETWEEN 14 PSIA AND 60 PSIA	FEWER THAN 2	2
	2 OR MORE	1
LESS THAN 14 PSIA	—	0

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
b) CS pumps running - EQUAL TO NUMBER REQUIRED	b) Manually operate CS pumps.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	__CHECK IF SI IN SERVICE:	GO TO Step 21.

- HHSI to cold legs - FLOW INDICATED

OR

- LHSI pumps - ANY RUNNING

QUESTION NUMBER: 47
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: WE14EK1.2

Knowledge of the operational implications of the following concepts as they apply to the (High Containment Pressure) Normal, abnormal and emergency operating procedures associated with (High Containment Pressure).

K/A IMPORTANCE: *RO* 3.2 *SRO* 3.7
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: FRP-J.1-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of steps related to high containment pressure as directed in FRP-J.1.

REFERENCES: FRP-J.1

SOURCE: *New* ☒ *Significantly Modified* ☐ *Direct* ☐

Bank Number NEW

JUSTIFICATION:

a. Plausible since EPP-15 has priority over FRP-J.1 for containment spray operation, but no conditions merit re-entry into EPP-15.

b. Plausible since containment pressure is lowering, but containment spray is maintained in operation until pressure is < 10 psig.

c. CORRECT Upon entry to FRP-J.1, if containment spray is being operated per EPP-15, no change should be made to the configuration.

d. Plausible since containment pressure is still above 10 psig, but EPP-15 has priority over FRP-J.1 for containment spray operation.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of priority of containment spray operations under abnormal conditions

REFERENCES SUPPLIED:

*48.

Given the following conditions:

- A recovery from a small break LOCA is in progress.
- NO RCPs are running.
- 1-ES-1.2, "Post-LOCA Cooldown and Depressurization," is being implemented.
- Depressurization of the RCS has commenced.
- Pressurizer level has just risen rapidly from off-scale low to 50%.

Which ONE (1) of the following identifies why the pressurizer level has rapidly increased?

a. Increased SI flow.

b. Voiding of the reactor vessel head.

c. Increased pressurizer spray flow.

d. Voiding in the pressurizer level reference leg, causing erroneous indication.

ANSWER: b

Reference: 1-ES-1.2, Post-LOCA Cooldown and Depressurization, page 7.
Difference between Surry and Robinson: Reworded question and distractors to fit standard question format. Eliminated RHR from distractor (a) and used Surry specific procedure number in stem of question.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: Voiding may occur in the RCS during RCS depressurization. Voiding will result in a rapidly increasing PRZR level.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.	__DEPRESSURIZE RCS TO REFILL PRZR:	
	a) Use normal PRZR spray	a) Use one PRZR PORV.
	b) PRZR level - GREATER THAN 35% [55%]	b) GO TO Step 13. WHEN level greater than 35% [55%], THEN stop RCS depressurization.
	c) Stop RCS depressurization	
13.	__CHECK IF AN RCP SHOULD BE STARTED:	
	a) All RCPs - STOPPED	a) Do the following: 1) Stop all but one RCP. 2) Close the spray valve for any stopped RCP. 3) GO TO Step 14.
	b) RCS subcooling based on CETCs - GREATER THAN 30°F [85°F]	b) GO TO Step 23.
	c) PRZR level - GREATER THAN 35% [55%]	c) RETURN TO Step 12.
	d) Establish conditions for starting an RCP IAW 1-OP-RC-001, STARTING AND RUNNING ANY RCP	
	e) Start one RCP	

QUESTION NUMBER: 48

TIER/GROUP: *RO* 1/2 *SRO* 1/2

K/A: WE03EA1.2

Ability to operate and / or monitor the following as they apply to the (LOCA Cooldown and Depressurization) Operating behavior characteristics of the facility.

K/A IMPORTANCE: *RO* 3.7 *SRO* 3.9

10CFR55 CONTENT: *55.41(b) RO* 5 *55.43(b) SRO*

OBJECTIVE: EPP-008-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in EPP-8 by explaining the basis of each.

REFERENCES: EPP-008

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number EPP-008-03 014

JUSTIFICATION:

a. Plausible since flow from centrifugal ECCS pumps increases as RCS pressure decreases and increased ECCS flow will fill the PZR, but level increases rapidly due to voiding in the head.

b. CORRECT The upper head region may void during RCS depressurization if RCPs are not running. This may result in a rapidly increasing PZR level.

c. Plausible since increased spray would cause RCS depressurization and inject more water into the PZR via the spray line, but level increases rapidly due to the voiding in the head.

d. Plausible since voiding in the reference leg would increase PZR level indication, but level increases rapidly due to voiding in the head.

DIFFICULTY:

Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the effects of a natural circulation cooldown on RCS head voiding

REFERENCES SUPPLIED:

*49.

Given the following conditions:

- The unit is operating at 100% power.
- Rod Control is in Manual.
- A safety valve fails open on SG "B".

Which ONE (1) of the following describes the effect on indicated power and RCS Tavg?

	INDICATED NIS POWER	RCS T-AVG
a.	Increases	Remains Relatively Constant
b.	Increases	Decreases
c.	Remains Relatively Constant	Remains Relatively Constant
d.	Remains Relatively Constant	Decreases

ANSWER: b

Reference: N/A
Difference between Surry and Robinson: N/A

Justification:

N/A

QUESTION NUMBER: 49
TIER/GROUP: ***RO*** 2/2 ***SRO*** 2/2
K/A: 039K5.08

Knowledge of the operational implications of the following concepts as they apply to the MRSS: Effect of steam removal on reactivity

K/A IMPORTANCE: ***RO*** 3.6 ***SRO*** 3.6
10CFR55 CONTENT: ***55.41(b) RO*** 5 ***55.43(b) SRO***

OBJECTIVE: MSS-14

EXPLAIN the effect on the Main Steam System due to selected failures.

REFERENCES: Main Steam Lesson Plan

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number MSS-14 003

JUSTIFICATION:

a. Plausible since the expected response to a power increase (controlled) is to withdraw rods to maintain temperature, but no rod motion is given.

b. **CORRECT** The increased heat removal due to increased steam demand will cause the RCS to cool down. This will add negative reactivity which will cause an increase in power.

c. Plausible since the expected response to a power increase (controlled) is to withdraw rods to maintain temperature, but no rod motion is given.

d. Plausible since the increased heat removal due to increased steam demand will cause the RCS to cool down, but this will add negative reactivity which will cause an increase in power.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Comprehension of the effect of increased steam flow on RCS parameters

REFERENCES SUPPLIED:

*50.

Given the following conditions:

- The unit is operating at 85% power.
- Control Rod Bank "D" Demand is at 195 steps.
- IRPI indication for Bank "D" Group 1 Control Rods are as follows:

ROD	POSITION
H-2	181 steps
B-8	181 steps
H-14	205 steps
P-8	205 steps

Which ONE (1) of the following ensures Tech Spec rod alignment requirements are met?

a. Are met under these conditions.

b. If Control Rods H-2 and B-8 is verified aligned to at least 183 steps.

c. If power is reduced below 60%.

d. If Control Rod H-14 and P-8 are verified aligned to at most 197 steps.

ANSWER: b

Reference: Technical Specifications Section 3.12.E.1.a.
Difference between Surry and Robinson: Reworded question and distractors to fit standard question format. Changed rods and rod heights to Surry values. 2 rods to alleviate Tech Spec relief for 1 IRPI /group.

Justification:

a. Plausible, if misconception exists that all conditions are met (Rods not too high), but rod alignment criteria are not met.

b. Correct Answer. If rods H-2 and B-8 are withdrawn to 183 steps, all criteria are met.

c. Plausible, since IRPI Tech Specs are relaxed at lower power (50%), power in this distractor is too high.

d. Plausible, if candidate uses Group demand within 2 steps in lieu of IRPI/group counters.

E. Rod Position Indication System

1. Rod position indication shall be provided as follows:

   a. Above 50% power, the Rod Position Indication System shall be OPERABLE and capable of determining the control rod assembly positions to within ± 12 steps of their respective group step demand counter indications.

   b. From movement of control banks to achieve criticality up to 50% power, the Rod Position Indication System shall be OPERABLE and capable of determining the control rod assembly positions to within ± 24 steps of their respective group step demand counter indications for a maximum of one hour out of twenty-four, and to within ± 12 steps otherwise. During the one-hour "Thermal Soak" period, the step demand counters shall be OPERABLE and capable of determining the group demand positions to within ± 2 steps.

   c. In HOT, INTERMEDIATE, and COLD SHUTDOWN, the step demand counters shall be OPERABLE and capable of determining the group demand positions to within ± 2 steps. The rod position indicators shall be available to verify control rod assembly movement upon demand.

2. If a rod position indicator channel is inoperable, then:

   a. For operation above 50% of RATED POWER, the position of the control rod assembly shall be checked indirectly using the movable incore detectors at least once per 8 hours and immediately after any motion of the non-indicating control rod assembly exceeding 24 steps, or

   b. Reduce power to less than 50% of RATED POWER within 8 hours. During operations below 50% of RATED POWER, no special monitoring is required.

QUESTION NUMBER: 50
TIER/GROUP: ***RO*** 1/1 ***SRO*** 1/1
K/A: 005AK3.03

Knowledge of the reasons for the following responses as they apply to the Inoperable / Stuck Control Rod: Tech-Spec limits for rod mismatch

K/A IMPORTANCE: ***RO*** 3.6 ***SRO*** 4.1
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: RDCNT-12

State the Technical Specification Limitations and explain the bases for the Rod Control System.

REFERENCES: Tech Spec 3.1.4

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number RNP-RO-2000 07

JUSTIFICATION:

a. Plausible since rods would be considered aligned if bank position was above 200 steps (within 15 inches). With rods below 200 steps, requirement is within 7.5 inches.

b. **CORRECT** Below 200 steps, rods must be aligned within 7.5 inches of average IRPI indication for the rods in the bank. If rod H-8 is included in this calculation, the average rod height is 119.4". If rod H-8 is not included, the average rod height is 121.5".

c. Plausible since actions are taken to lower power if a misaligned rod cannot be aligned within a time period. Although rod is misaligned, required power level is 70%, not 80%.

d. Plausible since this rod is higher than the average of the rods. Lowering rod D-8 to 120 inches would lower the average rod height to 120.75" if rod H-8 is not included and 118.8" if rod H-8 is included. Both values would still leave rod H-8 misaligned.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Comprehension of rod alignment limits and determination of rod misalignment.

REFERENCES SUPPLIED:

*51.

Given the following conditions:

- A reactor trip and safety injection have occurred.
- Due to multiple failures, an entry has been made to 1-ECA-2.1, "Uncontrolled Depressurization of All Steam Generators."
- Containment pressure is 9 psia.
- The RCS cooldown rate is 130°F/hour.
- AFW flow is presently greater than 400 gpm to each S/G.
- SG wide range levels are:

SG	LEVEL
"A"	1%
"B"	3%
"C"	14%

Which ONE (1) of the following actions should be taken?

a. Secure all AFW to "A" and "B" SGs, while feeding "C" SG at a rate of 60 gpm.

b. Secure all AFW flow to all SGs until "C" SG is below 7%, then feed **ONLY** "C" SG at a rate of 60 gpm.

c. Feed "A" and "B" SGs at a rate of 60 gpm while feeding "C" SG only as needed to maintain the RCS cooldown rate below 100°F/hour.

d. Feed all SGs at a rate of 60 gpm.

ANSWER: d

Reference: ECA-2.1, Step 2.
Difference between Surry and Robinson: Values changed for Surry Specifics.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: A minimum of 60 gpm [100 gpm] feed flow must be maintained to each SG with a narrow range level less than 11% [22%].

* *

NOTE: Shutdown Margin should be monitored during RCS cooldown. 16

2. __CONTROL FEED FLOW TO MINIMIZE RCS COOLDOWN:

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
a) Check cooldown rate in RCS cold legs - LESS THAN 100°F/HR	a) Lower feed flow to 60 gpm [100 gpm] to each SG. GO TO Step 2c.
b) Check narrow range level in all SGs - LESS THAN 50%	b) Control feed flow to maintain narrow range level less than 50% in all SGs.
c) Check RCS hot leg temperatures - STABLE OR DECREASING	c) Control feed flow or dump steam to stabilize RCS hot leg temperatures.

QUESTION NUMBER: 51
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: WE12EK1.2

Knowledge of the operational implications of the following concepts as they apply to the (Uncontrolled Depressurization of all Steam Generators) Normal, abnormal and emergency operating procedures.

K/A IMPORTANCE: *RO* 3.5 *SRO* 3.8
10CFR55 CONTENT: *55.41(b) RO* 4 *55.43(b) SRO*

OBJECTIVE: EPP-016-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of steps as directed in EPP-16.

REFERENCES: EPP-016

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since this is the required rate for 'C' SG and this would limit the cooldown, but all SGs must be fed at a minimum rate of 80 gpm until level is above 18%.

b. Plausible since this would limit the cooldown, but all SGs must be fed at a minimum rate of 80 gpm until level is above 18%.

c. Plausible since this is the required rate for 'A' and 'B' SGs and this would limit the cooldown, but all SGs must be fed at a minimum rate of 80 gpm until level is above 18%, not 8% due to adverse containment conditions.

d. CORRECT With an excessive cooldown rate, AFW flow is throttled to between 80 and 90 gpm. All SGs must be fed at a rate of at least 80 gpm due to level being below 18%.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Analysis of plant conditions to determine feed rate for all faulted SGs

REFERENCES SUPPLIED:

*52.

Given the following conditions:

- The unit is operating at 100% power.
- Testing is being performed on Reactor Trip Breaker "B" and it is currently open.
- A loss of the "A" 125 VDC Distribution Panel occurs.
- Reactor Trip Breaker "A" fails to open.

Which ONE (1) of the following describes the expected response of the plant due to this sequence of events, assuming NO operator action?

a. **NO** reactor trip occurs.

b. Reactor Trip Bypass Breaker "B" opens on an Undervoltage trip **ONLY**, resulting in a reactor trip.

c. Reactor Trip Bypass Breaker "B" opens on a Shunt trip **ONLY**, resulting in a reactor trip.

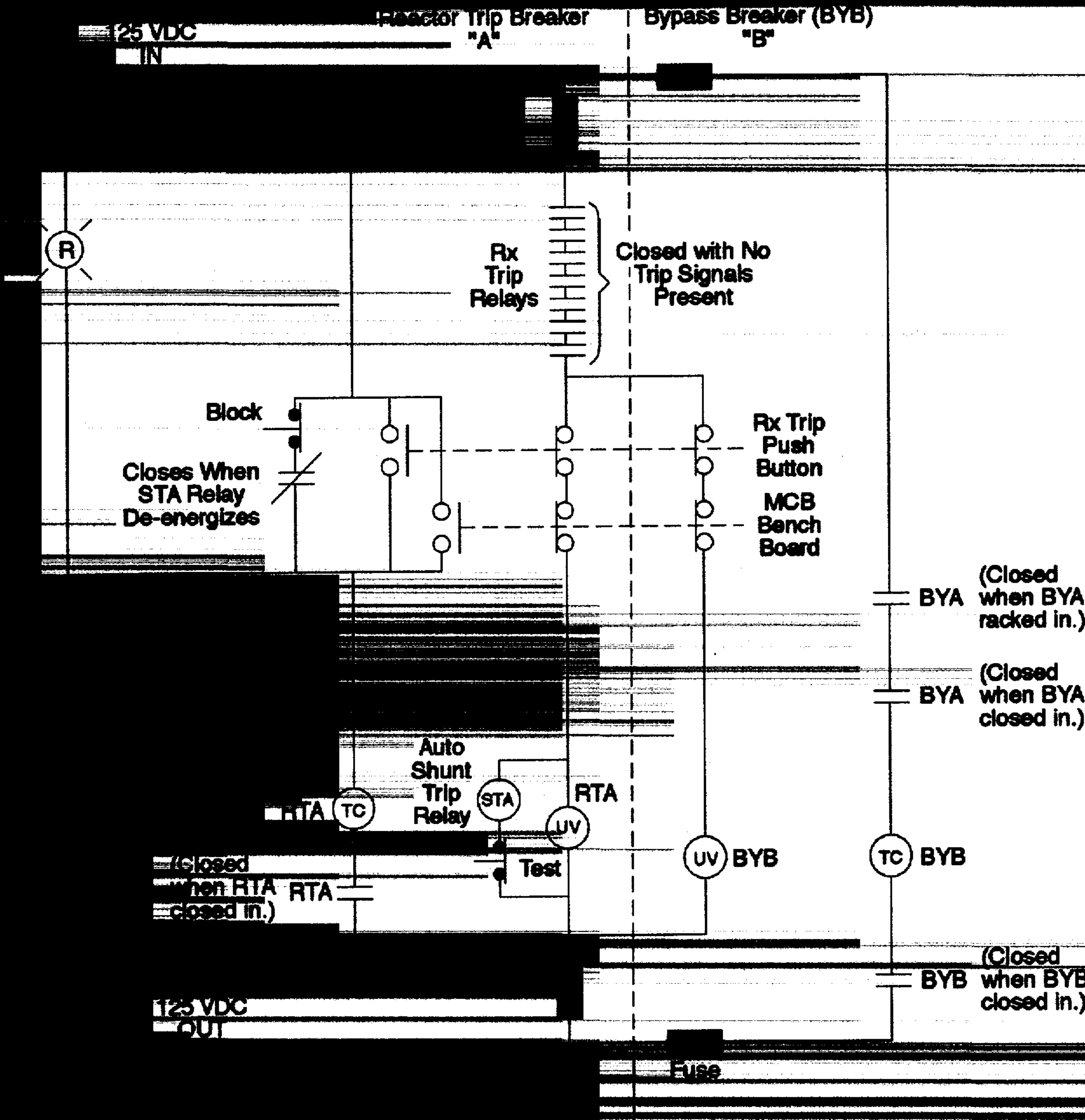
d. Reactor Trip Bypass Breaker "B" opens on **BOTH** an Undervoltage trip and a Shunt trip, resulting in a reactor trip.

ANSWER: b

Reference: ND-93.3-H/T-10.5
Difference between Surry and Robinson: Identical Question .

Justification:

N/A



NOTE: Trip Coils (TC) energize to trip breaker.
Under Voltage Coils (UV) de-energize to trip breaker.
Auto Shunt Trip Realy (STA) de-energizes to actuate.

TRIP BREAKER A AND BYPASS BREAKER TRIP LOGICS

QUESTION NUMBER: 52
TIER/GROUP: ***RO*** 2/2 ***SRO*** 2/2
K/A: 012K2.01

Knowledge of bus power supplies to the following: RPS channels, components, and interconnections

K/A IMPORTANCE: ***RO*** 3.3 ***SRO*** 3.7
10CFR55 CONTENT: ***55.41(b) RO*** 8 ***55.43(b) SRO***

OBJECTIVE: RPS-06

LIST power supplies for the major RPS System components as listed in the EDPs.

REFERENCES: SD-011
EDP-004

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number RPS-09 006

JUSTIFICATION:

a. Plausible since no trip would occur if 'B' bus were lost or if testing were being performed on 'A' trip breaker.

b. **CORRECT** A loss of 125 VDC bus will cause an undervoltage trip of the related trip breaker and the opposite train bypass breaker, but will not cause a shunt trip since power is required to cause a shunt trip.

c. Plausible since the automatic shunt trip relay loses power, but power is required to actually cause a shunt trip and the bypass breakers only trip on a shunt trip if the local trip mechanism is actuated.

d. Plausible since an undervoltage trip will occur, but no shunt trip will occur.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Analysis of the conditions expected during trip breaker testing and the effect of a loss of power

REFERENCES SUPPLIED:

*53.

Given the following conditions:

- The unit is in Hot Standby.
- A change in boron concentration from 500 ppm to 470 ppm is required.

Given the supplied references, which ONE (1) of the following identifies approximately how many gallons of primary water must be added to make this change?

a. 70 gallons

b. 90 gallons

c. 3,000 gallons

d. 4,500 gallons

ANSWER: c

Reference: DRP-003, Attachments 10, 14, and 15.
Difference between Surry and Robinson: Identical question.

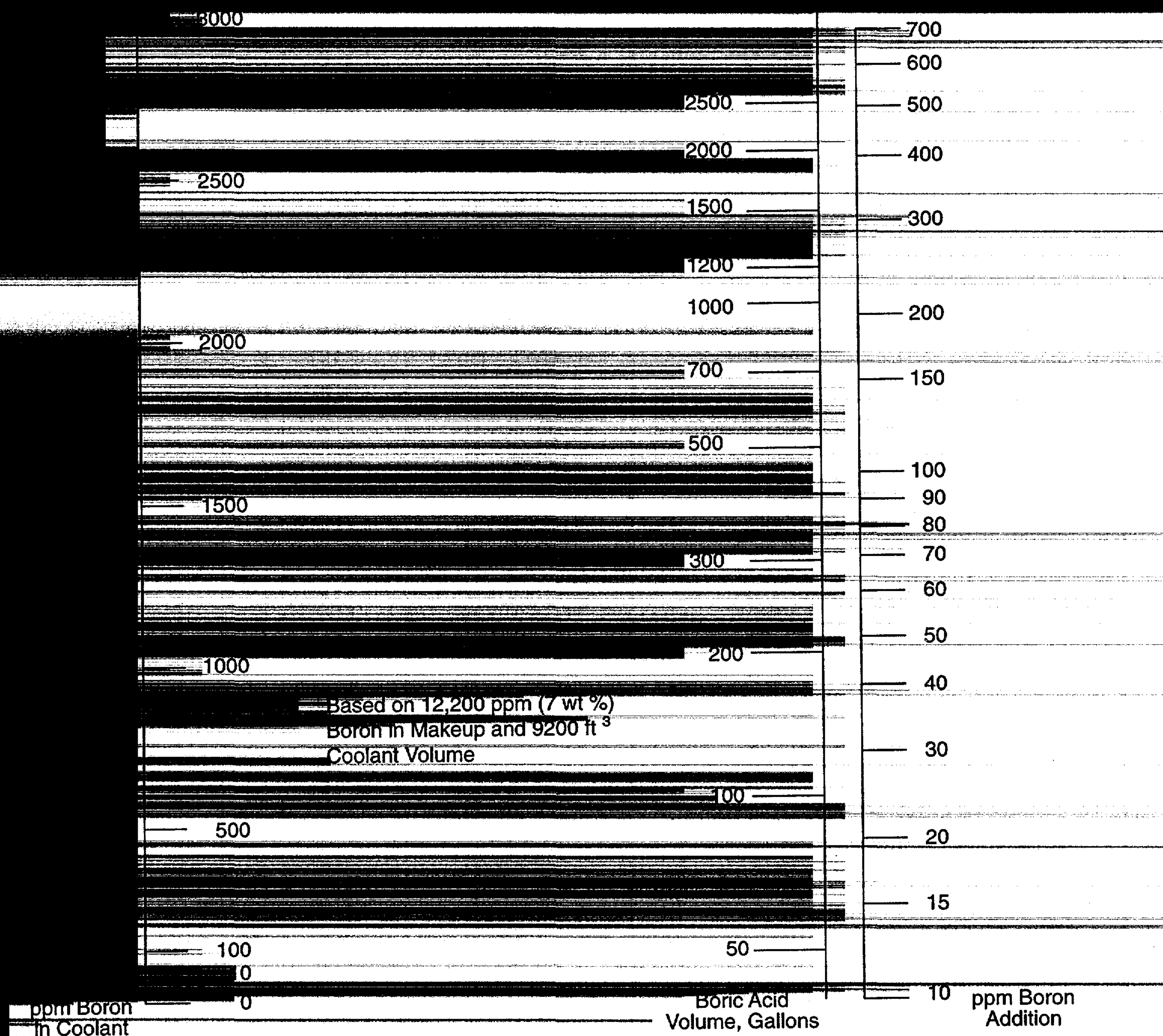
Justification:

N/A

ATTACHMENT 10

(Page 1 of 1)

BORON ADDITION - COOLANT HOT



BORON ADDITION RATE - COOLANT HOT (~ 580°F)

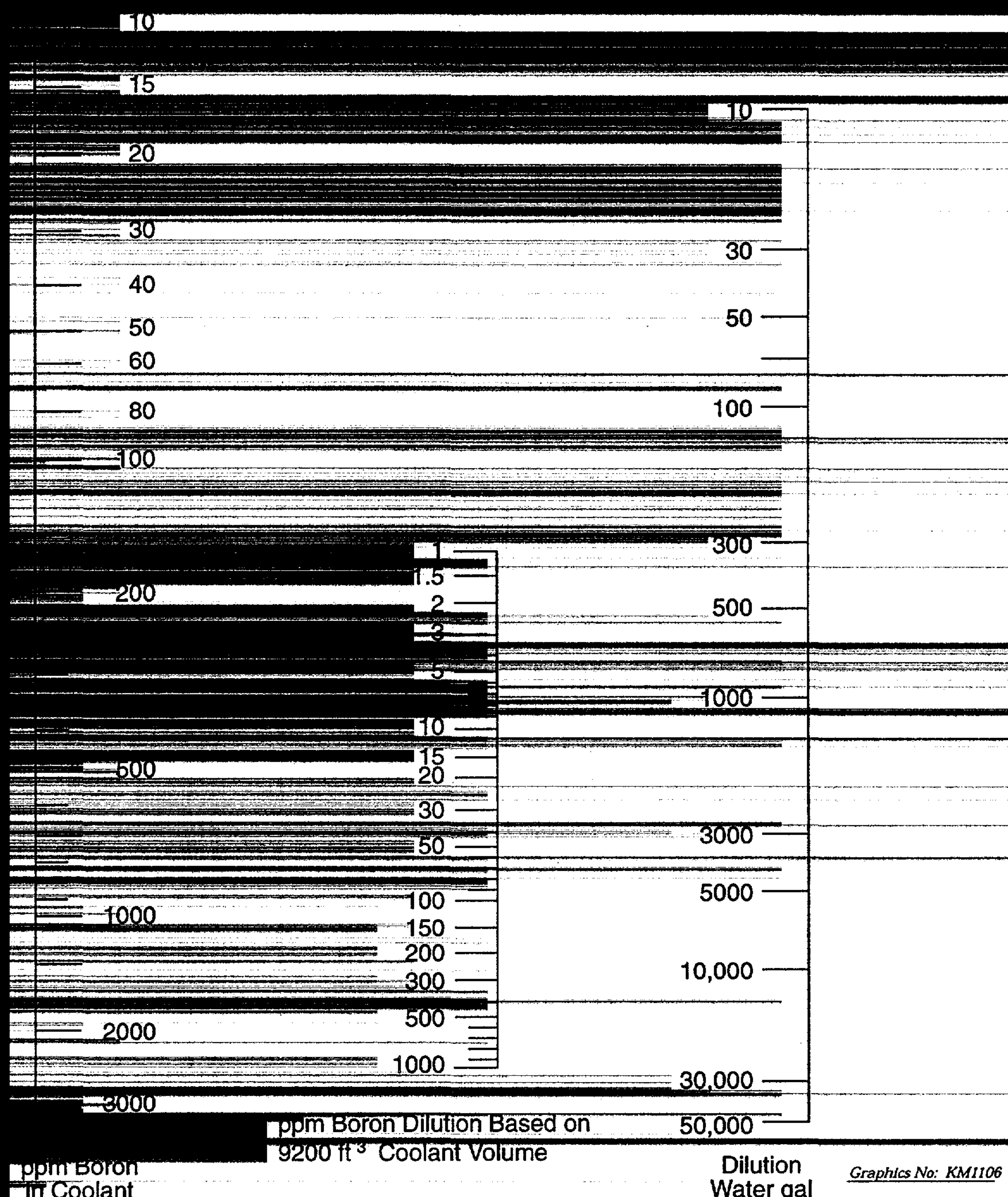
FIGURE S-3.1-3

Graphics No: KM1104B

ATTACHMENT 14

(Page 1 of 1)

DILUTION NOMOGRAPH - COOLANT HOT



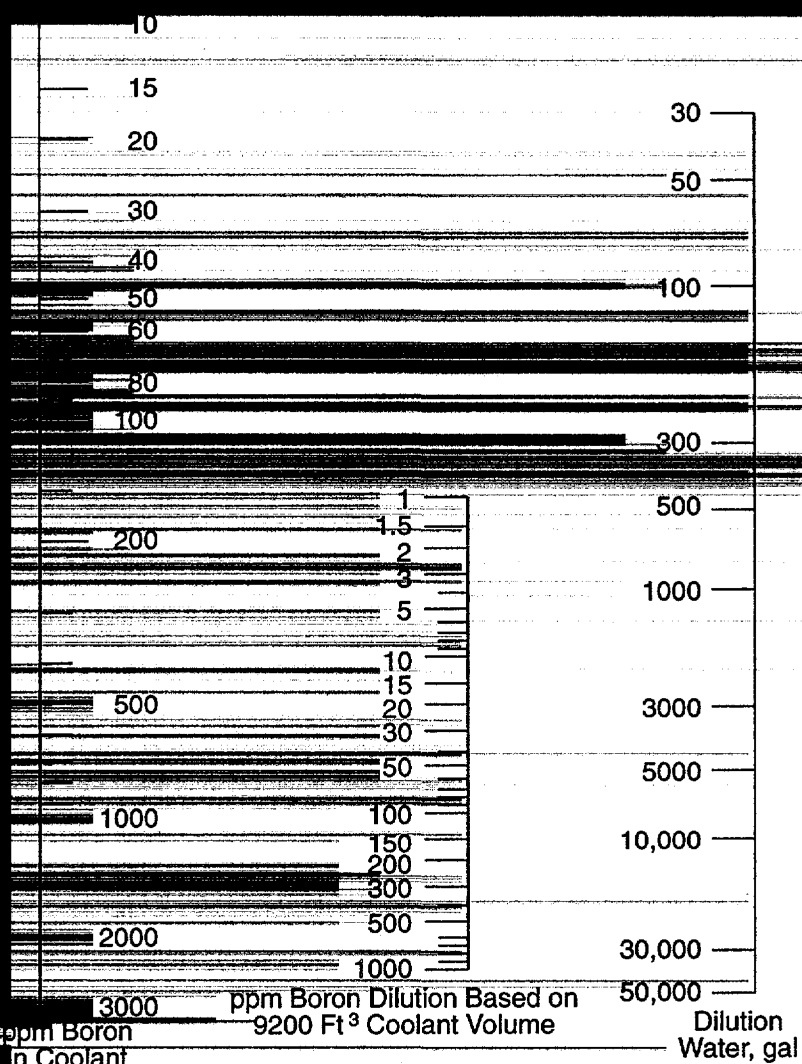
DILUTION VOLUME NOMOGRAPH - COOLANT HOT (~ 580°F)

FIGURE S-3.1-7

ATTACHMENT 15

(Page 1 of 1)

DILUTION NOMOGRAPH - COOLANT COLD



Graphics No: CB1422

DILUTION VOLUME NOMOGRAPH - COOLANT COLD (~ 100°F)
FIGURE S-3.1-8

QUESTION NUMBER: 53
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 004A4.04

Ability to manually operate and/or monitor in the control room: Calculation of boron concentration changes

K/A IMPORTANCE: *RO* 3.2 *SRO* 3.6
10CFR55 CONTENT: *55.41(b) RO* 6 *55.43(b) SRO*

OBJECTIVE: CVCS-10

EXPLAIN the operation of the CVCS.

REFERENCES: OP-301
Plant Curve 5.7

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number CVCS-10 005

JUSTIFICATION:

a. Plausible since this value would be obtained if Curve 5.3 (boron addition - hot) were used, but Curve 5.7 is to be used.

b. Plausible since this value would be obtained if Curve 5.4 (boron addition - hot) were used, but Curve 5.7 is to be used.

c. **CORRECT** Using Curve 5.7 (dilution - hot), a line drawn through 500 ppm coolant boron and 30 ppm dilution will intersect 3000 gallons dilution required.

d. Plausible since this value would be obtained if Curve 5.8 (dilution - cold) were used, but Curve 5.7 is to be used.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Application of given data to plant curves to determine required dilution

REFERENCES SUPPLIED: Plant Curves 5.3, 5.4, 5.7, 5.8

*54.

Given the following conditions:

- Unit 2 is being ramped to 100% following a refueling outage.
- The following Plant Parameters are noted:

PARAMETER	**VALUE**
Loop "A" Tavg	574°F
Loop "B" Tavg	573°F
Loop "C" Tavg	573°F
NI-41	100.0%
NI-42	99.0%
NI-43	99.0%
NI-44	100.0%
Loop "A" ΔT	102%
Loop "B" ΔT	102%
Loop "C" ΔT	102%
Loop "C" Steam Flow	3.9×10^6 lbm/hr
Loop "B" Steam Flow	3.9×10^6 lbm/hr
Loop "C" Steam Flow	3.95×10^6 lbm/hr
Loop "A" Feed Flow	3.9×10^6 lbm/hr
Loop "B" Feed Flow	3.9×10^6 lbm/hr
Loop "C" Feed Flow	3.85×10^6 lbm/hr
1st Stage Press (446)	101%
1st Stage Press (447)	101%
Generator Output	865 MWe

Which ONE (1) of the following indicates actual reactor power and the expected operations response?

a. 99.5%. The power ramp may continue until the plant is at 100%.

b. 99.5%. Power should be held constant to perform a calorimetric.

c. Greater than 100%. Power should be held constant to perform a calorimetric.

d. Greater than 100%. Power should be immediately lowered.

ANSWER: d

Reference: N/A
Difference between Surry and Robinson: Surry 100% values provided.

Justification:

N/A

QUESTION NUMBER: 54
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 002K5.10

Knowledge of the operational implications of the Relationship between reactor power and RCS differential temperature.

K/A IMPORTANCE: *RO* 3.6 *SRO* 4.1
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: GP-005-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in GP-005 by explaining the basis of each.

REFERENCES: GP-005

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number GP-005-03 017

JUSTIFICATION:

a. Plausible since NIS average is 99.5%, but other indications indicate power is above 100%.

b. Plausible since NIS average is 99.5%, but other indications indicate power is above 100%.

c. Plausible since indications other than NIS indicate plant is above 100%, but power must be reduced to highest value at or below 100% before calorimetric is performed

d. CORRECT .All indications other than NIS indicate plant is above 100%, which requires immediate reduction to maintain at or below 100%.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Analysis of conflicting power indications to determine actual power and required actions

REFERENCES SUPPLIED: GP-005, Attachment 10.1

*55.

Which ONE (1) of the following identifies the minimum level of approval for a safety-related temporary modification?

a. Shift Supervisor (SS)

b. Operations Manager on Call (OMOC)

c. Station Nuclear Safety Operating Committee (SNSOC)

d. Management Safety Review Committee (MSRC)

ANSWER: c

Reference: VPAP-1403
Difference between Surry and Robinson: New Question

Justification:

a. Shift Supervisor is highest level of management on-site most nights and weekends.

b. OMOC is a SNSOC level manager. His concurrence is required on many key decisions.

c. Correct Answer. See 5.3 of VPAP-1403.

d. MSRC does not provide approval of lower level items such as this. It is plausible since the MSRC is made of higher level managers than SNSOC.

5.3 SNSOC

SNSOC is responsible for:

5.3.1 Approving Temporary Modifications before installation.

5.3.2 Approving Temporary Modification extensions.

5.4 Site Engineering Superintendent

The Site Engineering Superintendent is responsible for ensuring Temporary Modifications are reviewed during the Temporary Modification Safety Evaluation.

5.5 Superintendent Operations

The Superintendent Operations is responsible for:

5.5.1 Administering the Temporary Modification program.

5.5.2 Reviewing active Temporary Modifications quarterly.

5.6 Shift Supervisor

The Shift Supervisor is responsible for:

5.6.1 Reviewing proposed Temporary Modifications to ensure they will not result in a violation of Technical Specifications (TS), create a hazard to Station safety or personnel, or conflict with existing Station conditions.

5.6.2 Maintaining a Temporary Modification Log and File, and routing Temporary Modification forms for applicable reviews and approval, as specified in this procedure.

5.6.3 Approving Temporary Modification installation and removal.

5.6.4 Ensuring Operations Department personnel are adequately informed of Temporary Modifications and Station status.

5.6.5 Reviewing drawings and procedures affected by Temporary Modifications.

5.6.6 Ensuring any other required notifications are made.

5.6.7 Authorizing restoration of systems to normal configuration.

5.6.8 Verifying that Temporary Modification-required testing is satisfactorily completed prior to declaring equipment inservice.

VIRGINIA POWER

Temporary Modification
Page 1 of 4

VPAP-1403 - Attachment 1

☐ Unit 1 ☐ Unit 2	Year	Sequence Number

Part A (To be completed by the Originator.)

Expiration Date (Not to exceed 6 months.)

1. Affected Systems

2. Reason (e.g., awaiting parts, testing, calibration, repairs, temporary power supply)

3. Description (e.g., specific details on the aspects of the modification; attach copies of the Work Order, affected marked-up drawings, procedures, and instrument index as applicable) and location (e.g., racks, cubicles, building, area, elevation, and rooms to identify in detail the location of the modification.) Attach sketches as necessary.

4. List any Documents, Including Drawings and Procedures (attach copy of PARs), that are Affected and require revision.

5. Required System Testing Following TM Installation

6. Required System Testing Following TM Removal

7. Action Plan for Removal - Close-out Document (EWR/DCP, Work Order, PARs)

8. Requested By (Name-Please Print)	Requested By (Signature)	Date
9. Responsible Superintendent (Name-Please Print)	Responsible Superintendent (Signature)	Date

Form No. 720596(May 98)

Key: TM-Temporary Modification; DCP-Design Change Package; EWR-Engineering Work Request; PAR-Procedure Action Request

QUESTION NUMBER: 55
TIER/GROUP: ***RO*** 3 ***SRO*** 3
K/A: 2.2.11

Knowledge of the process for controlling temporary changes.

K/A IMPORTANCE: ***RO*** 2.5 ***SRO*** 3.4
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: AP-022-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in AP-022 by explaining their basis.

REFERENCES: AP-022

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible if misconception is that expiration is 14-day instead of 21-day since this date would be determined based on original issue date of TC.

b. Plausible if misconception is that expiration is 14-day instead of 21-day and expiration clock is reset, but date is based on original issue date of TC.

c. CORRECT Reissue of the same TC, even under a different number, requires that the 21-day clock for expiration of the TC be based on the original issue date of the TC.

d. Plausible since expiration is 21-day, but date is based on original issue date of TC and not reset to reissue date.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Calculation of temporary change expiration based on knowledge of administrative requirements

REFERENCES SUPPLIED:

*56.

Given the following conditions:

- The plant is operating at 43% power.
- An electrical transient causes a momentary underfrequency condition on "A" 4160V SS Bus.
- Moments later, an undervoltage condition is also sensed on "A" 4160V SS Bus.
- The RCP powered from "A" 4160V SS Bus trips.
- The other two RCPs remain running.

A reactor trip occurs due to the above transient.

Which ONE (1) of the following identifies the signal, which **DIRECTLY** generated the reactor trip?

a. Bus underfrequency

b. Bus undervoltage

c. Low flow

d. Pump breaker trip

ANSWER: d

Reference: None
Difference between Surry and Robinson: Surry Specific mark numbers provided.

Justification:

N/A

QUESTION NUMBER: 56
TIER/GROUP: ***RO*** 2/2 ***SRO***
K/A: 012K6.04

Knowledge of the effect of a loss or malfunction of the concepts as the apply to the RPS: Bypass-block circuits

K/A IMPORTANCE: ***RO*** 2.9 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 8 ***55.43(b) SRO***

OBJECTIVE: RPS-11

EXPLAIN the reactor trips associated with the RPS System. Include purpose and setpoints.

REFERENCES: SD-011

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since UF on 2/3 buses will cause all RCPs to trip, but does not directly cause a reactor trip.

b. Plausible since UV on 2/3 buses will cause a reactor trip, but a single bus UV will only cause the related RCP to trip.

c. Plausible since a low flow signal would be generated in the single loop, but the UV condition would trip the reactor previous to the low flow signal so power would be below P-7 before the low flow condition was sensed.

d. **CORRECT** An undervoltage condition will cause the pump breaker to trip. The pump breaker tripping above P-8 (40%) will cause a reactor trip.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Analysis of plant conditions to determine cause of reactor trip as result of electrical perturbation

REFERENCES SUPPLIED:

*57.

The following plant conditions exist:

- Unit 1 was at 100% power when a Hi-Hi CLS signal was received.
- All three containment air recirc fans were operating at the time of the Hi-Hi CLS signal.

Which ONE (1) of the following describes the response of the Containment Air Recirc fans to the CLS signal?

a. All Containment Air Recirc Fans trip off.

b. No Containment Air Recirc Fans trip off.

c. "A" and "B" Containment Air Recirc Fans trip off.

d. "C" Containment Air Recirc Fan trips off.

ANSWER: c

Reference: ND-91-LP-5
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since tripping Containment Air Recirc Fans (CARFs) occurs on a Hi-Hi CLS, but just two trip and not all three.

b. Plausible, since one of the CARFs does not trip; trainee may think none of them trip.

c. Correct Answer. These CARFs trip because they are powered from the emergency buses.

d. Plausible, since tripping CARFs occurs on a Hi-Hi CLS, but just "A" and "B" trip and not "C" CARF. Also, this being a load off station service powered bus.

Refer to/display H/T-5.4, HI-HI CLS Functions.

either automatically by 3/4 channels >23.0 psia or manually by simultaneously pressing both CLS pushbuttons, the following functions

a. Starts:

(1) Containment Spray Pumps

(2) Inside Recirc Spray Pumps (2 min T.D.)

(3) Outside Recirc Spray Pumps (5 min T.D.)

(4) #1 Emergency Diesel Generator

(5) #3 Emergency Diesel Generator (also sends trip signal to other unit's #3 EDG output bkr)

(6) Recirc spray Hx SW rad mon sample pumps

b. Trips A and B Containment Air Recirculation Fans

c. The GDC-17 Auto-Start Inhibit Circuit is activated such that it blocks auto-start of large non-class 1E pumps for 315 seconds.

d. Phase III isolation closes:

(1) RCP motor CC

(2) RCP thermal barrier CC

QUESTION NUMBER: 57
TIER/GROUP: ***RO*** 2/1 ***SRO***
K/A: 022A3.01

Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation

K/A IMPORTANCE: ***RO*** 4.1 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 9 ***55.43(b) SRO***

OBJECTIVE: CVHVAC-05

DESCRIBE the performance and design attributes of the major CV HVAC, PACV and Hydrogen Recombiner Systems.

REFERENCES: SD-037

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number CVHVAC-07 003

JUSTIFICATION:

a. Plausible since until a recent modification to prevent the normal inlets from opening when SI was reset, these dampers would open.

b. Plausible since until a recent modification to prevent the normal inlets from opening when SI was reset, these dampers would open.

c. **CORRECT** On the SI normal inlet dampers automatically close and emergency inlet dampers remain open since they are failed open. When the signals are reset these components remain in the post-SI position.

d. Plausible since the normal inlet dampers remain closed, but the emergency inlet dampers will remain open.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of the operation of the Containment Ventilation systems to an SI

REFERENCES SUPPLIED:

*58.

The following conditions exist:

- Unit 1 is operating at 100% power.
- "B" Charging pump is running.
- "A" Charging pump is in Auto.
- "C" Charging pump is in Auto with its normal supply breaker racked in.

Which ONE (1) of the following would occur if the Inside Service Building Operator racked in the "C" Charging pump alternate supply breaker?

a. "C" Charging pump would auto-start after "B" Charging pump trips.

b. "B" Charging pump would trip and no other charging pump would auto-start.

c. "A" and "C" Charging pumps will auto-start after "B" Charging pump trips.

d. "A" Charging pump only would auto-start after "B" Charging pump trips.

ANSWER: d

Reference: ND-88.3-AIA-5.1
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, but "C" Charging pump is locked out when the alternate supply breaker is racked in.

b. Plausible, because the "B" Charging pump would trip, but the "A" Charging pump will auto-start.

c. Plausible, because "A" Charging pump does receive an auto-start signal and "C" Charging pump would receive an auto-start signal, but it is locked out when the alternate supply breaker is racked in.

d. Correct Answer. Racking in "C" Charging pump alternate supply trips "B" Charging pump. "B" Charging pump tripping generates an auto-start signal for "A" Charging pump.

15H5 15H6 15J2 15J5

A C B

Pump "A"
15H5

Start

Prestart Conditions
No Auto Trips
15H5 Racked In

1. Start Switch
2. With CS In Auto

   A. Degraded Or UV On 1J
   B. SI Train "A"
   C. Low Discharge Header Pressure
   D. 15J5, 15H6, And 15J2 Open

Stop

1. Stop Switch
2. Lockout On

A. Degraded Or UV On 1H With 15H6 Racked In And Closed
B. Over Current
C. Ground Over Current

Pump "B"
15J5

Start

Prestart Conditions
No Auto Trips
15J5 Racked In

1. Start Switch
2. With CS In Auto

   A. Degraded Or UV On 1H
   B. SI Train "B"
   C. Low Discharge Header Pressure
   D. 15H5 And 15H6 Open

Stop

1. Stop Switch
2. Lockout On

A. 15J2 Racked In
B. Over Current
C. Ground Over Current

Pump "C"
15H6

Start

Prestart Conditions
No Auto Trips
15H6 Racked In
15J2 Open

1. Start Switch
2. With CS In Auto

   A. Degraded Or UV On 1J
   B. SI Train "A" Or "B"
   C. Low Discharge Header Pressure
   D. 15H5 And 15J5 Open

Stop

1. Stop Switch
2. Lockout On

A. Ground Over Current
B. Over Current
C. 15J2 Closed
D. 15J2 Racked In
E. 15H5 Racked In and Closed with Degraded or UV on 1H for > 1 Sec

Pump "C"
15J2

Start

Prestart Conditions
No Auto Trips
15H6 Open
15J2 Racked In

1. Start Switch
2. No Auto Starts

Stop

1. Stop Switch
2. Lockout On

A. Over Current
B. Ground Over Current
C. 15H6 Racked In
D. 15H6 Closed

Graphics No. CB1318A

CHARGING PUMP STARTS AND TRIPS

QUESTION NUMBER: 58
TIER/GROUP: ***RO*** 2/1 ***SRO***
K/A: 004K2.03

Knowledge of bus power supplies to the Charging pumps

K/A IMPORTANCE: ***RO*** 3.3 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 8 ***55.43(b) SRO***

OBJECTIVE: CVCS-06

LIST power supplies for the major CVCS components as listed in the EDPs.

REFERENCES: EDP-002

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number PATH-1-03 001

JUSTIFICATION:

a. Plausible since the power supply for 'A' CCP is correct, but incorrect power supply listed for 'B' CCP.

b. Plausible since the power supply for 'C' CCP is correct, but incorrect power supply listed for 'B' CCP.

c. Plausible since power supply for both pumps seems logically correct, but incorrect power supply listed for both.

d. **CORRECT** C' CCP will be supplied by 'B' EDG and 'A' CCP will be supplied by DSDG.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of emergency power supplies for charging pumps

REFERENCES SUPPLIED:

*59.

Given the following conditions:

- The unit is experiencing a loss of all feedwater event and FR-H.1, "Response to Loss of Secondary Heat Sink," has been entered.
- NO AFW flow is available.

Which ONE (1) of the following describes when the operator is required to trip the RCPs and immediately initiate feed and bleed?

a. Five highest core exit TC temperatures are 652°F, 650°F, 649°F, 648°F, and 645°F and are all rising.

b. RCS hot leg temperatures are 652°F, 646°F, and 648°F and are all rising.

c. Pressurizer levels are indicating 83%, 87%, and 84% and are all rising.

d. SG wide range levels are 5%, 6%, and 12% and are all stable.

ANSWER: d

Reference: N/A
Difference between Surry and Robinson: Changed to Surry Specific setpoints.

Justification:

N/A

QUESTION NUMBER: 59

TIER/GROUP: *RO* 1/2 *SRO*

K/A: WE05EA2.2

Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink) Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments

K/A IMPORTANCE: *RO* 3.7 *SRO*

10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: FRP-H.1-08

Given plant conditions, EVALUATE the appropriate actions to mitigate consequences of a loss of secondary heat sink as directed by steps in FRP-H.1.

REFERENCES: FRP-H.1

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number FRP-H.1-03 012

JUSTIFICATION:

a. Plausible since this would be an indication that heat is not being adequately removed from the RCS, but trigger event is low SG level.

b. Plausible since this would be an indication that heat is not being adequately removed from the RCS, but trigger event is low SG level.

c. Plausible since this would be an indication that heat is not being adequately removed from the RCS, but trigger event is low SG level.

d. CORRECT Any 2 SGs below 26% wide range level requires immediate tripping of the RCPs and initiation of feed and bleed.

DIFFICULTY:

Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of feed and bleed initiation criteria

REFERENCES SUPPLIED:

*60.

Given the following conditions:

- A Unit trip and safety injection have occurred due to a Steam Generator Tube Rupture on "A" SG.
- 1-ES-3.1, "Post-SGTR Cooldown using Backfill," is being implemented.
- RCS pressure is 940 psig.
- It has been determined that the accumulators should be isolated.
- The breakers for the accumulator discharge valves (1-SI-MOV-1865A, B, C) have been closed.
- The "A" accumulator discharge valve (1-SI-MOV-1865A) loses light indication after it is given a closed signal.
- "B" and "C" accumulator valves stroke closed as expected.

Which ONE (1) of the following actions should be taken regarding "A" accumulator?

a. Slow the rate at which the RCS is being depressurized to allow a controlled injection of the accumulator.

b. Drain the accumulator to the Primary Drains Transfer Tank.

c. Vent the accumulator to the Process Vent System.

d. Maintain RCS pressure above 800 psig until a Containment entry can be made to locally close the discharge valve.

ANSWER: c

Reference: N/A
Difference between Surry and Robinson: Changed nomenclature to Surry Specific components and mark numbers.

Justification:

N/A

QUESTION NUMBER: 60

TIER/GROUP: *RO* 1/2 *SRO*

K/A: 038EA1.30

Ability to operate and monitor the following as they apply to a SGTR: Safety injection and containment isolation systems

K/A IMPORTANCE: *RO* 4.0 *SRO*

10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: EPP-012-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of steps related to the Post-SGTR Cooldown using Backfill as directed in EPP-12.

REFERENCES: EPP-12

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number EPP-012-08 001

JUSTIFICATION:

a. Plausible since the accumulators are designed to inject into the RCS during an accident, but vented to prevent nitrogen gas injection into the RCS.

b. Plausible since this appears to be a method of lowering pressure in accumulator and it does drain to the RCDT, but should be vented, not drained since some pressure will still remain in the accumulator due to the nitrogen gas.

c. **CORRECT** Vented to prevent nitrogen gas injection into the RCS when the RCS depressurization continues.

d. Plausible since manual isolation would prevent the accumulator from injecting, but would delay the continued cooldown and depressurization. Procedure directs venting.

DIFFICULTY:

Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of actions regarding SI accumulators during EPP implementation

REFERENCES SUPPLIED:

*61.

The Unit Reactor Operator needs a short-term relief to get his lunch in the Annex and take a restroom break.

Which ONE (1) of the following is <u>NOT</u> required to be performed as part of turnover to the relieving Reactor Operator?

a. Shift Relief Checklist must be completed.

b. Verifying that no uncontrolled unit transient is in progress.

c. Discuss evolutions in progress that could affect unit status.

d. Inform Unit Senior Reactor Operator that turnover has occurred.

ANSWER: a

Reference: OPAP-0005, Section 6.2
Difference between Surry and Robinson: NEW Question.

Justification:

a. Correct Answer. The Shift Relief Checklist must be completed as part of normal shift turnover but not for short-term relief.

b. Plausible, since this is part of short-term relief and normal shift turnover.

c. Plausible, since this is part of short-term relief and normal shift turnover.

d. Plausible, since this is part of short-term relief and normal shift turnover.

6.2 Short Term Reliefs Occurring During the Shift

6.2.1 When performing short term reliefs (e.g., meal and restroom breaks) during the shift, the following actions shall be performed:

a. Verify that no uncontrolled transient is in progress.

b. The Relieving Operator shall be made aware of any ongoing procedures, tests, maintenance, or other evolutions that could potentially affect Unit status.

c. Inform the responsible SRO that he/she has assumed the controls.

This process shall be completed upon return of the controls to the original Operator.

6.2.2 Reliefs during the shift (e.g., exchange of Control Room supervisor function between Senior Reactor Operators, or short term relief of a Unit duty Control Room Operator) should have a turnover that ensures the oncoming individual is knowledgeable of the Unit conditions.

6.2.3 If a Control Room Operator with Unit duty expects to be away from the assigned station for situations other then meal and restroom breaks, then the shift turnover shall be in accordance with Section 6.1.

6.3 Orderly Turnover for Post Trip Review Meetings [Commitment 3.2.2]

6.3.1 The OMOC should consult the Shift Supervisor, Shift Technical Advisor, and Director Nuclear Station Safety and Licensing to determine the time for the Post Trip Review Meeting.

6.3.2 When performing reliefs for the Post Trip Review Meeting the Shift Supervisor shall verify that:

a. The affected unit is in a stable condition.

b. The "E series" procedures are at an appropriate point to allow for turnover.

c. All major manipulations and evolutions that could affect plant stability are completed.

QUESTION NUMBER: 61
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.1.3

Knowledge of shift turnover practices.

K/A IMPORTANCE: *RO* 3.0 *SRO* 3.4
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: OMM-001-05-03

DISCUSS each section of OMM-001-05, when possible, using the information given in each section of the procedure.

REFERENCES: OMM-001-05

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number 10CFR-55.13-22 001

JUSTIFICATION:

a. Plausible since watchstanding requirements are correct, but must also perform a complete tour of the plant.

b. **CORRECT** Four complete 12-hour watches, plus shift turnovers, and a complete tour of the plant must be completed.

c. Plausible since this would satisfy watchstanding requirements, but must also perform a complete tour of the plant.

d. Plausible since this would satisfy all requirements, but is not the minimum requirement.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of administrative requirements for activating an inactive license

REFERENCES SUPPLIED:

*62.

Given the following conditions:

- The unit is operating at 100% power.
- RCS Tavg is 573°F and stable.
- PZR level is 53.7% and stable
- VCT level is 31% and stable.
- Letdown flow is 45 gpm (FI-150).
- RCP seal injection flows are:

RCP	SEAL INJ
"A"	8.3 gpm
"B"	7.9 gpm
"C"	7.8 gpm

- Seal return flows are:

"A"	3.4
"B"	3.3
"C"	3.3

Which ONE (1) of the following would be the expected flow indication on 1-CH-FI-122A, Charging Header Flow, assuming NO RCS leakage?

a. 21 gpm

b. 31 gpm

c. 36 gpm

d. 54 gpm

ANSWER: b

Reference: N/A
Difference between Surry and Robinson: Changed to Surry Specific setpoints. Added seal return flows.

Justification:

N/A

QUESTION NUMBER: 62
TIER/GROUP: ***RO*** 2/1 ***SRO*** 2/1
K/A: 004A1.11

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including: Letdown and charging flows

K/A IMPORTANCE: ***RO*** 3.0 ***SRO*** 3.0
10CFR55 CONTENT: ***55.41(b) RO*** 6 ***55.43(b) SRO***

OBJECTIVE: CVCS-05

DESCRIBE the performance and design attributes of the major CVCS components.

REFERENCES: AOP-016
SD-021

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number CVCS-03 010

JUSTIFICATION:

a. Plausible if misconception is that seal leakoff flow is ignored, but leakoff flow is not required to be made up. 45 - 24 = 21.

b. CORRECT Charging flow should equal letdown flow (105 gpm) less seal injection flow (24 gpm) plus seal return flow (9 gpm). 45 - 24 + 9 = 30.

c. Plausible if misconception that seal injection flow is measured as part of charging flow and seal leakoff must be subtracted, but seal injection is required to be included. 45 - 9 = 36.

d. Plausible if misconception that seal injection flow is measured as part of charging flow, but seal injection is required to be included. 45 + 9 = 54.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Calculation of expected charging flow indication based on given CVCS parameters

REFERENCES SUPPLIED:

*63.

The following conditions exist:

- A valve lineup is required on the Gas stripper.
- Operations and Health Physics have predicted the following:
- The lineup will take 4.5 Man-Hours.
- The dose rates within the area are 30 mr/hr.
- If shielding were placed, the dose rates would be 10 mr/hr.
- The time to place the shielding is 1.25 hours and takes 2 persons (assume the dose rate for these individuals is 30 mr/hr during the entire evolution).

Which ONE (1) of the following identifies the minimum dose that can be achieved for this evolution?

a. 45 mr

b. 83 mr

c. 120 mr

d. 135 mr

ANSWER: c

Reference: N/A
Difference between Surry and Robinson: NEW Question.

Justification:

a. Discount dose to place shielding.

b. Calculates for only one person placing shielding.

c. Correct Answer.

d. Dose if shielding not placed.

QUESTION NUMBER: 63
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.3.2

Knowledge of facility ALARA program.

K/A IMPORTANCE: *RO* 2.5 *SRO* 2.9
10CFR55 CONTENT: *55.41(b) RO* 12 *55.43(b) SRO*

OBJECTIVE: 10CFR20-04

Recognize how the practical aspects of the radiation protection program will be effected.
a. Surveys
b. Postings
c. Records

REFERENCES: HPP-006

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number HPP-006 001

JUSTIFICATION:

a. Plausible since routine radwaste processing is permissible, but exposure of > 100 mRem requires a Special RWP.

b. Plausible since maintenance activities which are expected to involve minimal radiological consequence are permissible, but exposure of > 100 mRem requires a Special RWP.

c. **CORRECT** Routine radwaste processing and maintenance activities which are expected to involve minimal radiological consequence are permissible. Any task where an individual is expected to receive > 100 mRem require a Special RWP.

d. Plausible since routine radwaste processing and maintenance activities which are expected to involve minimal radiological consequence are permissible, but exposure of > 100 mRem requires a Special RWP.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of administrative requirements for RWP usage

REFERENCES SUPPLIED:

*64.

Given the following conditions:

- The Unit was operating at 100% power.
- G-A-6, ROD CONT SYS URGENT FAILURE is lit.
- G-B-5, COMPU PRINTOUT ROD CONT SYS is lit.
- G-H-1, NIS DROPPED ROD FLUX DECREASE > 5% PER 2 SEC is lit.
- G-H-2 RPI ROD BTM < 20 STEPS is lit.

Which ONE (1) of the following procedures is initially implemented to respond to the event?

a. AP-1.00, "Rod Control System Malfunction."

b. AP-1.01, "Control Rod Misalignment."

c. AP-1.02, "Individual Rod Position Indicators (IRPI)."

d. AP-4.00, "Nuclear Instrumentation Malfunction."

ANSWER: a

Reference: AP-1.00, 1.01, 1.02, and 4.00.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Correct Answer.

b. This procedure is normally transitioned to from AP-1.00.

c. Plausible, if the candidate believes the failure is an IRPI failure.

d. Plausible, if the candidate believes the alarm is a NI power range failure.

VIRGINIA POWER
SURRY POWER STATION

ABNORMAL PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
0-AP-1.00	ROD CONTROL SYSTEM MALFUNCTION (With 1 Attachment)	6
		PAGE 1 of 5

PURPOSE

To provide guidance to respond to Rod Control system malfunctions.

ENTRY CONDITIONS

1. Continuous rod insertion or withdrawal.
2. Dropped control rod or rods.
3. Failure of automatic control system.
4. Transition from Annunciator ()G-B5, COMPU PRINTOUT ROD CONT SYS.
5. Transition from Annunciator ()G-H2, RPI ROD BOTTOM ≤ 20 STEPS.
6. Transition from Annunciator ()G-A6, ROD CONT SYS URGENT FAILURE.
7. Transition from Annunciator ()G-H1, NIS DROPPED ROD FLUX DECREASE ≥ 5% PER 2 SEC.

APPROVAL RECOMMENDED	APPROVED	DATE
REVIEWED	CHAIRMAN STATION NUCLEAR SAFETY AND OPERATING COMMITTEE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: The minimum temperature for criticality is 522°F. If Tave decreases below this temperature, Tech Spec 3.1.e must be reviewed.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[1]	__CHECK FOR EITHER OF THE FOLLOWING: • Continuous rod withdrawal • Continuous rod insertion	GO TO Step 4.
[2]	__STOP ROD MOTION: a) Put ROD CONT MODE SEL switch in MANUAL b) Verify rod motion - STOPPED	b) Trip Reactor and GO TO ()-E-0, REACTOR TRIP OR SAFETY INJECTION.
3.	__GO TO STEP 13	
4.	__CHECK IF ANY ROD DROPPED: • Annunciator ()G-H2, RPI ROD BOTTOM ≤ 20 STEPS - LIT OR • Annunciator ()G-H1, NIS DROPPED ROD FLUX DECREASE ≥ 5% PER 2 SEC - LIT OR • Rod Bottom Lights - ANY LIT	IF deviation between any IRPI and associated Step Counter greater than or equal to 8 steps, THEN GO TO 0-AP-1.02, INDIVIDUAL ROD POSITION INDICATORS. IF deviation between all IRPIs and associated Step Counters less than 8 steps, THEN do the following: a) IF any IRPI indicating erratically, THEN notify Instrument Department. b) GO TO Step 13.

QUESTION NUMBER: 64
TIER/GROUP: *RO* 1/2 *SRO* 1/1
K/A: 003 2.4.4

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures (Dropped Rod).

K/A IMPORTANCE: *RO* 4.0 *SRO* 4.3
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: AOP-001-02

RECOGNIZE the selected entry level conditions of AOP-001.

REFERENCES: AOP-001
AOP-015
AOP-024
AOP-025
APP-005

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number AOP-001-02 006

JUSTIFICATION:

a. **CORRECT** Any indication of a malfunction involving rod position indication is addressed by AOP-001.

b. Plausible since a runback has occurred, but entry into AOP-015 would be caused by an NIS failure not an IRPI failure.

c. Plausible since a loss of power to the rod position indication has occurred, but entry into AOP-024 is excluded for a loss of the instrument bus for rod position indication.

d. Plausible since rod position indiction is located on the RTGB, but entry should be made into AOP-001.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 2

Knowledge of entry requirements / purpose of AOPs

REFERENCES SUPPLIED:

*65.

Given the following conditions:

- A line break caused the Fire Header pressure to drop.
- Fire Header pressure eventually stabilized at 83 psig.

Which ONE (1) of the following expected fire system responses would have resulted in this condition?

a. The Electric Fire Pump automatically started, then the Diesel Fire Pump automatically started.

b. The Electric Fire Pump automatically started and the Diesel Fire Pump remained in standby.

c. The Diesel Fire Pump automatically started, then the Electric Fire Pump automatically started.

d. The Diesel Fire Pump automatically started and the Electric Fire Pump remained in standby.

ANSWER: a

Reference: ND-92.2-LP-1.
Difference between Surry and Robinson: Identical Question.

Justification:

N/A

a. Firewater Storage Tanks - provide the required storage capacity necessary for fire fighting.

(1) Capacity 300,000 gallons - tank supplies both the Fire Water System and the Domestic Water System.

(2) The bottom 250,000 gallons are reserved for fire fighting and the top 50,000 gallons are for domestic water.

(3) Domestic water line taps off at the 33' level. The fire pump suction lines tap off the bottom of the tanks. The fire pump suction lines are cross connected.

(4) Tank level is controlled automatically.

b. Motor driven fire pump

Refer to/display H/T-1.3, Motor Driven Fire Pump.

(1) The motor driven fire pump is the lead pump for maintaining system pressure when demand exceeds the capacity of the pressure maintenance pump.

(2) Location - Both fire pumps are located in the fire pump house. The two pumps are separated by a fire wall and a fire door.

(3) Capacity 2500 gpm at 330 feet head. The pump has a relief valve on

the discharge set at 164 psig. Power supply - 14B2-6 (B station service). Two breakers in series supply power to the pump. 14B2-6 and the breaker in the lexington cabinet in the fire pump house. Normally both are shut and a contact in the control circuit will close to start the pump. Pulling a local start handle at the lexington control cabinet may also close the contacts. The breaker in the fire pump house does not have the ability to be racked out, so a gang operated blade disconnect switch can be used to disconnect the motor electrically from the downstream side if 14B2-6. This is only done when the motor is not running since this disconnect is not capable of interrupting power to the motor under load. Once started the motor heater circuit is deenergized.

(4) There are two modes of operating the motor driven fire pump; automatic and manual. The mode of operation is selected by a control switch on the main control board. The switch is an ON/AUTO switch.

Refer to/display H/T-1.4, Fire Pump Control Switches, H/T-1.5, Manual/Auto Starts, and H/T-1.6, Lexington Control Cabinet.

(a) In the ON position the fire pump will start and remain running until it is secured locally.

(b) In AUTO, the pump starts when fire system pressure drops to 100.5 psig (PS-FP-105).

(c) The pump will also start when the local start pushbutton is pushed.

(d) The pump can only be stopped by depressing the local stop button. To stop the pump, the STOP button must be pushed.

This will stop the pump if all the following conditions are satisfied:

(1) The switch in the control room is in AUTO. (This switch spring-returns to AUTO.)

(2) The manual starting lever is in the STOP position.

(3) The START pushbutton is not pressed.

(5) The Motor Fire Pump has two annunciator alarms in the Main Control Room.

Refer to/display H/T-1.7, MCR Alarms.

(a) MOTOR FIRE PUMP RUNNING (VSP-L3): Actuates when the fire pump is started automatically of manually.

(b) MOTOR FIRE PUMP TROUBLE (VSP-K3): Activated by loss of power to the motor.

c. Diesel Driven Fire Pump Control.

Refer to/display H/T-1.8, Diesel Driven Fire Pump.

The diesel driven fire pump is started by an electric starter motor that can be powered by either of two redundant batteries. The start circuit automatically

selects which battery will start the diesel, and also automatically swaps batteries as needed. A battery charger common to both batteries is set up to automatically line up to each battery for one hour at a time; at the end of the hour the charger swaps to the other battery. If the voltage of the selected battery is low, the battery charger automatically charges the battery until the voltage returns too normal. The battery charger can also be manually lined up to either battery or can be turned off. The engine may be started by the battery on charge or by the battery not on charge. A current sensing relay automatically disconnects the battery charger from the battery if a high current is sensed, indicating that the battery is being used to crank the engine. The start circuit automatically cranks the engine and automatically shuts down the diesel if it overspeeds. The machine has provision for automatic start, various types of manual starts, and can be set up for weekly test runs.

Refer to/display H/T-1.9, Diesel Driven Fire Pump Control Cabinet, and H/T-1.10 Mode Selector Switch.

(1) There are two ways to manually start the diesel at the control panel: by selecting MAN A or MAN B and pressing the START button, or by selecting TEST.

(a) Selecting MAN A or MAN B determines which battery and starter solenoid energizes the starter motor; however, there is only one starter motor. After MAN A or MAN B is selected, pushing the START button cranks the engine and energizes the fuel solenoid valve. The engine will crank over as long as the button is pushed; when the button is released, the cranking stops.

(b) If TEST is selected, the engine starts through the normal start circuit relays. A ratchet relay selects the battery to be used on each start attempt; this relay switches positions each time its coil is energized. RR energizes, shifting from one battery to the other, on any of three signals:

1) Loss of power to the control circuit (that is, the battery connected to the control circuit is dead).

2) Engine shut down following a successful start.

3) Engine fails to start after cranking for ten seconds on any start other than MAN A or MAN B. This sets up the control circuit for another start attempt on the other battery.

(2) Start of the engine involves energizing the starter motor and energizing the fuel solenoid. The fuel solenoid is energized if there has not been an overspeed and any of the following conditions are met:

(a) The control switch is in MAN A or MAN B.

(b) The engine is up to speed, as sensed by voltage out of the engine driven generator.

(c) A start signal has been received by the auto/remote/test circuit.

(3) The starter motor energizes by either of the following:

Refer to/display H/T-1.11, Diesel Driven Fire Pump Start Switch.

(a) The control switch in MANUAL A or MANUAL B and the

START button pressed. The engine will crank for as long as the START button is pushed.

(b) The auto/remote/test circuit activated with the control switch in AUTO or TEST.

1) This circuit is actuated if any of the following conditions are present:

a) Control switch in TEST.

Refer to/display H/T-1.12, Automatic Starts.

b) Control switch in AUTO and any one of the following:

i Weekly test timer calling for a start. This is installed but has been defeated at Surry.

ii Low pump discharge header pressure (94.5 psig as sensed by PS-FP-103).

iii Loss of AC control power; AC supplies the battery charger. The AC supply is the lighting panel in the Diesel Fire Pump Room, which is supplied by the Motor Control Center in the room.

iv Control room switch placed in ON. This switch is spring-return to AUTO.

QUESTION NUMBER: 65
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 086A3.01

Ability to monitor automatic operation of the Fire Protection System including: Starting mechanisms of fire water pumps

K/A IMPORTANCE: *RO* 2.9 *SRO* 3.3
10CFR55 CONTENT: *55.41(b) RO* 4 *55.43(b) SRO*

OBJECTIVE: FPW-09

EXPLAIN the normal operation of the Fire Water control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: SD-041

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number FP-05 003

JUSTIFICATION:

a. CORRECT The electric fire pump starts at 100 psig and the diesel fire pump starts at 90 psig. Pressure would stablize at some value below the starting setpoint for both pumps based on demand.

b. Plausible since the electric pump would start, but pressure is below diesel pump start setpoint so it would also be operating.

c. Plausible since both pumps would be running, but start order of pumps is backwards.

d. Plausible if misconception is that diesel pump starts first and electric pump setpoint is below 83 psig, but both pumps would be running.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of the automatic response of the fire system to decreasing pressure

REFERENCES SUPPLIED:

*66.

Given the following conditions with the #1 EDG paralleled to the "F" transfer bus for a load test:

- Voltage – 4200 V
- Load – 1560 Kw
- Speed – 900 RPM
- VARS - +270 KVAR
- Frequency – 59.8 Hz

Which ONE (1) of the following describes the indications of taking the "Emerg Gen No 1 Volt ADJ" to the lower position?

a. Voltage decreases

b. VARS decrease

c. Speed decreases

d. Frequency increases

ANSWER: b

Reference: N/A
Difference between Surry and Robinson: NEW Question.

Justification:

a. Common misconception for affects on various parameters.

b. Correct Answer.

c. Common misconception for affects on various parameters.

d. Common misconception for affects on various parameters.

QUESTION NUMBER: 66
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 064A4.02

Ability to manually operate and/or monitor in the control room: Adjustment of exciter voltage (using voltage control switch)

K/A IMPORTANCE: *RO* 3.3 *SRO* 3.4
10CFR55 CONTENT: *55.41(b) RO* 4 *55.43(b) SRO*

OBJECTIVE: EDG-08

EXPLAIN the component operation associated with each switch position for the Emergency Diesel Generator System switches and controls.

REFERENCES: OP-604

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number EDG-08 001

JUSTIFICATION:

a. Plausible since the regulator is designed to control voltage in this range and the field automatically flashes above 200 rpm, but it must be manually shutdown to prevent damage after 5 seconds.

b. Plausible since the field automatically flashes above 200 rpm and must be manually shutdown, but it must be manually reinstated above 900 rpm.

c. Plausible since the voltage regulator is to be shutdown within 5 seconds after reaching 200 rpm, but this is a manual operation not automatic.

d. CORRECT The field automatically flashes when speed increases above 200 rpm. The voltage regulator must be manually shutdown within 5 seconds if speed will be maintained below 900 rpm and then manually reinstated when speed is increased above 900 rpm.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

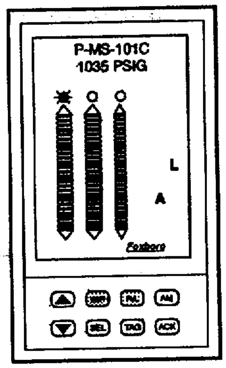
Knowledge of procedural requirements for starting an EDG

REFERENCES SUPPLIED:

*67.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- The "A" S/G PORV controller is in the condition pictured below.



- The steam line pressure input to the "A" S/G PORV controller fails high.

Which ONE (1) of the following describes the "A" S/G PORV response to this failure?

a. No response. The PORV controller is in LOCAL CONTROL from the instrument racks.

b. The "A" S/G PORV opens fully.

c. No response. The PORV is in the SETPOINT ADJUST mode of control.

d. The PORV is incapable of automatic operation due to the controller sensing an input failure.

ANSWER: b

Reference: ND-89.1-LP-2 pages 17-19/ ND-89.1-H/T-2.7
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, if misconception exists that the "L" means local control from the instrument racks.

b. Correct Answer. The Controller is set up for normal operation and will respond to the high pressure input.

c. Plausible, if misconception exists that the controller/valve will not respond while the setpoint is being adjusted.

d. Plausible, if misconception exists that the controller can differentiate between an input failure and actual pressure change due to rate of change of input (Tave circuit operates similar to this).

INSTRUCTOR NOTE: Detailed discussion of the TDAFW pump SOV control switches are contained in ND-89.3-LP-4, Auxiliary feedwater.

7. PORV Controller

Refer to/display H/T-2.7, Foxboro M/A Station, as required.

a. There are two operating modes for the SG PORV controllers; Auto and Manual

(1) In Auto Mode, an "A" will be displayed and the ▲ (UP) and ▼(DN) pushbuttons are used to change the PORV setpoint as long as the LED above any of the Bargraphs is visible. If an LED is not lit, the operator cannot change the setpoint. To see a digital indication of the setpoint, the LED must positioned above the leftmost Bargraph, if the LED is positioned over either of the other two Bargraphs only a single line on the left bargraph will show the effect of using the UP or DN arrow buttons. ***This single line is a very rough indicator of setpoint.***

(2) To change the position of the LED above the Bargraphs, the SEL button is depressed.

b. The second mode of operation is Manual. When in Manual mode an "M" will be displayed. The controller is shifted between Manual and Auto by pressing the A/M button. In Manual mode, the ▲ (UP) and ▼(DN) buttons are used to change valve demand. While in this mode the LED should be over either the right or center Bargraph.

(1) The right Bargraph shows demand to the controller in the Relay Room.

(2) The center Bargraph shows the demand from the controller in the Relay Room to the valve.

(3) When the LED is lit above the right Bargraph, the display will show a 0.0-100 demand to the controller. When the LED is over the center Bargraph, the display will show 0-100% demand to the valve.

(4) Similar to the Auto mode, if the LED is not lit above any of the Bargraphs, the operator cannot adjust valve position.

c. If normal and backup power from the SVB is lost to MBR 8, which supplies the relay rack controllers for the SG PORVs, the indications and controls supplied from this MBR remain functioning for a period of 30 minutes due to a battery supplied UPS in the MBR. This means that the SG PORVs remain operational for this 30 minute period. If SVB breaker #26 (Power supply for the SG PORV controllers in the MCR) trips, the SG PORVs will continue to operate in automatic based on the last setpoint set by the operator. When the breaker is reset, the operator will have to return the controller to Local operation. On a loss of the SVB, control of the SG PORVs will shift to the control unit in the Relay Room, which is powered by the UPS for a period of 30 minutes. During this time the control system will automatically operate the PORV based on the last setpoint set into the benchboard controller (usually 1035). At the end of the 30 minute period, the SG PORV will fail closed.

d. If power is lost for greater than 30 minutes and the UPS expires, indications and control will be lost. Upon power restoration, first the computer must reboot which takes about ≈3.5 minutes. After the computer has rebooted, it will send the data needed to reboot the individual MBR control processors. A total of ≈4.5 minutes will elapse before the control board indications are regained and the SG PORVs are operational.

e. When SVB power is restored, the benchboard controller will have an "R" backlit signifying Remote (Rack) control. To return to Local (Benchboard) operation, the "AM" key is pressed and the display will change from "R" to "L" signifying a return to Local (Benchboard) control.

f. Control signal for the controller comes from the control channel for steam line pressure.

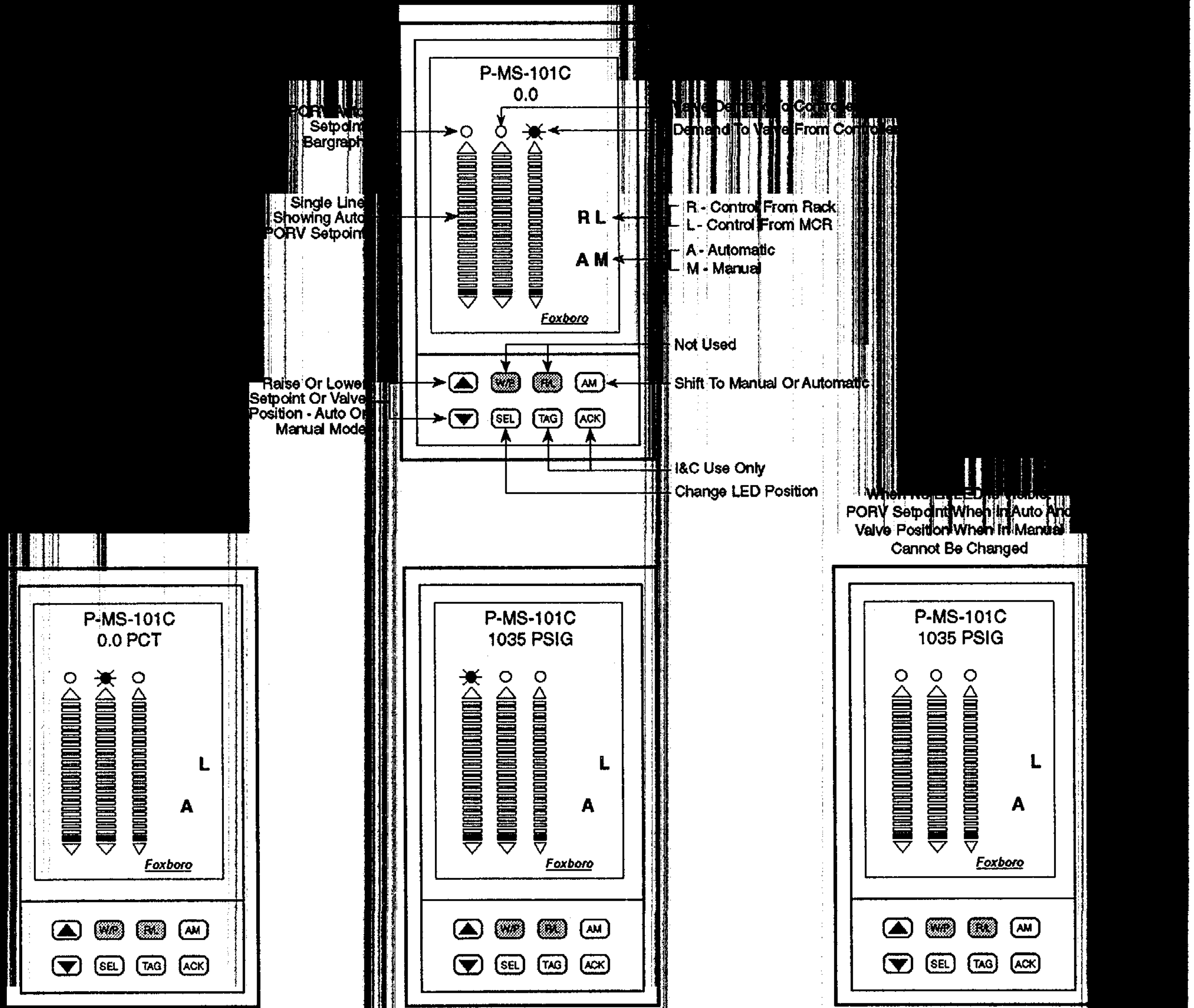
g. Valve position indication (red/green lights) is provided directly above the controller.

8. Main Steam Safety Valve Position Indication

a. Regulatory Guide 1.97 (Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Environs Conditions During and Following an Accident) requires that the main steam safety valve position indication be provided to the control room operator in order to assess plant environs conditions during and following an accident.

b. There is a temperature sensing flow probe in the discharge line from each main steam safety valve.

c. Each flow sensor has dual setpoints. One setpoint, on the lower end of the sensor range, indicates that the valve is not fully closed or is leaking. The



FOXBORO M/A STATION

QUESTION NUMBER: 67
TIER/GROUP: *RO* 2/3 *SRO* 2/3
K/A: 041K6.03

Knowledge of the effect of a loss or malfunction on the following will have on the SDS: Controller and positioners, including ICS, S/G, CRDS

K/A IMPORTANCE: *RO* 2.7 *SRO* 2.9
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: SD-09

EXPLAIN the normal operation of the Steam Dump control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: SD-031

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number MSS-12 002

JUSTIFICATION:

a. Plausible since the setpoint is raised, but the PORV would remain closed.

b. Plausible since the setpoint would be decreased on most potentiometer adjusted controllers, but PORV stations are reversed so setpoint actually increases.

c. CORRECT Setting of 3.10 is 1035 psig. The range for the ten turn pot is 0-1500 psig. Changing the setpoint to 1.50 would raise the setpoint to 1351.5 psig. Since this is higher than even the safety setpoins, the PORV will remain closed.

d. Plausible since the PORV will remain closed and the setpoint would be decreased on most potentiometer adjusted controllers, but PORV stations are reversed so setpoint actually increases.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the magnitude of the effect of operator actions on the SG PORV

REFERENCES SUPPLIED:

*68.

Given the following conditions:

- A small break LOCA has occurred.
- Entry has been made into FR-C.1, "Response to Inadequate Core Cooling."
- CETs are all indicating between 740°F and 760°F and rising slowly.
- RCS pressure has stabilized at 1605 psig.
- PZR level is off-scale low.
- RVLIS Full Range is indicating 39% and lowering slowly.
- HHSI is <u>NOT</u> available.
- SG pressures are all between 360 psig and 400 psig.

Which ONE (1) of the following actions should be taken?

a. Dump steam to cooldown and depressurize the RCS to provide LHSI flow.

b. Open the RCS Vent System valves to depressurize the RCS to provide LHSI flow.

c. Start an RCP immediately to provide forced cooling flow.

d. Open the PZR PORVs to depressurize the RCS to provide LHSI flow.

ANSWER: a

Reference: N/A
Difference between Surry and Robinson: Surry Specific nomenclature used.

<u>Justification:</u>

N/A

QUESTION NUMBER: 68

TIER/GROUP: *RO* 1/1 *SRO* 1/1

K/A: WE06EK2.2

Knowledge of the interrelations between the (Degraded Core Cooling) and the facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems.

K/A IMPORTANCE: *RO* 3.8 *SRO* 4.1

10CFR55 CONTENT: *55.41(b) RO* 5 *55.43(b) SRO*

OBJECTIVE: FRP-C.1-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of steps related to inadequate core cooling as directed in FRP-C.1.

REFERENCES: FRP-C.1

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number NEW

JUSTIFICATION:

a. **CORRECT** SGs should be depressurized in 2 steps (140 psig and atmospheric pressure) in an attempt to cooldown and depressurize the RCS to provide injection flow.

b. Plausible since this is an alternate bleed flowpath if entry had been made to FRP-H.1, but valves are only verified closed in FRP-C.1 to ensure that these are not the cause of the LOCA.

c. Plausible since RCPs will be started if CETs exceed 1200 °F and attempts to cooldown and depressurize using other means are not successful, but start requirements are not yet met.

d. Plausible since this is the normal bleed flowpath if entry had been made to FRP-H.1, but valves are only verified closed in FRP-C.1 to ensure that these are not the cause of the LOCA.

DIFFICULTY:

Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Analysis of plant conditions to determine appropriate actions in response to inadequate core cooling

REFERENCES SUPPLIED:

*69.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- Unit 2 is operating at 60% power with "A" MFP out of service for repairs.
- Low Level Transformer 1G is lost due to a lightning strike, causing a loss of four (4) Circ Water Pumps.

Which ONE (1) of the following describes the correct operator response for this event IAW AP-12.01, "Loss of Intake Canal Level?"

a. Reduce turbine load and throttle Circ Water to the condenser waterboxes to conserve canal level. When condenser vacuum reaches 19" Hg, manually trip both Units.

b. Manually trip both Units when Annunciator B-E-6, INTAKE CANAL HI-LO LEVEL, alarms for low canal level at 26 feet.

c. Initiate 1-E-0, Reactor or Safety Injection, when canal level decreases to 23.5 feet.

d. Manually trip both Units when canal level decreases below 17 feet, 2 inches.

ANSWER: c

Reference: AP-12.01
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since load reduction and throttling waterboxes is required by AP-12.01, but reactor trip is required prior to reaching 19" Hg.

b. Plausible, since reactor trip is required based on Intake Canal Level, but not at 26 feet.

c. Correct Answer.

d. Plausible, since 17 feet, 2 inches is the Design Basis minimum canal level.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>NOTE</u>: • An admin key is required for entry into the ESW Pump house and the Low Level Switchgear Room.

• There are no restrictions on the number of CW pumps which may be started with the 1G and 2G buses crosstied.

3.	__SEND OPERATOR TO LOW LEVEL INTAKE TO PERFORM THE FOLLOWING PROCEDURES: • Attachment 2, LOW LEVEL INTAKE RESPONSES • 0-OP-SW-002, EMERGENCY SERVICE WATER PUMP OPERATION • OP-48.1.1, STARTING ANY CW PUMP	
4.	__CHECK INTAKE CANAL LEVEL - GREATER THAN TRIP SETPOINT • Annunciator ( )F-G1, INTK CANAL LO LVL TRIP - NOT LIT • Intake Canal level - GREATER THAN 23.5 FEET	GO TO Step 8.
5.	__CONTINUE TO REDUCE UNIT LOAD AS NECESSARY TO MAINTAIN VACUUM	
6.	__CHECK INTAKE CANAL LEVEL - STABLE OR INCREASING	RETURN TO Step 4.
7.	__GO TO STEP 20	
8.	__INITIATE BOTH 1-E-0 <u>AND</u> 2-E-0, REACTOR TRIP OR SAFETY INJECTION	

QUESTION NUMBER: 69

TIER/GROUP: ***RO*** 2/2 ***SRO*** 2/2

K/A: 075A2.02

Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) use procedures to correct, control, or mitigate the consequences: Loss of circulating water pumps

K/A IMPORTANCE: ***RO*** 2.5 ***SRO*** 2.7

10CFR55 CONTENT: ***55.41(b) RO*** 7 ***55.43(b) SRO***

OBJECTIVE: CW-09

EXPLAIN the normal operation of the CW control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: APP-008
OP-603

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number EHC-11 004

JUSTIFICATION:

a. Plausible since a lowering vacuum without any chance of recovery will require a manual trip, but an automatic trip will occur due to the loss of all 3 CW pumps.

b. **CORRECT** The loss of power will result in all 3 CW pump breakers being open. This will generate an automatic turbine trip.

c. Plausible since an automatic trip on low vacuum would occur if one CW pump were not able to remove enough heat to maintain vacuum, but no CW pumps are available.

d. Plausible since a single CW pump might be able to remove adequate heat at this power level, but no CW pumps are available.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Analysis of the knowledge of CW pump power supplies and the effect on the plant of the loss of power

REFERENCES SUPPLIED:

*70.

Given the following conditions:

- The unit is operating at 2% power.
- The following RCP indications are observed:

INDICATION	**RCP "A"**	**RCP "B"**	**RCP "C"**
Motor Bearing Temperatures	210°F and ↑ slowly	180°F and stable	195°F and ↑ slowly
#1 Seal Leakoff Temperatures	150°F and stable	150°F and stable	165°F and ↑ slowly
#1 Seal Leakoff Flow	5.8 gpm and stable	4.2 gpm and stable	3.8 gpm and stable
Seal Injection	7.4 gpm	8 gpm	8.2 gpm
Frame Vibration	3.6 mils and ↑ at 0.1 mil per hr	2.8 mils and stable	4 mils and ↑ at 0.05 mil per hr
Shaft Vibration	12 mils and stable	7 mils and stable	9.5 mils and ↑ at 0.6 mils per hour

Which ONE (1) of the following describes the actions required for this condition?

a. Stop "A" RCP and enter Technical Specification 3.1, Reactor Coolant System.

b. Trip the reactor, initiate E-0, "Reactor Trip or Safety Injection," and stop "A" RCP.

c. Stop "C" RCP and enter Technical Specification 3.1, Reactor Coolant System.

d. Trip the reactor, initiate E-0, "Reactor Trip or Safety Injection," and stop "C" RCP.

ANSWER: b

Reference: AP-9.00.
Difference between Surry and Robinson: Surry Specific setpoints, procedures, and Tech Specs changed.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: This procedure assumes that CC is available to the RCP oil and air coolers. Loss of CC is covered by the individual pump alarms for LOW CC FLOW and HI CC TEMP.

* *

*26. __CHECK RCP MOTOR BEARINGS - ANY ONE GREATER THAN OR EQUAL TO 200°F

Bearing	P-250 RCP A	P-250 RCP B	P-250 RCP C
Upper Thrust	T0414A	T0434A	T0454A
Lower Thrust	T0416A	T0436A	T0456A
Upper Radial	T0413A	T0433A	T0453A
Lower Radial	T0415A	T0435A	T0455A

IF bearing temperature(s) are greater than 175 °F, THEN do the following:

a) Continue to monitor bearing temperatures.

b) Monitor RCP parameters IAW Attachment 2.

c) Investigate cause for high bearing temperature:

- CC leak to cooler
- Failed bearing
- Loss of CC to cooler(s)
- Low injection flow

- Low seal leakoff
- High seal leakoff
- High injection water temperature

d) Monitor pump vibration.

e) IF vibration increases, THEN notify SS and System Engineering.

f) IF any bearing temperature reaches 200 °F, THEN GO TO Step 33.

g) GO TO Step 28.

IF bearing temperatures are less than 175°F, THEN GO TO Step 28.

27. __GO TO STEP 29

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION:
- An RCP should be secured for low seal leakoff (less than 0.8 gpm) within 8 hours if Attachment 2 parameters are stable.
- An RCP should be secured for high seal leakoff using the following time limits: 1) Stop the RCP immediately (within 5 minutes) after a manual Reactor trip if Total No. 1 seal leakoff flow has increased to greater than 8 gpm. (regardless of Attachment 2 parameters.) 2) Stop the RCP within 8 hours if Total No. 1 seal leakoff flow is greater than 6 gpm and Attachment 2 parameters are stable.
- An RCP with high or low seal leakoff should be secured immediately (within 5 minutes) after a manual Reactor trip if any Attachment 2 parameter is continuously increasing or at Action level.

* *

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34.	__CHECK UNIT STATUS - ON LINE	GO TO Step 36.
35.	__REMOVE UNIT FROM SERVICE IAW SS DIRECTION: • GOP-2 Series Operating Procedures OR • 1-E-0, REACTOR TRIP OR SAFETY INJECTION OR • 0-AP-23.00, RAPID LOAD REDUCTION	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

* *

CAUTION: If an immediate (within 5 minutes) RCP trip was performed due to high or low seal leakoff, the RCP SEAL LKOFF ISOL VV should be closed within three to five minutes after pump trip.

* *

36. __TRIP AFFECTED RCP IAW SS DIRECTION

37. __CLOSE THE AFFECTED RCP SEAL LEAKOFF ISOLATION VALVE AS NECESSARY:

- PP A/HCV-1303A, RCP A
- PP B/HCV-1303B, RCP B
- PP C/HCV-1303C, RCP C

38. __CHECK THERMAL BARRIER CC FLOW ON AFFECTED RCP - IN SERVICE

RESPONSE NOT OBTAINED:

Do the following:

a) Verify open or open the following valves:

- TV-CC-120A, B, or C
- 1-CC-TV-140A
- 1-CC-TV-140B

b) Check for Thermal Barrier tube leakage:

- CC Surge Tank Level - INCREASING AT 1% PER MINUTE INDICATES APPROXIMATELY 35 GPM LEAKAGE
- Thermal Barrier CC temperature - INCREASING
- Thermal Barrier CC flow - HIGHER THAN NORMAL
- PRZR level - DECREASING
- PRZR pressure - DECREASING

(STEP 38 CONTINUED ON NEXT PAGE)

QUESTION NUMBER: 70
TIER/GROUP: *RO* 1/1 *SRO* 1/1
K/A: 015/017AA1.20

Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCP bearing temperature indicators

K/A IMPORTANCE: *RO* 2.7 *SRO* 2.7
10CFR55 CONTENT: *55.41(b) RO* 3 *55.43(b) SRO*

OBJECTIVE: AOP-018-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in AOP-018 by explaining the basis of each.

REFERENCES: AOP-018
AOP-014

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number AOP-014-03 011

JUSTIFICATION:

a. CORRECT 'A' RCP motor bearing temperature has exceeded limits and the pump must be stopped. With the plant in Mode 2, a reactor trip is not required.

b. Plausible since these would be the correct actions if the plant was in Mode 1, but the plant is in Mode 2.

c. Plausible since these are the correct actions, but 'C' RCP has not reached any trip limits while 'A' RCP has.

d. Plausible since these would be the correct actions if the plant was in Mode 1, but 'C' RCP has not reached any trip limits while 'A' RCP has and the plant is in Mode 2.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 4

Analysis to determine which RCP must be stopped and comparison to power level to determine proper action

REFERENCES SUPPLIED:

*71.

A fire in the Main Control Room has forced evacuation. The fire has initiated a transient, which has left NO Unit 1 CC pumps running.

Which ONE (1) of the following identifies how a Unit 1 CC pump can be restarted?

a. Depress the "START" pushbutton inside the breaker cubicle.

b. Transfer control to the Aux Shutdown Panel (ASDP) and start the pump at the ASDP.

c. At the Breaker panel, select "Local," and start the pump at the breaker control panel.

d. Locally start the pump from the Unit 1 Appendix "R" panel.

ANSWER: c

Reference: ND-88.5-LP-1, Page 19 Item 6
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, because breaker can be closed from the cubicle, however, it is a pull station and not a push button.

b. Plausible, because many components can be started from the Aux Shutdown Panel. This cannot.

c. Correct Answer.

d. Plausible, due to CC being an Appendix R type component.

f. TV-CC-109A and 109B

In order to provide reactor decay heat removal during Appendix "R" situations, the air supply lines for TV-CC-109A and 109B have been modified to provide a means to locally operate the valves with a portable air bottle via quick-disconnect fittings.

5. Annunciator Displays

The annunciators associated with the CC system are located on the "C" and "K" annunciator panels and the "VSP" Annunciator panel.

Have the trainees refer to AIA-1.2, Annunciator Displays, for a listing of all CC annunciators.

6. To provide a means of isolating Control Room wiring and to provide a means of operating the Component Cooling Water pumps remote from the Control Room, a transfer switch and a control switch on each pump's breaker compartment at the switchgear are installed. The transfer switch will be a two (2) position selector switch (LOCAL-REMOTE). The "LOCAL" position will isolate all wiring between the switchgear and the Control Room. The pump can be restored to the remote control mode by turning the transfer switch to the "REMOTE" position. The local control switch will operate the breaker only when the transfer switch is in the "LOCAL" position. When the transfer switch at the switchgear is in the local position, both the red and green status lights in the Control Room for the affected pump will be out, and the associated annunciator "CC pump in local control or OL trip" will alarm (K-C-5 and 6). This will indicate (Appendix "R" concerns) that control of that pump from the Control Room has been lost.

QUESTION NUMBER: 71
TIER/GROUP: ***RO*** 1/1 ***SRO*** 1/1
K/A: 067AA2.04

Ability to determine and interpret the following as they apply to the Plant Fire on Site: The fire's extent of potential operational damage to plant equipment

K/A IMPORTANCE: ***RO*** 3.1 ***SRO*** 4.3
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: DSP-001-02

RECOGNIZE the selected entry level conditions of DSP-001.

REFERENCES: DSP-001

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number DSP-001-02 005

JUSTIFICATION:

a. Plausible since operating in Mode 1 and would damage equipment vital to generating capacity, but not located in AB, CV, or CR.

b. **CORRECT** Entry conditions are a fire in the AB, CV, or CR that has the potential to damage vital controls/components and/or their power/control cables when in Mode 4 or higher.

c. Plausible since entry would be made into DSP-001 if in a higher Mode, but temperature is below required entry conditions.

d. Plausible since entry would be made into DSP-001 if in a higher Mode, but temperature is below required entry conditions.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of the entry conditions / purpose of AOPs

REFERENCES SUPPLIED:

*72.

Which ONE (1) of the following actions occurs when a high radiation alarm is received on RI-CC-105 or 106, Component Cooling Water Radiation Monitor?

a. Isolates the makeup header to the Component Cooling (CC) System.

b. Shuts the CC Surge Tank Vent Valve.

c. Isolates the RCP thermal barrier CC return header.

d. Shuts the CC Temperature Control Valve to the NRHX.

ANSWER: b

Reference: ARP RM-M5 and M6.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since leak into CC could overfill system; isolating the makeup header will minimize potential to overfill.

b. Correct Answer. Isolates Surge Tank Vent Valve to minimize release.

c. Plausible, since this isolates a highly probable source of activity sensed by the Radiation Monitor.

d. Plausible, since this isolates a highly probable source of activity sensed by the Radiation Monitor.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- If a monitor fails, the automatic functions associated with that monitor should be verified or performed.
- When HP has surveyed the area and declared radiation levels normal, the components that were realigned due to monitor failure may be returned to normal and activities in the affected area may continue.
- Tech Spec 3.13.C requires that HCV-CC-100 remain closed if either CC radiation monitor is inoperable.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	__VERIFY ALARM - READING ON MONITOR GREATER THAN OR EQUAL TO HIGH SETPOINT • 1-CC-RI-105, HDR A • 1-RM-RI-150C, Pen 1	Do the following: a) Increase surveillance on the following monitor: • 1-CC-RI-106 b) Evaluate entry into 0-AP-10.13, LOSS OF MAIN CONTROL ROOM ANNUNCIATORS. c) Initiate a Work Request. d) GO TO Step 8.
2.	__VERIFY CC HEAD TANK VENT VALVE - CLOSED • HCV-CC-100	Manually close valve.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- If a monitor fails, the automatic functions associated with that monitor should be verified or performed.
- When HP has surveyed the area and declared radiation levels normal, the components that were realigned due to monitor failure may be returned to normal and activities in the affected area may continue.
- Tech Spec 3.13.C requires that HCV-CC-100 remain closed if either CC radiation monitor is inoperable.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	___VERIFY ALARM - READING ON MONITOR GREATER THAN OR EQUAL TO HIGH SETPOINT • 1-CC-RI-106, HDR B • 1-RM-RR-150D, Pen 1	Do the following: a) Increase surveillance on the following monitor: • 1-CC-RI-105 b) Evaluate entry into 0-AP-10.13, LOSS OF MAIN CONTROL ROOM ANNUNCIATORS. c) Initiate a Work Request. d) GO TO Step 8.
2.	___VERIFY CC HEAD TANK VENT VALVE - CLOSED • HCV-CC-100	Manually close valve.

QUESTION NUMBER: 72
TIER/GROUP: *RO* 2/3 *SRO* 2/3
K/A: 008K4.02

Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Operation of the surge tank, including the associated valves and controls

K/A IMPORTANCE: *RO* 2.9 *SRO* 3.7
10CFR55 CONTENT: *55.41(b) RO* 4 *55.43(b) SRO*

OBJECTIVE: CCW-05

DESCRIBE the performance and design attributes of the major CCW System components.

REFERENCES: SD-013

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number CCW-04 001

JUSTIFICATION:

a. Plausible since CCW and RHR systems interface, but loss of RHR would cause CCW to cooldown not heatup.

b. CORRECT Sized to relieve the maximum flowrate of water following the rupture of a RCP thermal barrier cooling coil.

c. Plausible since CCW is cooled by SW, but loss of SW would not cause a heatup of sufficient magnitude to cause an insurge to challenge the capacity of this valve.

d. Plausible since CCW cools RHR pump cooler, but differential pressure would not cause insurge.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of CCW system design attributes

REFERENCES SUPPLIED:

*73.

Given the following plant conditions:

- Unit 1 is in Refueling Shutdown.
- Fuel movement is in progress.
- Due to a malfunction in the manipulator crane control circuitry, the underload protection circuit stopped the hoist downward travel before the fuel assembly was fully set down on the lower core plate pins.

Which ONE (1) of the following individuals can authorize the interlock bypass for the underload condition to allow fully lowering the fuel assembly into the core?

a. Unit 1 SRO.

b. Shift Supervisor.

c. Refueling SRO.

d. Operations Manager on Call (OMOC).

ANSWER: c

Reference: ND-92.5-LP-3.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since the Unit SRO is responsible for supervising all activities on Unit 1, but does not have authority to authorize use of Manipulator Crane Interlocks.

b. Plausible, since the Shift Supervisor is responsible for supervising all Operations Department activities, but does not have authority to authorize use of Manipulator Crane Interlocks.

c. Correct Answer.

d. Plausible, since the OMOC is notified of Operations Department problems/events and provides concurrence with decisions as necessary, but does not have the authority to authorize use of Manipulator Crane Interlocks.

c. The hoist is not operated with the Dillon meter on high range except under emergency conditions. The load scale limit circuits are calibrated to operate on the low range scale (0-3000 pounds).

d. Initial gripper tube movements, up or down, are done by jogging when handling fuel.

e. When fuel is being moved or prepared for movement, a visual watch is maintained to ensure that adequate clearances are being maintained for safe fuel movement and to ensure that fuel assemblies are fully seated prior to releasing the gripper. This is accomplished by use of the TUBE DOWN light, the SLACK CABLE light, and the Z-Z axis tape reading.

f. When a fuel assembly is entering or coming out of the core, jogging movement should be used.

g. The crane operator should maintain communications with other fueling stations at all times.

h. During periods of extended non-use, the gripper assembly is left in the engaged or closed position.

i. Only the Refueling SRO may authorize the use of interlock bypasses.

6. In-Mast Sipping (IMS) of Fuel Assemblies

a. Fuel sipping is a process of identifying leaking fuel assemblies by detecting gaseous fission products which have escaped from breached irradiated fuel rods.

QUESTION NUMBER: 73
TIER/GROUP: ***RO*** 1/3 ***SRO*** 1/3
K/A: 036 2.2.28

Knowledge of new and spent fuel movement procedures (Fuel Handling Accident).

K/A IMPORTANCE: ***RO*** 2.6 ***SRO*** 3.5
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: AOP-028-01

STATE the purpose of AOP-028.

REFERENCES: AOP-028

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number AOP-028-01 004

JUSTIFICATION:

a. Plausible since this event could result in increased radiation levels, but AOP-028 specifically addresses this condition.

b. Plausible since this event could result in release, but AOP-028 specifically addresses this condition.

c. Plausible since this event could occur while refueling, but AOP-028 specifically addresses this condition.

d. **CORRECT** Entry conditions for AOP-028 include cask drop when loaded with spent fuel in dry shielded canister.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of the entry conditions / purpose of AOPs

REFERENCES SUPPLIED:

*74.

Given the following conditions:

- The unit is operating at 50% power.
- PZR level transmitter 1-RC-LT-460 (channel II) failed low and was removed from service.
- The PZR high level Reactor Trip and low level Annunciator bistables associated with 1-RC-LT-460 were placed in the TRIPPED condition.
- PZR level channel selector switch 1-RC-LM-459 was selected to Position 2, Channel 1 upper, Channel 3 lower position.

Which ONE (1) of the following describes the function provided by PZR level transmitter 1-RC-LT-461 under these conditions?

a. Energizes the backup heaters on a high level deviation.

b. Decreases charging flow on an increasing level.

c. De-energizes the proportional and backup heaters on a low level.

d. Automatically closes 1-CH-LCV-1460A on a low level.

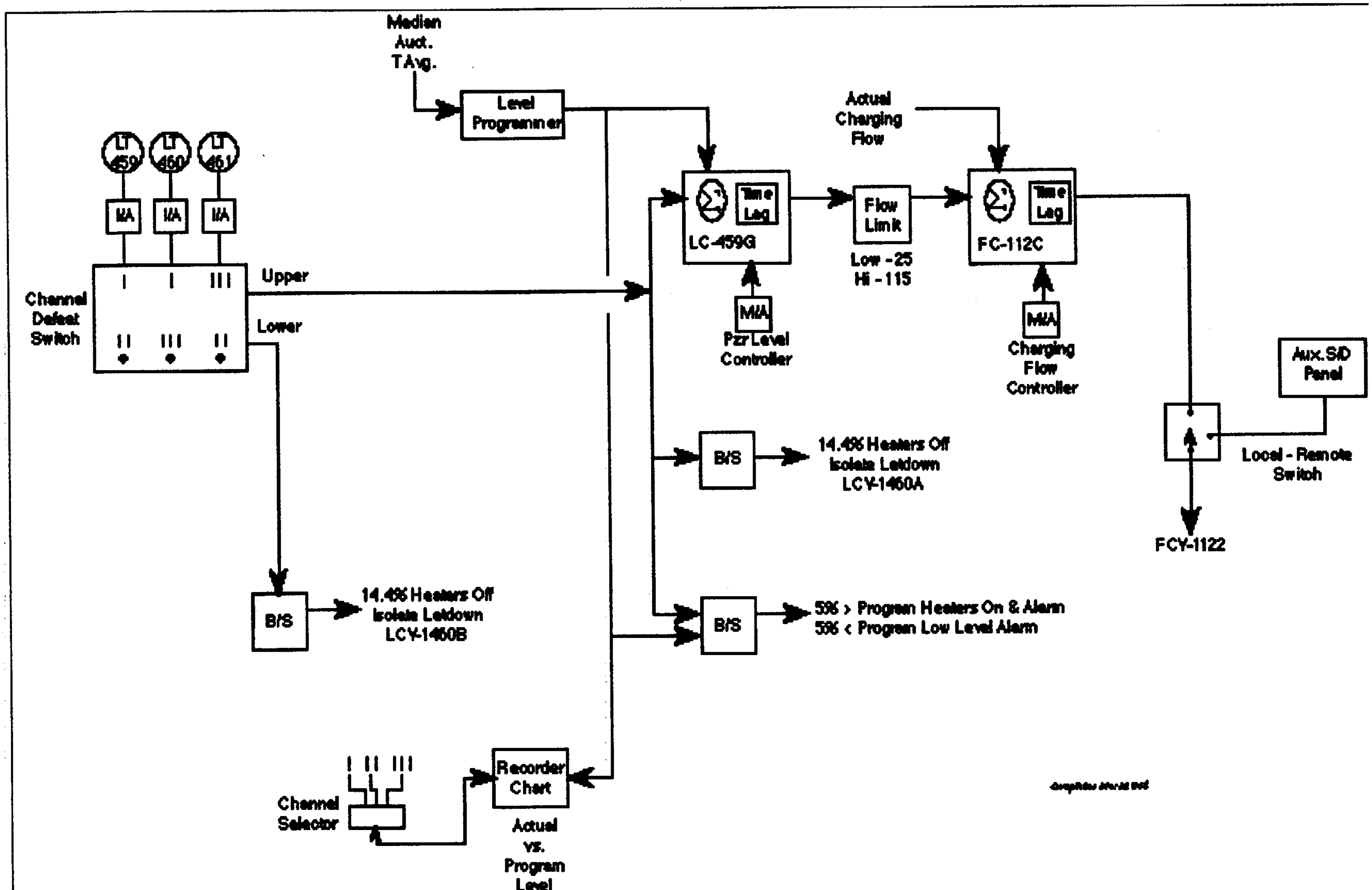
ANSWER: c

Reference: ND-93.3-H/T-7.5.
Difference between Surry and Robinson: Changed to Surry Specific nomenclature and eliminated distractor (d) due to it being a correct answer also.

Justification:

Used Robinson justification for (a) and (b)

d. Plausible since lower channel controls one letdown isolation valve (1-CH-LCV-1460B).



PZR LEVEL CONTROL

QUESTION NUMBER: 74
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 011K6.04

Knowledge of the effect of a loss or malfunction on the Operation of PZR level controllers

K/A IMPORTANCE: *RO* 3.1 *SRO* 3.1
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: PZR-08

EXPLAIN the component operation associated with each switch position for the PZR and PRT System switches and controls.

REFERENCES:
AOP-025
SD-059
SD-011

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number PZR-07 003

JUSTIFICATION:

a. Plausible since LT-461 could perform this function if switch in 461 REPL 459 position, but this function is performed by LT-459 under these conditions.

b. Plausible since LT-461 could perform this function if switch in 461 REPL 459 position, but this function is performed by LT-459 under these conditions.

c. **CORRECT** LT-461 performs all functions normally performed by LT-460. This includes isolating letdown and deenergizing all heaters on a low level. Input to RPS is independent of control switch position.

d. Plausible since 2/3 high levels would trip the reactor if above P-7, but plant is below 10% power.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of the Pressurizer Level Control system design attributes

REFERENCES SUPPLIED:

*75.

Given the following conditions:

- Reactor power was initially 100%.
- All CC flow has been lost to the RCPs and a reactor trip has been initiated.

Which ONE (1) of the following nuclear instrument indications would warrant entry into FR-S.1, "Response to Nuclear Power Generation/ATWS?"

a. Intermediate range startup rate is +0.1 dpm.

b. Power range indicates 3% and decreasing.

c. Source range startup rate is +0.1 dpm.

d. **NEITHER** source range channel is energized and intermediate startup rate is -0.1 dpm.

ANSWER: a

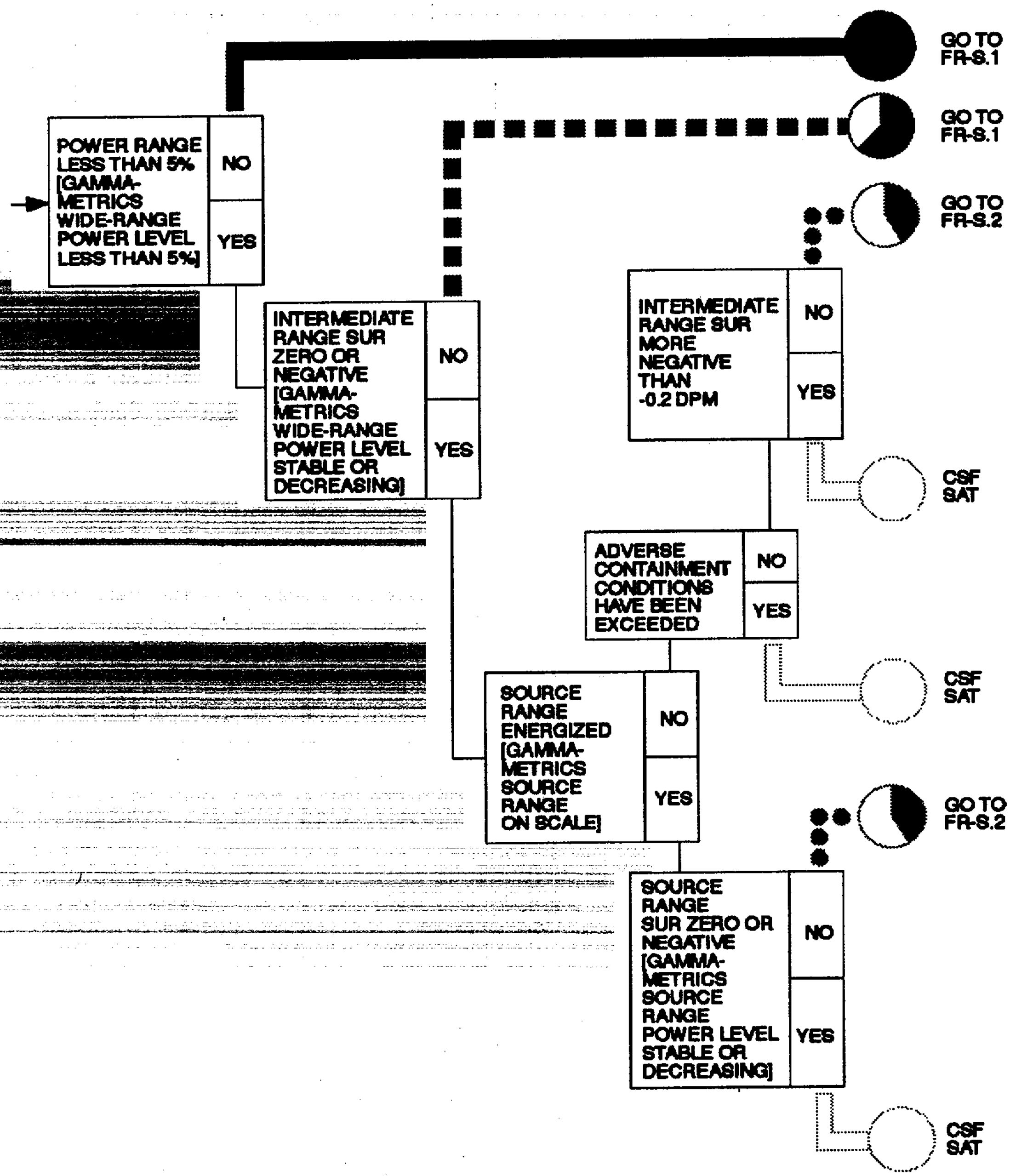
Reference: CSF Status Tree F-1.
Difference between Surry and Robinson: Changed to Surry Specific nomenclature and change SUR to .1 for both IR and SR. This alleviates 401-9 comment of RO applicability.

Justification:

N/A

Number:	Title:	Revision:
F-1	SUBCRITICALITY	2

NOTE: IF adverse Containment conditions have been exceeded, THEN the Gamma-Metrics Excore Neutron Monitor system (Source and Wide Ranges) should be used to monitor neutron flux for the duration of the event.



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SNSOC CHAIRMAN

DATE

QUESTION NUMBER: 75
TIER/GROUP: ***RO*** 1/2 ***SRO*** 1/1
K/A: 029EA2.01

Ability to determine or interpret the following as they apply to a ATWS: Reactor nuclear instrumentation

K/A IMPORTANCE: ***RO*** 4.4 ***SRO*** 4.7
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: FRP-S.1-02

RECOGNIZE the selected entry level conditions of FRP-S.1.

REFERENCES: CSFST

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number FRP-S.1-02 005

JUSTIFICATION:

a. **CORRECT** Either the PR instruments indicating > 5% (RED) or the IR instruments indicating a SUR > 0.0 dpm (ORANGE) would require entry into FRP-S.1.

b. Plausible since excessive power range level indicates that the reactor is not tripped, but power range is below the 5% level which warrants enty into FRP-S.1.

c. Plausible since source range startup rate is greater than 0.0 and CSF-1 is not satisfied, but entry into FRP-S.2 vice S.1 is warranted.

d. Plausible since with the source range not energized and intermediate range startup rate less negative than -0.2 dpm and CSF-1 is not satisfied, but entry into FRP-S.2 vice S.1 is warranted.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of the entry conditions for FRPs

REFERENCES SUPPLIED:

*76.

Given the following plant conditions:

- Control Rod P-6 dropped into the core from 100% power.
- Unit 1 reactor power is presently at 70% after ramping following the dropped rod.
- The operating team has completed the ICCE brief and is ready to commence withdrawal of Control Rod P-6.
- The time since the rod dropped is 2 hours.

Which ONE (1) of the following identifies the maximum rod withdrawal rate while recovering the dropped rod?

a. 72 steps per minute.

b. 48 steps per minute.

c. 3 steps per hour.

d. 2 steps per hour.

ANSWER: b

Reference: AP-1.01, Caution prior to Step 17.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since maximum auto withdrawal rate is 72 steps per minute.

b. Correct Answer, since time is less than 12 hours.

c. Plausible, since it would be correct hour if time was greater than 12 hours and candidate rounded up on 2/P calculation.

d. Plausible, since it would be correct hour if time was greater than 12 hours and candidate rounded down on 2/P calculation.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. ___TRANSFER ROD CONT MODE SEL SWITCH TO AFFECTED BANK

15. ___ALIGN LIFT COIL DISCONNECT SWITCHES FOR AFFECTED BANK:

    a) Place all disconnect switches to OPEN position

    b) Place affected rod disconnect switch to CLOSE position

    c) Have alignment of disconnect switches independently verified

16. ___RECORD BANK POSITION OF AFFECTED ROD:

    • Group 1 Step Counter:___________

    • Group 2 Step Counter:___________

* *

CAUTION: • The affected withdrawal rate during realignment is limited to 2/P (P=fraction of Core Power where 100% power is equal to 1.0) steps per hour if affected rod remains misaligned for more than 12 hours or the duration of misalignment can NOT be determined.

• The withdrawal rate limitation may be relaxed with authorization from the Reactor Engineer or Nuclear Analysis and Fuels.

* *

17. ___RECORD THE FOLLOWING:

    • Reactor power:___________

    • Withdrawal rate:___________

QUESTION NUMBER: 76
TIER/GROUP: *RO* 2/1 *SRO*
K/A: 001A1.06

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: Reactor power

K/A IMPORTANCE: *RO* 4.1 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: GP-005-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in GP-005 by explaining the basis of each.

REFERENCES: GP-005

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number GP-005-07 003

JUSTIFICATION:

a. Plausible since this is the largest change, but changes of this magnitude are expected and acceptable while synchronizing the generator to the grid.

b. Plausible since this is the largest non-step change (5.6%), but limitations only apply above 50% power.

c. CORRECT Power ramp rate limitations are 3.5% per hour between 50% and 100%. This would be a 3.8% change over a 1-hour period.

d. Plausible since this exceeds the previous limitation of 3% per hour (3.2%) and is at the highest given power level, but the limit is 3.5% per hour.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of the power ramp rate limitations

REFERENCES SUPPLIED:

*77.

Which ONE (1) of the following can **NOT** supply a direct suction source of water to the Auxiliary Feedwater Pumps?

a. 1-CN-TK-1, 110,000 Gallon Aboveground Emergency Condensate Storage Tank.

b. 1-CN-TK-2, 300,000 Gallon Normal Condensate Storage Makeup Tank.

c. 1-CN-TK-3, 100,000 Gallon Horizontal Emergency Makeup Tank via the AFW Booster Pumps.

d. Fire Main.

ANSWER: b

Reference: ND-89.3-H/T-4.2
Difference between Surry and Robinson: Revised to use Surry Specific sources of AFW.

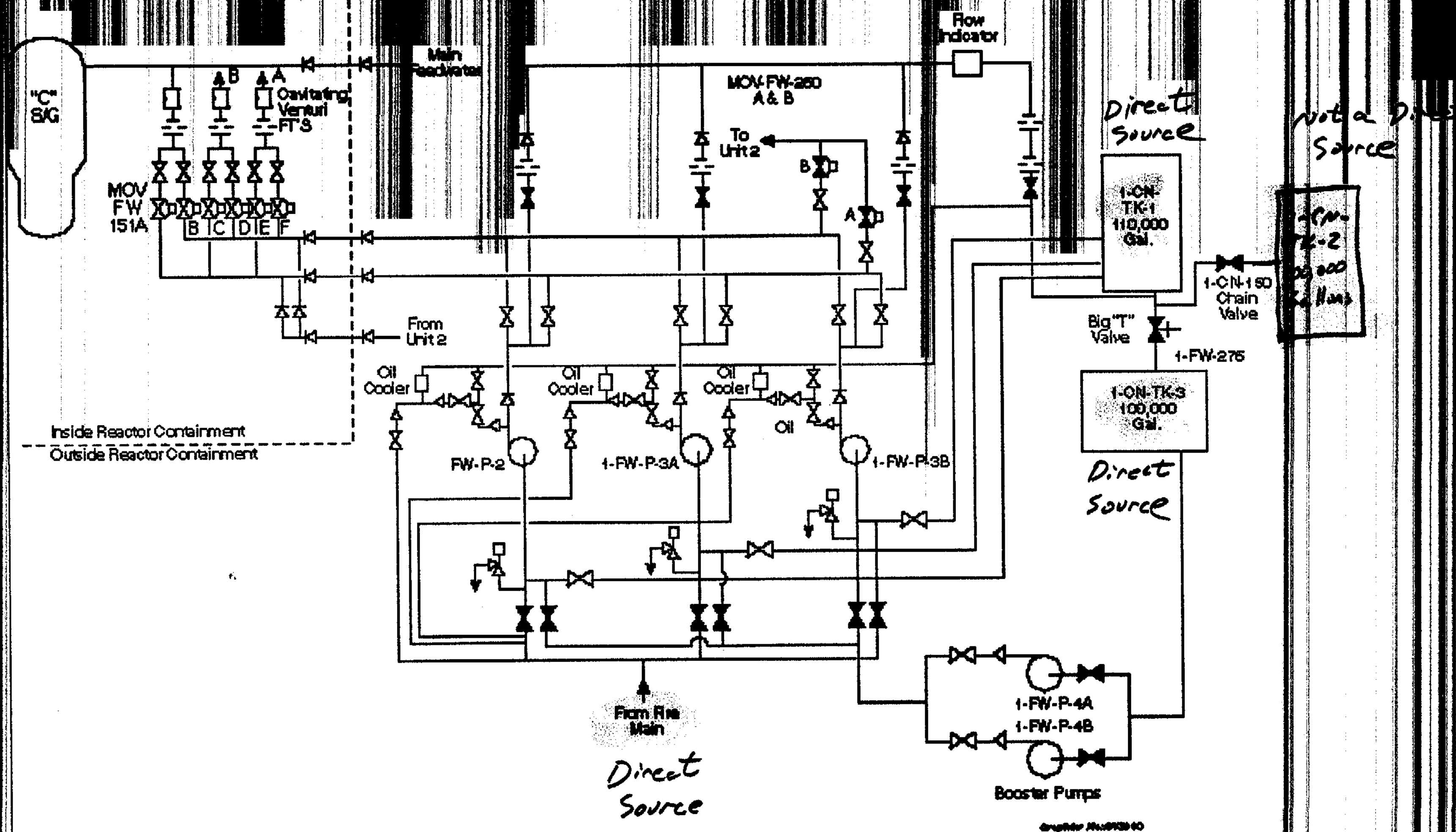
Justification:

a. Plausible, but supplies direct suction to AFW pumps.

b. Correct Answer – supplies makeup to AFW tanks but not directly to AFW Pump suction.

c. Plausible, but supplies direct suction to AFW pumps.

d. Plausible, but supplies direct suction to AFW pumps.



AUXILIARY FEEDWATER SYSTEM

QUESTION NUMBER: 77
TIER/GROUP: ***RO*** 2/1 ***SRO***
K/A: 061K1.07

Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: Emergency water source

K/A IMPORTANCE: ***RO*** 3.6 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 4 ***55.43(b) SRO***

OBJECTIVE: AFW-05

DESCRIBE the performance and design attributes of the major AFW System components.

REFERENCES: EPP-Foldout A
OP-402

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number AFW-02 002

JUSTIFICATION:

a. **CORRECT** Both Service Water and Deepwell water can be used with Service Water being the preferred backup source.

b. Plausible since Service Water is the preferred backup source, but Fire Water is not a backup source.

c. Plausible since both Service Water and Deepwell water can be used, but Service Water is the preferred backup source.

d. Plausible since Service Water is a backup source, but Fire Water is not a backup source.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of backup water supplies to AFW

REFERENCES SUPPLIED:

*78.

Given the following conditions:

- A turbine governor valve failed shut reducing power from 100% to 70% power.
- RCS Tavg is 567°F.
- PZR Pressure is 2265 psig.
- PZR Level is 51%.

Which ONE (1) of the following describes the expected condition of the proportional heaters and pressurizer spray valves?

	PROPORTIONAL HEATERS	SPRAY VALVES
a.	On	Open
b.	On	Closed
c.	Off	Open
d.	Off	Closed

ANSWER: c

Reference: ND-93.3-H/T-5.4; ND-93.3-LP-7, page 5 and H/T-7.3.
Difference between Surry and Robinson: Changed initial power reduction methods. Surry does not have a runback to 70%. Changed correct answer to (c). This answer is correct for Surry parameters and operation.

Justification:

Answer changed due to different system operation; same configuration. Distractors used for same reason.

PRESSURE CONTROL SETPOINTS

PT-445 Pressurizer Pressure Control

PSIG	Function
2335	PCV-1456 PORV Operation
2310	High Pressure Alarm
2205 (2210 - Unit 2)	Low Pressure Alarm

PT-444 Master Controller Output Pressure Control

% Controller Output	* Ref. Pressure, psig*	Function
75	2335	PCV-1455C PORV Operation
68.75	2310	High Pressure Alarm
67.5	2305	Spray Valves Open
55	2255	Spray Valves Start Open
53.75	2250	Proportional Heaters Off
50	2235	NOP
46.25	2220	Proportional Heaters Full On
43.8	2210	Backup Heaters On/Off

* The numbers listed in this column are not actual pressures, but a relative signal of a comparator using a pressure reference setpoint signal of 2235% of controller output.

Refer to/display H/T-7.5, Pzr Level Control.

3. The three hot-calibrated level transmitters have the protection circuitry portion separated from the control portion by **Isolation amplifiers.**

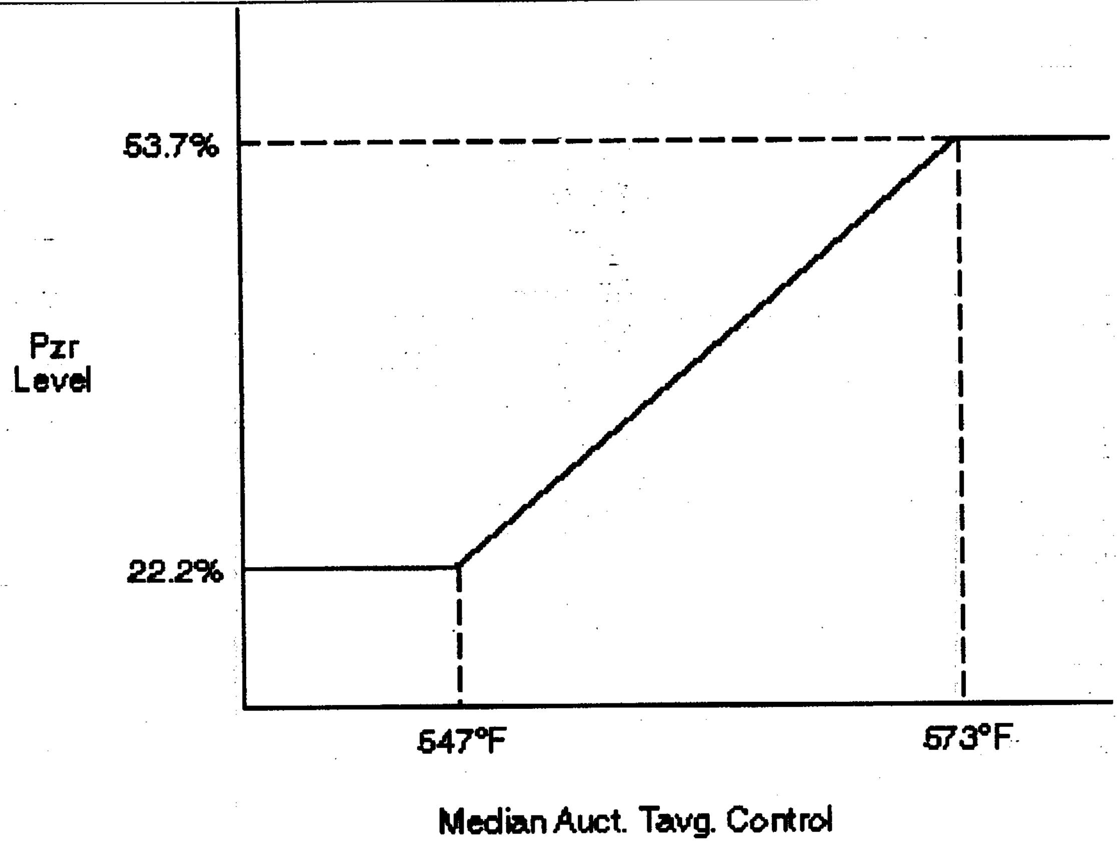
4. The three level input signals are routed into the **Channel Defeat Switch**. This switch, located on the vertical section of benchboard 1-1, provides the flexibility of defeating any one of these three signals. The outputs of the defeat switch are transmitted to either the upper or lower control channels.

5. The selected **lower control channel** provides signal input to a bistable for **isolating letdown and tripping the pzr heaters.** When the selected lower control channel reaches **< or = 14.4%**, the letdown isolation valve, **LCV-1460B**, is **closed** and all pzr heater groups are tripped. These actions are performed to conserve RCS inventory and to prevent heater burnout due to becoming uncovered.

6. The **upper control channel** is provided for input to the level controlling section. This selected signal provides input to another bistable for **isolating letdown and tripping the pzr heaters.** This bistable also actuates at **< or = 14.4%**. However, the letdown isolation valve that it **closes** is **LCV-1460A**.

7. The **high and low level alarms** (control, not protection) are actuated from this upper channel.

   a. At **5% > programmed level**, the **"HIGH LEVEL HEATERS ON" alarm** sounds and **heaters are energized** to heat the water coming into the pressurizer.



PRESSURIZER LEVEL PROGRAM

QUESTION NUMBER: 78
TIER/GROUP: *RO* 1/1 *SRO*
K/A: 027AK2.03

Knowledge of the interrelations between the Pressurizer Pressure Control Controllers and positioners

K/A IMPORTANCE: *RO* 2.6 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: PZR-09

EXPLAIN the normal operation of the PZR and PRT control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: SD-059

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number AOP-019-08 002

JUSTIFICATION:

a. CORRECT Heaters are on due to level being more than 5% above program and sprays are open due to a high deviation signal of more than 25 psid.

b. Plausible since heaters are on due to being more than 5% above program, but sprays should be open due to a high deviation signal of more than 25 psid.

c. Plausible since sprays are open due to a high deviation signal of more than 25 psid, but heaters should be on due to being more than 5% above program.

d. Plausible since heaters would normally be expected to be off due to the high pressure condition, but should be on due to level deviation.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of effect of conflicting conditions for heater and spray operation

REFERENCES SUPPLIED:

*79.

Following an accident, FR-C.2, "Response to Degraded Core Cooling," is being implemented.

After the performance of several steps in FR-C.2, the following Critical Safety Function Status Tree (CSFST) conditions are noted:

- Integrity - RED
- Core Cooling - RED
- Containment - ORANGE
- Heat Sink - YELLOW
- Subcriticality - YELLOW
- Inventory – YELLOW

Which ONE (1) of the following describes which action should be taken by the Operating Team?

a. Remain in FR-C.2, "Response to Degraded Core Cooling," until completion and then recheck the CSFSTs.

b. Transition to FR-C.1, "Response to Inadequate Core Cooling," due to the RED condition on Core Cooling.

c. Transition to FR-P.1, "Response to Imminent Pressurized Thermal Shock," due to the RED condition on Integrity.

d. Transition to FR-Z.1, "Response to High Containment Pressure," due to the ORANGE condition on Containment.

ANSWER: b

Reference: ND-95.3-LP-26, pages 12 and 15.
Difference between Surry and Robinson: Changed CRSS to Operating Team. Changed FRP to FR. Changed FRP-J.1 to FR-Z.1 with same title.

Justification:

N/A

D. Prioritization of Challenges

1. Having prioritized the CSFs, the challenges must be prioritized within each CSF and between the CSFs. The status tree decision points are arranged so that decisions result in conditions being arranged in descending order.

2. If during the performance of any <u>RED-path</u> FR, **a <u>RED</u> path** of **<u>higher priority</u>** arises, then the **higher priority condition should be addressed first**, and the **lower priority <u>RED-path</u> FR suspended**.

3. [illegible] **or higher priority <u>ORANGE</u> condition** arises, then the **RED or higher priority ORANGE** [illegible]

4. Once a FR is entered due to a RED or ORANGE condition, **that FR is to be <u>performed to completion</u>, unless preempted by some higher priority condition.** It is expected that the actions in the FR will clear the RED or ORANGE condition before all operator actions are complete. However, these guidelines should be performed to the point of the defined transition to a specific guideline or to the "procedure and step in effect."

E. Initiation of CSFST Monitoring

1. Without transition from E-0.

   If the team has SI'd and progressed through E-0 without transition to another procedure, step 25 will direct monitoring of the status trees.

Review the color coding scheme with the trainees by questioning what priority each color represents:

- RED - Extreme challenge
- ORANGE - Severe challenge
- YELLOW - CSF Not satisfied (operator discretion)
- GREEN – CSF satisfied

Review the priority of CSFs by asking trainees to give them in order one at a time:

- Subcriticality
- Core Cooling
- Heat Sink
- Integrity
- Containment
- Inventory

Ask trainees the following questions:

- Is a RED path for core cooling higher priority than a RED path for Containment?Yes
- Is an ORANGE path on subcriticality a higher path than a RED path on containment?No

QUESTION NUMBER: 79
TIER/GROUP: *RO* 3 *SRO*
K/A: 2.4.22

Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.

K/A IMPORTANCE: *RO* 3.0 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: OMM-022-09

DETERMINE the different flowpaths generated by OMM-022.

REFERENCES: OMM-022

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number NEW

JUSTIFICATION:

a. Plausible since FRP-C.2 is being performed in response to an ORANGE path on Core Cooling, but FRP-C.1 has additional actions which will need to be performed in response to the worsening condition.

b. CORRECT The highest RED path should be addressed first and Core Cooling has a higher priority than Integrity.

c. Plausible since Integrity is a RED path, but Core Cooling has a higher priority.

d. Plausible if a misconception exists that ORANGE paths are a higher priority, but the highest priority are RED paths.

DIFFICULTY:
Comprehensive/Analysis [X] *Knowledge/Recall* [ ] *Rating* 3

Evaluation of CSFST to determine highest priority

REFERENCES SUPPLIED:

*80.

The following events and actions occurred on Unit 1 in order:

- An unisolable Main Steam Line Break occurred on "A" S/G.
- Auxiliary Feedwater was isolated to "A" S/G.
- AMSAC has been reset to allow securing the Turbine-Driven Auxiliary Feedwater Pump.
- A Safety Injection has just initiated due to the Steam Line Break.
- An AFW MOV open signal is generated when SI is initiated.

Which ONE (1) of the following describes the actions required to close the "A" S/G AFW MOVs?

a. No action is required. The "A" S/G AFW MOVs will remain closed due to "A" S/G low pressure.

b. Immediately place both AFW MOV control switches in the closed position and release. Observe valve position indication until both valves are fully closed.

c. Wait until the valves are full open, then place and hold both AFW MOV control switches in the closed position until valves are fully closed.

d. Wait until the valves are full open then place both AFW MOV control switches in the closed position and release. Observe valve position indication until both valves are fully closed.

ANSWER: c

Reference: ND-89.3-LP-4
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since it is logical to maintain FW isolated to a faulted S/G.

b. Plausible, because many MOV control circuits allow changing valve direction in mid-stroke.

c. Correct Answer. Operator must wait until valve is full open before closing valve. Switches must be held in the close position since these valves are throttleable.

d. Plausible, but switches must be held in the close position since these valves are throttleable.

8. MOV-FW-151A-F

Six, normally open MOVs are located inside containment to control the aux feedwater flow to the S/Gs and provide two parallel flowpaths for each. These valves are controlled from both the Aux Shutdown Panel and the MCR benchboard 1-2. They will automatically open when aux feed receives an auto-start signal. Following auto-[illegible], opening power is maintained for 45 seconds by a time delay relay, and the steam generator blowdown valves are automatically closed to conserve water in the S/Gs. The MOVs cannot be closed during this 45 second period. After the 45 second [illegible] times out, the MOVs can be manually closed using the control switch even [illegible]. Power supply is from 1H1-2 and 1J1-2, each powering one valve in the supply train to each S/G.

9. Flow transmitters

These flow transmitters provide indication of flow to each S/G in gpm. They are powered from vital buses 2 and 3 which is necessary to provide diversity of power supply.

10. Cavitating venturis

The cavitating venturis are designed to limit AFW runout flow to the loop which has been affected by a MSLB or MFLB inside containment. They permit the minimum required flow to the intact S/Gs necessary for core residual heat removal. They are designed to limit flow to the affected S/G to 350 gpm and permit 382 gpm to the intact S/Gs. This design was based on the loss of the TDAFW pump and the availability of both MDAFW pumps.

11. Radiation monitoring

QUESTION NUMBER: 80
TIER/GROUP: ***RO*** 2/1 ***SRO***
K/A: 061A3.03

Ability to monitor automatic operation of the AFW, including: AFW S/G level control on automatic start

K/A IMPORTANCE: ***RO*** 3.9 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 4 ***55.43(b) SRO***

OBJECTIVE: AFW-09

EXPLAIN the normal operation of the AFW control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: SD-042

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number AFW-10 023

JUSTIFICATION:

a. Plausible since FCV-1424 & 1425 are normally closed, but the valves do not fully open. When the pumps are started, the discharge flow control loops are energized and the valves throttle to maintain flow rate at the setpoint.

b. **CORRECT** The normally open valve FCV-6416 will throttle to maintain desired flow on a pump start.

c. Plausible since FCV-6416 does throttle to maintain desired flow, but it is normally open.

d. Plausible since FCV-1424 and FCV-1425 do throttle to maintain desired flow, but the valves are normally closed.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 3

Knowledge of AFW valve operation on startup

REFERENCES SUPPLIED:

*81.

Given the following conditions:

- The unit is operating at 100% power.
- Channel III PZR Pressure PT-457 is failed, with all bistables in the TRIPPED condition.
- An electrical fault occurs which results in a loss of Vital Bus 2.

Which ONE (1) of the following describes the impact that the loss of Vital Bus 2 has on the plant?

a. A reactor trip occurs and **BOTH** trains of Safety Injection initiate.

b. A reactor trip occurs, but **ONLY** Train "A" of Safety Injection initiates.

c. A reactor trip occurs, but **ONLY** Train "B" of Safety Injection initiates.

d. A reactor trip occurs, but **NO SI** occurs.

ANSWER: a

Reference: N/A
Difference between Surry and Robinson: Changed to Surry Specific terminology for Vital Bus and Safety Injection.

Justification:

N/A

QUESTION NUMBER: 81
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 013K2.01

Knowledge of bus power supplies to the ESFAS/safeguards equipment control

K/A IMPORTANCE: *RO* 3.6 *SRO* 3.8
10CFR55 CONTENT: *55.41(b) RO* 8 *55.43(b) SRO*

OBJECTIVE: ESF-06

LIST power supplies for the major ESFAS components as listed in the EDPs.

REFERENCES: SD-006
AOP-024

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number ESF-09 015

JUSTIFICATION:

a. Plausible since a reactor trip and SI will occur and train 'A' sequencer is powered by IB 7, but IB 7 gets power from IB2 so only train 'B' sequencer has power available.

b. Plausible since a reactor trip and SI will occur, but only train 'B' sequencer has power available.

c. **CORRECT** A loss of Instrument Bus 2 will cause 2/3 low pressure conditions which will generate a SI and reactor trip. Only train 'B' sequencer has power available since it is powered by IB 3 and train 'A' is powered by IB 7, which gets power from IB 2.

d. Plausible since a reactor trip will occur and some ESF functions, such as CV high pressure, require power to actuate, but low pressure goes to its tripped conditions and an SI will also occur.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 4

Analysis of the effect of multiple failures on the RPS and ESFAS

REFERENCES SUPPLIED:

*82.

Given the following conditions:

- Unit 1 is in Hot Shutdown.
- A loss of "F" Transfer Bus occurs.

Which ONE (1) of the following identifies plant equipment that is affected by the power loss?

a.
- 1-RC-P-1A, "A" Reactor Coolant Pump
- 1-FW-P-1A, "A" Main Feed Pump

b.
- 1-RC-P-1B, "B" Reactor Coolant Pump
- 1-FW-P-1B, "B" Main Feed Pump

c.
- 1-RC-P-1C, "C" Reactor Coolant Pump
- 1-FW-P-1B, "B" Main Feed Pump

d.
- 1-CN-P-1B, "B" Condensate Pump
- 1-FW-P-1A, "A" Main Feed Pump

ANSWER: c

Reference: ND-90.2-LP-2, pages 7 and 8, H/T-2.2.
Difference between Surry and Robinson: Changed for Surry Specific electric lineup.

Justification:

a. Plausible, if misconception exists that "F" Transfer Bus supplies "A" SS Bus, which supplies "A" RCP and MFP.

b. Plausible, if misconception exists that "F" Transfer Bus supplies "B" SS Bus, which supplies "B" RCP and one motor of "B" MFP.

c. Correct Answer. "F" Transfer Bus supplies "C" SS Bus, which supplies "C" RCP and one motor of "B" MFP.

d. Plausible, if misconception exists that "F" Transfer Bus supplies individual loads.

15C1 - supply from RSS

15C2 - supply from SS

[illegible]

15C4 - 1-CN-P-1C "C" CN

[illegible]

15C6 - 1-SD-P-1B "B" HP

15C7 - 4160/480v transformer feeder

15C8 - 1-BC-P-1B "B" BC

15C9 - 1-SD-P-2B "B" LP

15C10 - CN polish feeder

8. 480v bus loads

Ask trainee to explain the following designation as it is written on the board: 1A2-14A-1.

Answer: 1A2-14A-1, MCC is powered from Unit 1, A 480v bus, bus 2. It is MCC #1, the fourth breaker column, the top breaker, left hand breaker. The third breaker down in the first column would be labeled as 1A2-11C.

In general, the loads powered off of the 480v bus include MCCs, pzr heaters, motor driven fire pump, main transformer control power, and rod drive MG sets.

B. Load Shedding

To improve station voltage profiles and prevent overloading the RSS buses and feeders, an automatic Load Shed System is installed.

1. The system is controlled from a 2-position control switch in the Main Control Room.

Ask Trainees: Where is the load shed control switch located?

Refer to/display H/T-2.3, 4160v and 480 V Bus Loads.

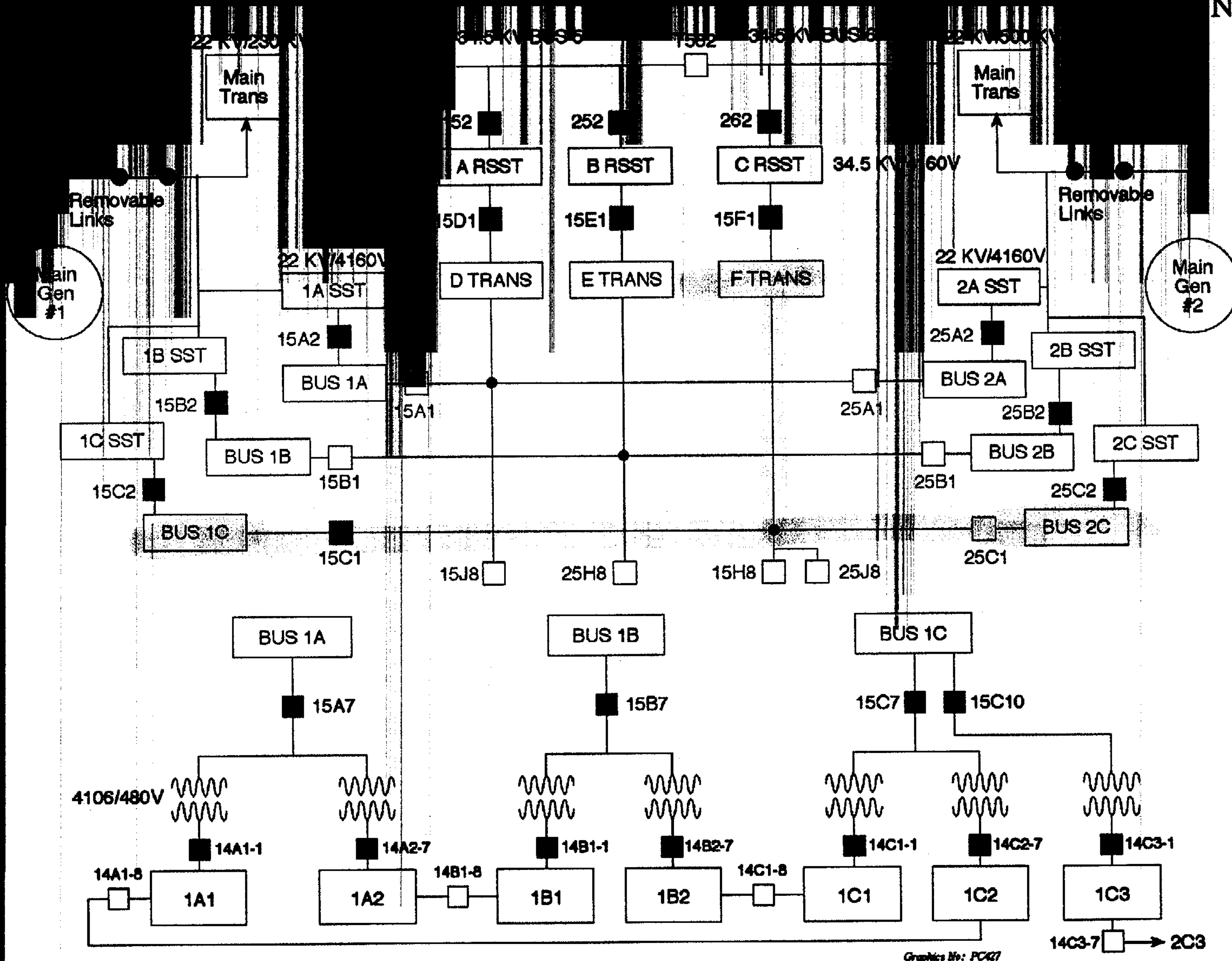
a. "A" 4160v station service bus

- 15A1 - supply from RSS
- 15A2 - supply from SS
- 15A3 - 1-RC-P-1A "A" RCP
- 15A4 - 1-CN-P-1A "A" CN
- 15A5 - 1-FW-P-1A "A" FW motor 1
- 15A6 - 1-FW-P-1A "A" FW motor 2
- 15A7- 4160/480 transformer feeder
- 15A8 – Spare
- 15A9 - 1-CD-Ref-1A Chill water unit
- 15A10 - 1-SD-P-2A "A" LP

b. "B" 4160v station service bus

- 15B1 - supply from RSS
- 15B2 - supply from SS
- 15B3 - 1-RC-P-1B "B" RCP
- 15B4 - 1-CN-P-1B "B" CN
- 15B5 - 1-FW-P-1B "B" FW motor 1
- 15B6 - 1-SD-P-1A "A" HP
- 15B7 - 4160/480v transformer feeder
- 15B8 - 1-BC-P-1A "A" BC
- 15B9 - 1-CD-REF-1B "B" chill water unit

c. 4160v station service bus loads



STATION SERVICE DISTRIBUTION

QUESTION NUMBER: 82
TIER/GROUP: ***RO*** 2/2 ***SRO*** 2/2
K/A: 062K2.01

Knowledge of bus power supplies to the Major system loads

K/A IMPORTANCE: ***RO*** 3.3 ***SRO*** 3.4
10CFR55 CONTENT: ***55.41(b) RO*** 3 ***55.43(b) SRO***

OBJECTIVE: KVAC-06

LIST power supplies for the major 230/4KV Electrical System components as listed in the EDPs.

REFERENCES: EDP-001

SOURCE: ***New*** ☐ ***Significantly Modified*** ☒ ***Direct*** ☐

Bank Number KVAC-06 003

JUSTIFICATION:

a. Plausible since these are both 'B' equipment, but the transformer is supplied by 4 KV Bus 1 and the RCP by Bus 4.

b. **CORRECT** Major loads supplied by 4 KV Bus 2 include Station Service Transformers 2A and 2F and RCP 'C'.

c. Plausible since the FWP is identified as 'B', but the FWP and transformer are both supplied by Bus 4.

d. Plausible since RCP 'C' is supplied by this Bus and the FWP is identified as 'B', but is supplied by Bus 4.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of major component power supplies

REFERENCES SUPPLIED:

*83.

Given the following plant conditions:

- A Large Break LOCA has occurred on Unit 1.
- 1-FR-Z.2, "Response to Containment Flooding," has been initiated due to high water level in Containment.

Which ONE (1) of the following pipe breaks would result in the highest water level inside Containment if the leakage cannot be isolated?

a. Component Cooling header to the Residual Heat Removal Heat Exchanger.

b. Service Water header to the "B" Recirc Spray Heat Exchanger.

c. Containment Primary Grade Water header.

d. Unit 2 RWST via the crosstie line.

ANSWER: b

Reference: ND-89.5-H/T-2.4; ND-88.5-H/T-1.2; ND-88.3-LP-9, page 4; ND-91-LP-2, page 20.
Difference between Surry and Robinson: NEW Question.

Justification:

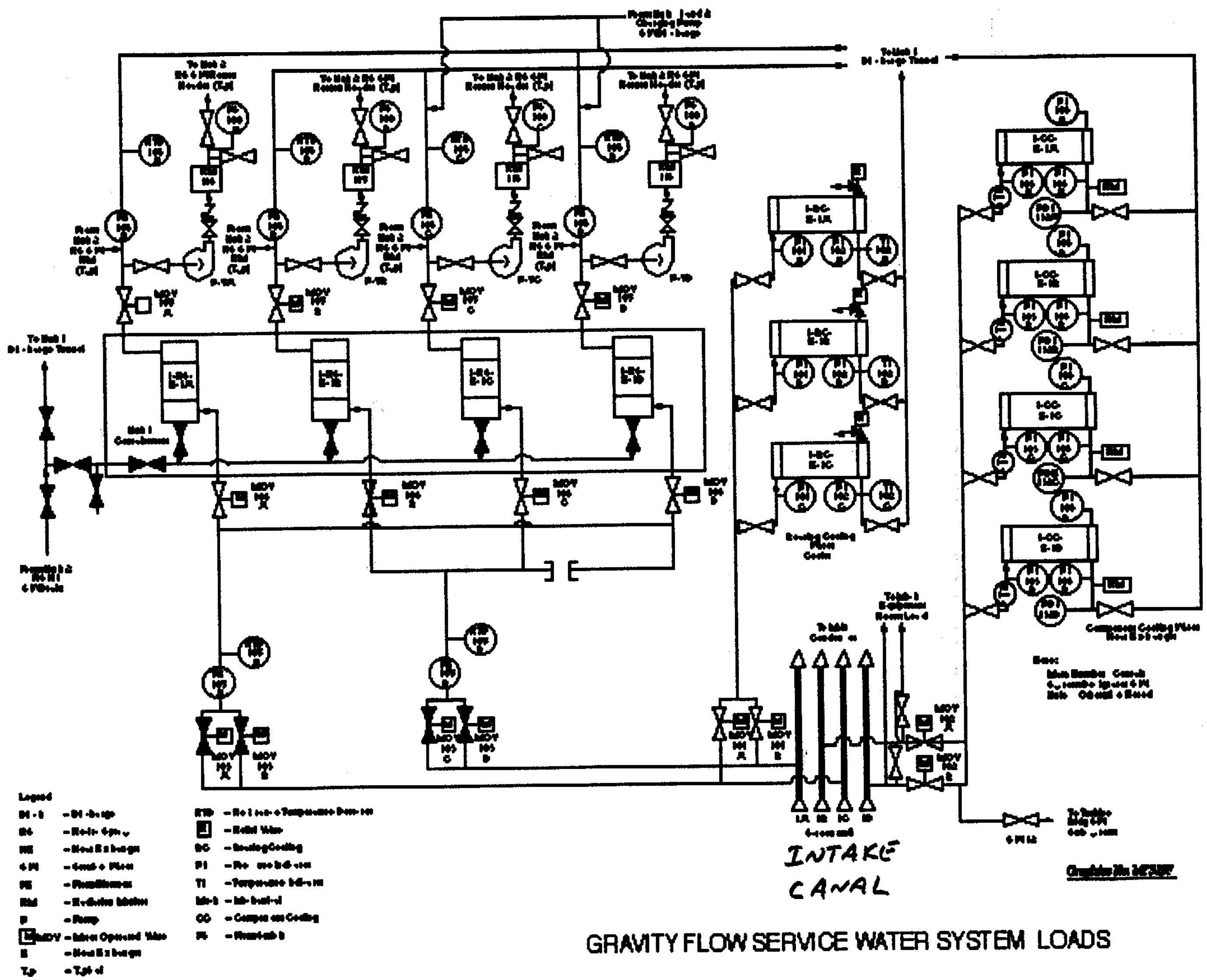
a. Plausible, since Component Cooling to the RHR Heat Exchangers is a large volume of water, but it is a closed system and will be depleted.

b. Correct Answer – RSHX Service Water is supplied by the Intake Canal, which is an endless supply of water.

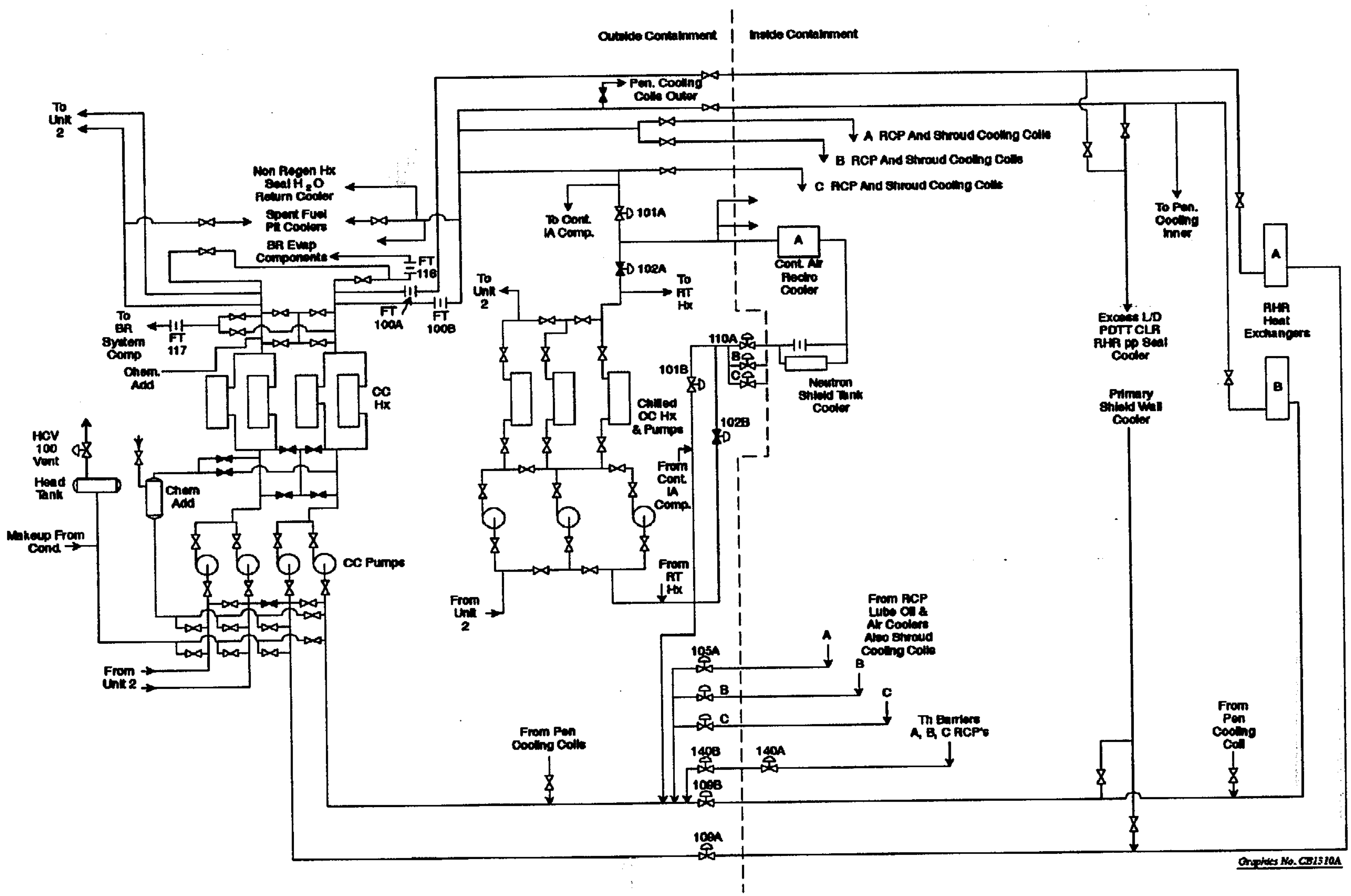
c. Plausible, since Primary Grade Water is a large volume of water (total capacity – 360,000 gallons), but it is a closed system and will be depleted.

d. Plausible, since the opposite Unit's RWST can be crosstied and the RWST is a large volume of water (minimum capacity – 387, 000 gallons), but it is a closed system and will be depleted.

ND-89.5-H/T-2.4



GRAVITY FLOW SERVICE WATER SYSTEM LOADS



COMPONENT COOLING FLOW DIAGRAM

1. The purpose of the PG Water System is to provide a clean source of makeup to various primary plant systems.

2. Normal System Lineup and Operation

Refer to/display H/T-9.2, Primary Grade Water System.

a. Two PG Water Tanks (1-PG-TK-1A, B)

(1) Common to both Units

(2) Capacity: 180,000 gallons each that are normally filled to 93%.

(3) Level indication provided locally and in the MCR (Boron Recovery Panel LI-BR-116A and B).

(4) Level annunciators:

(a) PRI WTR TK A HI LVL (BR-B9) at ≥ 95% increasing.

(b) WTR TK A LO LVL (BR-C9) at ≤ 29 % decreasing.

(c) PRI WTR TK B HI LVL (BR-B10) at ≥ 95% increasing.

(d) PRI WTR TK B LO LVL (BR-C10) at ≤ 29 % decreasing.

(5) Floating rubber diaphragm to minimize absorption of air.

(6) Heated by auxiliary steam via natural circulation heaters during freezing

10. An SI VALVE OUT OF POSITION alarm (A-D-4) is actuated when any one of the following occur:

a. Suction from RWST to LHSI pumps is not fully open (1862A & B)

b. Accumulator discharge valves is not fully open (1865A, B & C)

c. Charging pump discharge to hot leg is not fully closed (1869 A, & B)

d. LHSI pump recircs is not fully open (1885 A, B, C, D)

e. RMT initiated blocks this alarm.

D. Technical Specifications

1. Purpose - defines the conditions for the SI System necessary to provide sufficient borated cooling water to remove decay heat from the core in emergency situations.

2. The Reactor cannot be made critical unless:

a. The RWST is operable with:

(1) A contained borated water volume of at least 387,100 gallons.

(2) A boron concentration of at least 2300 ppm but not greater than 2500 ppm.

(3) A maximum solution temperature of 45°F.

QUESTION NUMBER: 83

TIER/GROUP: *RO* 1/3 *SRO* 1/3

K/A: WE15EK3.1

Knowledge of the reasons for the following responses as they apply to the (Containment Flooding) Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes

K/A IMPORTANCE: *RO* 2.7 *SRO* 2.9

10CFR55 CONTENT: *55.41(b) RO* 9 *55.43(b) SRO*

OBJECTIVE: AOP-032-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in AOP-032 by explaining the basis of each.

REFERENCES: AOP-032

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number AOP-032-03 002

JUSTIFICATION:

a. Plausible since some safeguards equipment is located inside containment, but concern is dilution of LOCA water.

b. Plausible since fire water is much colder than the vessel, but thermal stresses on the vessel are an internal stress concern.

c. Plausible since some instruments may be affected, but the qualified post-accident instruments are designed to be in an adverse environment.

d. CORRECT Safeguards equipment will not be affected, but the water needs to be removed from the sump since it represents an unanalyzed condition that would dilute LOCA water before a sump recirc condition.

DIFFICULTY:

Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of basis for actions contained in EPPs

REFERENCES SUPPLIED:

*84.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- A fault on the "B" DC bus initiates a loss of "B" DC bus.

Which ONE (1) of the following is NOT an action that occurs due to the loss of the "B" DC bus?

a. The reactor trips due to loss of power to "B" reactor trip breaker undervoltage coil.

b. #3 EDG auto-starts due to loss of power to the undervoltage detection circuit.

c. Annunciators F through K are de-energized due to loss of power to control circuit.

d. 4KV breakers on "B" Station Service Bus lose control power.

ANSWER: c

Reference: ND-90.3-LP-6.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, but this is an action that occurs on a loss of "B" DC bus.

b. Plausible, but this is an action that occurs on a loss of "B" DC bus.

c. Correct Answer. This used to occur on loss of "B" DC bus, but is no longer a result since the new annunciator system was installed.

d. Plausible, but this is an action that occurs on a loss of "B" DC bus.

locally-manually opening the local valve with the lever inside the break-glass station.

Ask trainees: Why isn't a HI-HI CLS initiated from this event? Answer: HI-HI CLS is an energize to function relay.

2. Major effects from loss of "B" DC bus.

a. The reactor will trip on loss of voltage to "B" reactor trip bkr UV coil. The turbine trips because the manual Rx trip energizes AST-1. MG-2 control power is lost.

b. Generator output breakers will **NOT AUTOMATICALLY OPEN** following the turbine trip. The output breakers must be manually opened by the operator on the board (Generator trips come from the "B" DC bus).
The field breaker will not trip automatically due to the failure of the auto generator trip failure. However, it can be tripped from the MCR once the generator output breakers are opened.

INSTRUCTOR NOTE: Emphasize when the exciter field breaker is opened the "B" and "C" SS busses will be de-energized.

This will cause potential header/line SI concerns on the "B" and "C" SGs, a loss of BC and a loss of all components on these two busses.

NOTE: ANYTIME THE GENERATOR BREAKERS MUST BE MANUALLY OPENED THE FIELD BREAKER SHOULD BE OPENED AS WELL. THIS HAS BEEN A RE-OCCURRING LORP WEAKNESS.

c. #3 EDG starts automatically but no control power exists for output breaker.

d. No control power for "E" & "F" transfer buses and "B" & "C" Station Service buses. Again the buses will coastdown with the turbine. Loss of "B" & "C" RCP may result in spray flow from the "A" spray valve being ineffective but auxiliary spray is available.

e. "B" train of SI, Hi CLS, and Hi Hi CLS relays de-energize. High CLS train "B" only initiates due to it being a de-energize to function system.

f. Main, Station, and Reserve Station Service Protection relays lost power, Main Generator trip circuits inoperable.

g. TDAFWP SOV-MS-102B opens, all Main FRVs and bypass valves go closed. "B" MFP, "B" Main Condensate Pump, "B" LP HTR DRN PP, and "A" and "B" HP HTR DRN PP will all lose control power, in addition the HPD level trip/start circuit will be de-energized.

h. Steam dumps are inoperable.

i. "B" and "C" SG PORV indicating lights are lost. Once "B" and "C" RCPs are lost the "A" RCP will cause reverse flow in those loops. All heat removal from the RCS will be through the "A" SG PORV and it will be fully open for a time following the reactor trip.

j. "B" CC pump will have no control power.

k. Makeup to VCT is disabled, charging pump suctions will need to be swapped to the RWST. Control power to 1-CH-P-1B & 1C (alt. feeder).

l. One PRZR PORV (1-RC-PCV-1456) will not operate due to loss of power to the DC solenoids. One set of indicating lights for both PORVs is lost.

QUESTION NUMBER: 84
TIER/GROUP: ***RO*** 2/2 ***SRO*** 2/1
K/A: 063 2.1.32

Ability to explain and apply all system limits and precautions (DC Electrical).

K/A IMPORTANCE: ***RO*** 3.4 ***SRO*** 3.8
10CFR55 CONTENT: ***55.41(b) RO*** 7 ***55.43(b) SRO***

OBJECTIVE: DC-10

EXPLAIN the operation of the DC Electrical System.

REFERENCES: OP-601

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number DC-10 003

JUSTIFICATION:

a. CORRECT Due to the power transient a momentary signal may be generated which results in a turbine runback signal.

b. Plausible since the concern is that a momentary signal may be generated due to the power transient, but it would affect the runback circuitry.

c. Plausible since a power transient may occur which could cause a trip of a breaker, but concern is that a momentary runback signal would be generated.

d. Plausible since a power transient may occur which could cause a trip of a breaker, but concern is that a momentary runback signal would be generated.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of basis for actions taken in System Operating Procedures

REFERENCES SUPPLIED:

*85.

Which ONE (1) of the following describes the correct lineup and operation of the Liquid Waste System?

a. Both High Level Waste Tank Pumps can take suction on both High Level Waste Tanks through a suction crosstie valve and trip off on high level in the High Level Waste Tanks.

b. Both High Level Waste Tank Pumps can take suction on both High Level Waste Tanks through a suction crosstie valve and trip off on low level in the High Level Waste Tanks.

c. The High Level Waste Tank Pumps can take suction on either the High Level Waste Tank or the Low Level Waste Tank through suction line crosstie valves and trip off on high level in the High Level or Low Level Waste Tanks.

d. The High Level Waste Tank Pumps can take suction on either the High Level Waste Tank or the Low Level Waste Tank through suction line crosstie valves and trip off on low level in the High Level or Low Level Waste Tanks.

ANSWER: b

Reference: ND-92.4-LP-1, page 31 and H/T-1.8.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since the tanks lines to the pumps suction are crosstied, but the pump will trip on low level and not high level.

b. Correct Answer. Tank/Pump suctions are normally crosstied and pump trips on low level.

c. Plausible, since the HLWT to high level pump suction is crosstied and the LLWT to low level pump suction is crosstied, but the HL pumps cannot take suction on the LLWT.

d. Plausible, since the HLWT to high level pump suction is crosstied and the LLWT to low level pump suction is crosstied, but the HL pumps cannot take suction on the LLWT.

- S/G Recirc and Transfer system
- Decon Building Resin Mix Tank

f. The LW headers are designed so that the incoming fluids from the various sumps can be directed to either LW header.

Redisplay H/T-1.8, Liquid Waste System Diagram.

g. Low Level LW

(1) There are two LLLW tanks (1-LW-TK-3A/3B) located behind high rad gate #9, each with a capacity of 1833 gallons.

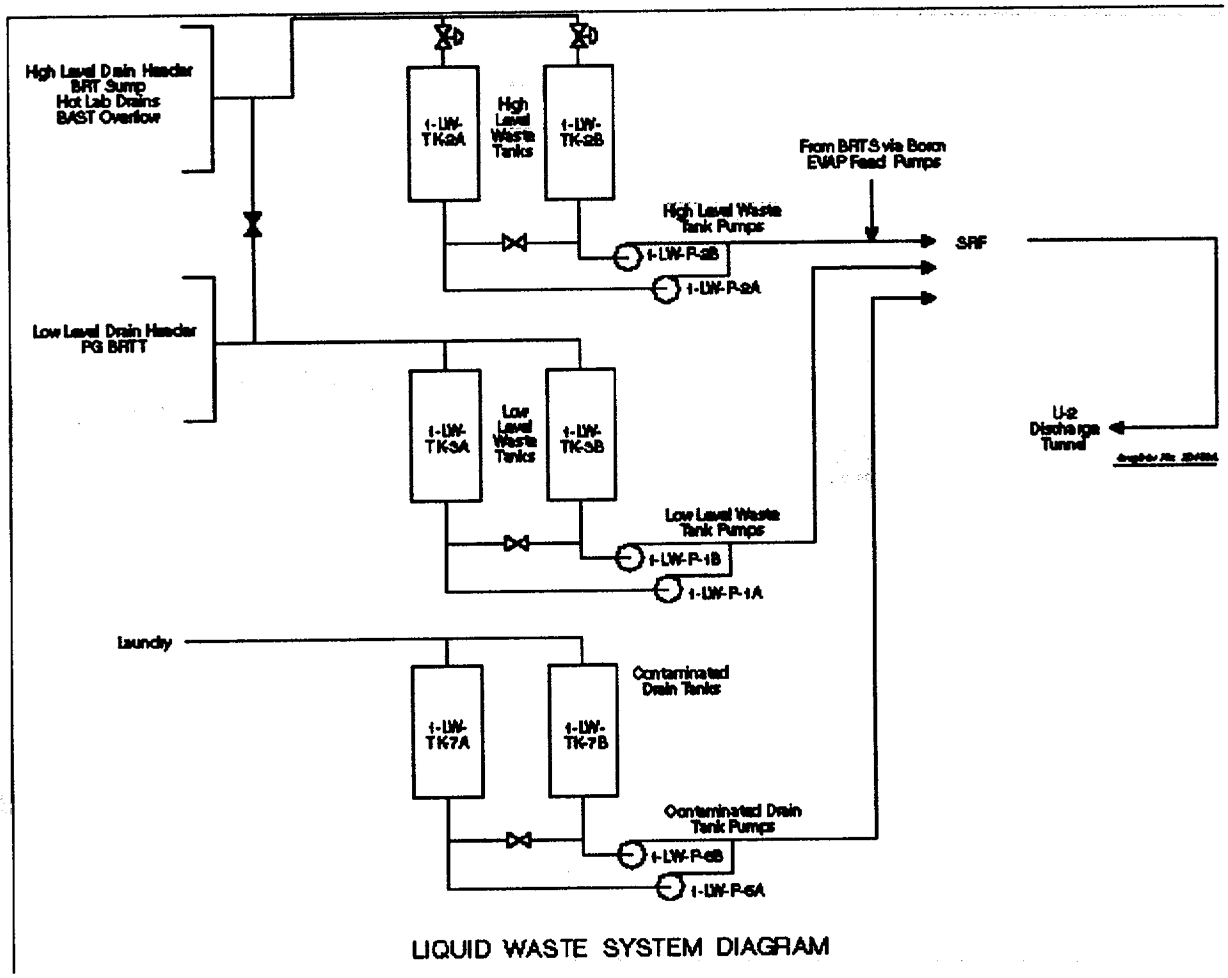
(2) Each LLLW tank has an associated pump for transferring the tank to the SRF. Each of the LLLW pumps has an automatic cutoff on low tank level from its respective tank. The pump suctions are normally maintained cross-connected.

h. High Level LW

(1) There are two HLLW tanks (1-LW-TK-2A/2B) located behind high rad gate #11 (gas stripper room), each with a capacity of 1567 gallons.

(2) Each HLLW tank has an associated pump for transferring the HLLW water to the SRF. Pumps have automatic low level cutoff on a low-

(3) The HLLW pumps also maintain the suction cross-tie valves open. This allows either pump to draw from either tank.



LIQUID WASTE SYSTEM DIAGRAM

QUESTION NUMBER: 85

TIER/GROUP: *RO* 2/1 *SRO* 2/1

K/A: 068 2.3.11

Ability to control radiation releases (Liquid Radwaste).

K/A IMPORTANCE: *RO* 2.7 *SRO* 3.2

10CFR55 CONTENT: *55.41(b) RO* 13 *55.43(b) SRO*

OBJECTIVE: WD-03

Describe the major flow path(s) through the Waste Disposal System. Liquid Waste Disposal

REFERENCES: SD-023

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number RNP-RO-2000 85

JUSTIFICATION:

a. Plausible since 2 Waste Condensate Tanks use their individual pumps to recirc the tank. Waste Condensate Tanks with this capability are 'A' and 'B'.

b. Plausible since transferring contents of Waste Condensate Tank 'E' to a different tank would allow use of Waste Condensate Pump 'C' or 'D' for discharge. Waste Condensate Tanks 'C', 'D', and 'E' must use the Waste Condensate Recirc Pump.

c. Plausible since either Waste Condensate Tank 'A' or 'B' can be recirculated with either Waste Condensate Pump 'A' or 'B'. Waste Condensate Tanks 'C', 'D', and 'E' must use the Waste Condensate Recirc Pump.

d. **CORRECT** Waste Condensate Tanks 'C', 'D', and 'E' can only be recirculated using Waste Condensate Recirc Pump.

DIFFICULTY:

Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comprehension of system operations to determine acceptable alternative liquid waste flowpaths

REFERENCES SUPPLIED:

*86.

Given the following conditions:

- The plant is being started up.
- The operator is in the process of shifting feedwater from bypass control to Main Feed Regulating Valve Control with the Main Feed Regulating Valves and Feed Water Bypass Valves all throttled open.
- A Reactor Trip occurs.
- RCS Tavg stabilizes at no load Tavg.

Which ONE (1) of the following identifies the expected position of the Feed Water Regulating Bypass Valves (FRBVs) and the Feed Water Regulating Valves (FRVs)?

	FRBVs	FRVs
a.	Open	Open
b.	Open	Closed
c.	Closed	Open
d.	Closed	Closed

ANSWER: b

Reference: ND-89.3-H/T-3.3
Difference between Surry and Robinson: Identical except, Surry does not have automatic Feedwater Block Valves.

Justification:

a. Plausible, since the FRBV position is correct, but the FRVs close when the reactor trips.

b. Correct Answer. FRVs close on reactor trip and FRBVs remain open.

c. Plausible, if misconception exists that FRBVs receive the close signal instead of the FRVs.

d. Plausible, since the FRVs position is correct, but the FRBVs remain open.

MAIN FEED SYSTEM FACT SHEET

F.W. PUMP DISCHARGE MOV's SHUT SIGNALS

1) 1/2 F.W. PUMP BREAKERS OPEN
2) MANUAL

FEEDWATER BYPASS VALVES BLOCK SIGNALS

1) S.I.
2) 2/3 CHANNELS S/G HI-HI LEVEL (75%) BLOCK RESPECTIVE VALVE.

NOTE: IF BLOCK HAS OCCURRED, IT MAY BE BYPASSED BY PUSHING "S/G LEVEL RESET" PUSHBUTTONS (ALSO ALLOWS F.W. PUMP START).

MAIN FEED REG. VALVES BLOCK SIGNALS

1) AUCT. MEDIUM T_{AVG} 554°F & REACTOR TRIP BREAKERS OPEN.
2) S.I.
3) 2/3 CHANNELS S/G HI-HI LEVEL (75%) BLOCKS RESPECTIVE VALVE.

NOTE: IF REACTOR TRIP OCCURS WITH VALVES SHUT DUE TO S.I. OR HI-HI S/G LEVEL, VALVES MAY NOT BE OPENED UNTIL REACTOR TRIP BREAKERS ARE RESET.

QUESTION NUMBER: 86
TIER/GROUP: *RO* 2/1 *SRO* 2/1
K/A: 059K4.19

Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following:
Automatic feedwater isolation of MFW

K/A IMPORTANCE: *RO* 3.2 *SRO* 3.4
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: FW-09

EXPLAIN the normal operation of the Feedwater control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES: SD-027

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number FW-09 004

JUSTIFICATION:

a. **CORRECT** Only the FRVs receive a close signal on a reactor trip and low Tavg. The FRBVs and FBVs will close on an SI signal.

b. Plausible since the position of the FRBVs is correct, but the FBVs will also be open.

c. Plausible since the position of the FBVs is correct, but the FRBVs will also be open.

d. Plausible since both sets of valves do receive automatic close signals, but not from a reactor trip with low Tavg.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Analysis of plant response to trip to determine FW system response

REFERENCES SUPPLIED:

*87.

A loss of Component Cooling to the Containment Air Recirc Fans results in Containment temperature increasing from 95°F to 125°F.

Which ONE (1) of the following describes the effects on indicated pressurizer level if actual level in the pressurizer is held constant?

a. Increases due to reference leg heating effects of increasing Containment temperature.

b. Decreases due to reference leg heating effects of increasing Containment temperature.

c. Does not change because indicated pressurizer level is not affected by Containment temperature.

d. Does not change because the mass change due to reference leg heating is displaced back into the pressurizer.

ANSWER: a

Reference: ND-93.1-LP-1, page 30.
Difference between Surry and Robinson: New Question. Changed question to match KA.

Justification:

a. Correct Answer. Increasing Containment temperature decreases the density in the reference leg and therefore decreasing the differential pressure across the level detector. Decreasing differential pressure causes increased indicated level.

b. Plausible, since increasing Containment temperature will change indicated level, but indicated level goes up and not down.

c. Plausible, since indicated level in some tanks will not change depending on the type of level detector used, but indicated pressurizer level will change.

d. Plausible, since level in the reference leg does not change.

(e) There are several errors common to wet leg type systems:

1) Reference leg temperature. Since the system must use a condensing pot, the temperature of the fluid in the reference leg can be different than the temperature in the tank. If the system cannot use a condensing pot, the reference leg can still be susceptible to heating by ambient temperature changes. If this temperature should increase, the density of the reference leg would decrease, thus decreasing the pressure on the Low side of the D/P Transmitter causing an indicated level greater than actual.

2) Reference leg flashing. In hot systems that use condensing pots, if the tank pressure should rapidly decrease, the reference leg could partially or fully flash off. This would decrease the pressure on the Low side of the D/P transmitter causing indicated level to be much greater than actual. Hydrogen could also come rapidly out of solution removing water from the reference leg and causing a similar effect.

3) For a reference leg leak, the leak would decrease the pressure on the Low side of the D/P transmitter thus indicated level will be greater than actual (e.g., ~6% increase for the pressurizer transmitters on a partial loss of the reference leg).

4) For a variable leg leak, the pressure on the High side of the D/P transmitter would increase, thus the indicated level will be less than actual.

QUESTION NUMBER: 87
TIER/GROUP: ***RO*** 2/1 ***SRO*** 2/1
K/A: 022K3.02

Knowledge of the effect that a loss or malfunction of the CCS will have on the following:
Containment instrumentation readings

K/A IMPORTANCE: ***RO*** 3.0 ***SRO*** 3.3
10CFR55 CONTENT: ***55.41(b) RO*** 10 ***55.43(b) SRO***

OBJECTIVE: OMM-022-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in OMM-022 by explaining the basis of each.

REFERENCES: OMM-022

SOURCE: ***New*** [X] ***Significantly Modified*** [ ] ***Direct*** [ ]

Bank Number NEW

JUSTIFICATION:

a. CORRECT Although adverse containment conditions no longer exist due to pressure being below 4 psig, adverse values are used until the EOP network is exited.

b. Plausible since containment pressure is below the adverse containment value, but adverse values are used until the EOP network is exited.

c. Plausible since adverse containment value must be used, but pressurizer level already exceeds the adverse value.

d. Plausible since containment pressure is below the adverse containment value, but adverse values are used until the EOP network is exited.

DIFFICULTY:
Comprehensive/Analysis [X] ***Knowledge/Recall*** [ ] ***Rating*** 3

Application of the uasge requirements for adverse containment conditions

REFERENCES SUPPLIED:

*88.

Given the following conditions:

- Unit 1 is in Hot Shutdown.
- The Reserve Station Transformers are supplying all Unit 1 4KV buses.
- A severe short has resulted in a loss of the Unit 1 "B" DC Bus.

Which ONE (1) of the following describes the response of the emergency diesel generators (EDGs)?

	#1 EDG	#3 EDG
a.	Starts and Loads	Does NOT start
b.	Does NOT start	Starts and Loads
c.	Does NOT start	Starts, but does NOT Load
d.	Starts, but does NOT Load	Starts and Loads

ANSWER: c

Reference: 1-AP-10.06, Loss of DC Power and ND-90.3-LP-6, page 18.
Difference between Surry and Robinson: Changed for Surry Specific electrical lineup and operation.

Justification:

a. Plausible, if misconception exists that loss of "B" DC bus affects #1 EDG instead of #3 EDG.

b. Plausible, since #3 EDG starts due to loss of "B" DC bus, but it does not load.

c. Correct Answer. #1 EDG is not affected. #3 EDG auto-starts, but does not load due to loss of control power to breaker.

d. Plausible, if misconception exists that both EDGs are affected by loss of "B" DC bus.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE:
- The EDG 1 auto-starts when 1A DC Bus is lost.
- The EDG 3 auto-starts when 1B DC Bus is lost.
- AFW flow must be throttled to idle loops to prevent an inadvertent Header to Line SI. 4

1. __VERIFY LOSS OF DC BUS:
   - Reactor Trip Breakers - One open and one de-energized

     AND

   - 1-MS-SOV-102A OR 1-MS-SOV-102B - DE-ENERGIZED (OPEN)

     AND

   - RX Trip BRK A and BYP BRK B OR RX Trip BRK B and BYP BRK A indicating lights - OFF

   RESPONSE NOT OBTAINED: Do the following:

   a) Review appropriate station drawings for loss of individual circuits.

   b) RETURN TO procedure and step in effect.

2. __VERIFY TURBINE TRIP: 4

   a) Manually trip the turbine

      RNO: a) Locally trip the turbine. 4

   b) Verify all turbine stop valves - CLOSED

      RNO: b) IF turbine will NOT trip, THEN close MSTVs. 4

   c) Isolate reheaters by closing MSR steam supply SOV
      - 1-MS-SOV-104

      RNO: c) IF reheater FCVs will NOT close, THEN close MSR steam supply MOVs. 4

3. __VERIFY THE MAIN GENERATOR OUTPUT BREAKERS - OPEN
   - OCB-G102
   - OCB-G1T240

   RNO: Manually open breakers.

locally-manually opening the local valve with the lever inside the break-glass station.

Ask trainees: Why isn't a HI-HI CLS initiated from this event?

Answer: HI-HI CLS is an energize to function relay.

2. Major effects from loss of "B" DC bus.

   a. The reactor will trip on loss of voltage to "B" reactor trip bkr UV coil. The turbine trips because the manual Rx trip energizes AST-1. MG-2 control power is lost.

   b. Generator output breakers will **<u>NOT AUTOMATICALLY OPEN</u>** following the turbine trip. The output breakers must be manually opened by the operator on the board (Generator trips come from the "B" DC bus).
   The field breaker will not trip automatically due to the failure of the auto generator trip failure. However, it can be tripped from the MCR once the generator output breakers are opened.

   INSTRUCTOR NOTE: Emphasize when the exciter field breaker is opened the "B" and "C" SS busses will be de-energized.

   This will cause potential header/line SI concerns on the "B" and "C" SGs, a loss of BC and a loss of all components on these two busses.

   NOTE: ANYTIME THE GENERATOR BREAKERS MUST BE MANUALLY OPENED THE FIELD BREAKER SHOULD BE OPENED AS WELL. THIS HAS BEEN A RE-OCCURRING LORP WEAKNESS.

   c. #3 EDG starts automatically but no control power exists for output breaker.

QUESTION NUMBER: 88
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: 058AK3.01

Knowledge of the reasons for the following responses as they apply to the Loss of DC Power:
Use of dc control power by D/Gs

K/A IMPORTANCE: *RO* 3.4 *SRO* 3.7
10CFR55 CONTENT: *55.41(b) RO* 7 *55.43(b) SRO*

OBJECTIVE: EPP-026/27-03

DEMONSTRATE an understanding of selected steps, cautions, and notes in EPP-26 by explaining the basis of each.

REFERENCES: EPP-27

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number EPP-026/27-14 001

JUSTIFICATION:

a. Plausible since the loss of DC control power does affect the 'B' EDG, but it affects it by not flashing the field or allowing the output breaker to close.

b. **CORRECT** The 'B' EDG will start, but field flashing will not be available due to no DC power. The 'A' train is not affected.

c. Plausible since the 'B' EDG will start and will not load due to no field flash or output breaker closure, but the 'A' EDG is not affected.

d. Plausible since the 'B' EDG will start, but the 'B' EDG field will not flash and the output breaker will not close.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Analysis of effect of loss of control power on operation of EDGs

REFERENCES SUPPLIED:

*89.

Given the following conditions:

- The unit is operating at 80% power.
- A misaligned rod in Group 2 of Control Bank "D" has occurred.
- A recovery of the misaligned rod has just begun.
- Annunciator G-A-6, ROD CONT SYSTEM URGENT FAILURE, has just alarmed.

Which ONE (1) of the following indicates the cause of the "Urgent Failure" alarm?

a. IRPI/Group step counter deviation.

b. Rod sequencing error.

c. Improper bank overlap with the "Rod Control Mode Select" switch in the bank select position.

d. The lift coils of the remaining rods in "D" bank are de-energized.

ANSWER: d

Reference: 0-AP-1.01, Control Rod Misalignment note prior to step 18.
Difference between Surry and Robinson: NEW Question.

Justification:

a. Plausible, since this condition does cause a "Computer Printout Rod Control Sys" alarm.

b. Plausible, since this condition would cause a "Computer Printout Rod Control Sys" alarm.

c. Plausible, since bank overlap is a concern when withdrawing rods, however, it is not affected with the "D" bank selected.

d. 0-AP-1.01, Control Rod Misalignment note prior to step 18.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>NOTE</u>: Annunciator ( )G-A6, ROD CONT SYS URGENT FAILURE, will alarm when the affected rod is withdrawn indicating that the lift coils of the remaining rods in the bank are deenergized.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18.	__CHECK AFFECTED ROD - ON BOTTOM	Do the following: a) Reset affected Group Step Counter to IRPI of misaligned rod. b) Reset P/A Converter of affected bank to IRPI of misaligned rod. c) Withdraw the rod until affected Group Step Counter is at 242. d) Reset affected Group Step Counter to 230. e) GO TO Step 21.
19.	__RESET AFFECTED GROUP STEP COUNTER TO 0	
20.	__RESET AFFECTED BANK P/A CONVERTER TO 000	
21.	__REALIGN AFFECTED ROD TO ITS BANK POSITION RECORDED IN STEP 16	<u>IF</u> rod will <u>NOT</u> align, <u>THEN</u> do the following: a) Have Engineering determine hot channel factors are within limits IAW 0-NPT-RX-010. b) GO TO Step 31.
22.	__CLOSE AFFECTED BANK LIFT COIL DISCONNECT SWITCHES	

QUESTION NUMBER: 89
TIER/GROUP: *RO* 2/2 *SRO* 2/1
K/A: 014A2.04

Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Misaligned rod

K/A IMPORTANCE: *RO* 3.4 *SRO* 3.9
10CFR55 CONTENT: *55.41(b) RO* 6 *55.43(b) SRO*

OBJECTIVE: RDCNT-14

EXPLAIN the effect on the Rod Control System due to selected failures.

REFERENCES: AOP-001

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number HNP-RO-2000 76

JUSTIFICATION:

a. Plausible since other group of rods, Group 1, causes alarm, but group must be powered from same power cabinet.

b. Plausible since alarm caused by other group, and this is other bank, but group must be powered from same power cabinet.

c. **CORRECT** The other group of rods in the bank do not move when directed due to the lift coil disconnect switches being open and cause the urgent failure.

d. Plausible since this is the group of rods which are being moved and other rods in the group have the disconnect switch open, but caused by other group in same bank.

DIFFICULTY:
Comprehensive/Analysis [X] *Knowledge/Recall* [ ] *Rating* 3

Comprehension of rod control system design and operation during misaligned rod recovery

REFERENCES SUPPLIED:

*90.

Which ONE (1) of the following is the specified method for performing independent verification of a locked closed manual valve?

a. Verify that the lock is installed on the correct valve and properly locked.

b. Remove the lock, attempt to turn the valve handwheel in the closed direction, reinstall the locking device.

c. Attempt to move the valve handwheel in the open direction with the lock installed.

d. The verifier must observe the initial valve operations and placement of the locking device.

ANSWER: a

Reference: OPAP-0012, Valve Operation, Section 6.8.4.
Difference between Surry and Robinson: Operators do not trip bistables at Surry. Changed to valve verification question.

Justification:

a. Correct Answer.

b. Plausible, since this is the correct method to check a closed valve that is not locked.

c. Plausible, since the operator would be checking if the locking device would prevent opening the valve.

d. Plausible, but that is simultaneous verification and not independent verification.

6.8.4 Valves to be Checked Locked Closed

Valves that should be locked closed should be checked by:

a. Unlocking the valve.

b. Checking the manual valve closed in accordance with 6.8.2.

c. Locking the valve such that the valve operator travel is limited as much as possible.

d. Verifying the locking mechanism is properly restored and secured.

e. Having a second qualified individual Independently Verify that the lock is installed [illegible]

f. IF Independent Verification is required, THEN have a second qualified individual Independently Verify the valve position by verifying the following: **(North Anna)**

1. The lock is installed on the correct valve and properly locked.

2. Visually verifying valve position or process parameters, IF unsure of valve position, THEN do the following:
   - Use simultaneous verification and check the valve position by unlocking the valve, checking correct position and relocking the valve
   - Both parties will initial check space
   - A third person will independently verify the lock is installed on the correct valve and properly locked

6.8.5 Valves to be Checked Throttled

Valve position should be verified by, but is not limited to, one or more of the following:

a. Visual verification using the valve stem position, local indicators, or any other valve component suitable for verification.

b. Observation of the expected system response in regard to valve position (i.e., indication of proper flow rate or pressure as applicable).

c. Observation of the valve mark number label and the installed tamper seal. Visual position of the valve stem should also be checked if the valve is readily accessible.

d. Shut and re-open the valve a prescribed number of turns. This practice should be avoided because the valve may be mispositioned.

QUESTION NUMBER: 90
TIER/GROUP: *RO* 3 *SRO* 3
K/A: 2.1.29

Knowledge of how to conduct and verify valve lineups.

K/A IMPORTANCE: *RO* 3.4 *SRO* 3.3
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: PLP-030-04

Given a set of conditions or components needing position checks or positioning actions DETERMINE the applicable functional testing and independent verification requirements.

REFERENCES: OPS-NGGC-1303

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number PLP-030-04 005

JUSTIFICATION:

a. Plausible since independent verification is identified on the OWP, but concurrent verification is what is used.

b. Plausible since independent verification is identified on the OWP, but concurrent verification is what is used.

c. **CORRECT** Concurrent verification is used where an improper positioning of a component has a high probability of resulting in an immediate plant trip or safety actuation. Selecting the wrong cabinet or bistable could cause a trip in this condition.

d. Plausible since functional verification can be used to verify bistable status change, but the bistable would already be tripped in this condition.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of administrative requirements for independent verification

REFERENCES SUPPLIED:

*91.

Given the following conditions:

- The unit has just experienced a reactor trip.
- NO SI equipment has actuated.
- 2 turbine stop valves are shut.
- 3 turbine governor valves are shut.
- RCS pressure is 1860 psig.
- Tavg is 542°F.
- All MSTVs are open.
- SG Pressures and Steam Flows are:

SG	PRESSURE	STEAM FLOW
"A"	925 psig	0.1×10^6 lbm/hr
"B"	935 psig	0.1×10^6 lbm/hr
"C"	845 psig	1.3×10^6 lbm/hr

Which ONE of the following identifies the status of the turbine trip (1), and the automatic SI requirement (2)?

	(1)	(2)
a.	tripped	NOT required.
b.	tripped	required.
c.	NOT tripped	NOT required.
d.	NOT tripped	required.

ANSWER: c

Reference: 1-E-0, Step 2; ND-91-LP-3.
Difference between Surry and Robinson: Changed MSIVs to MSTVs. Addressed 401-9 comment about leading with 2/4 valves.

Justification:

N/A

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
[1]	__VERIFY REACTOR TRIP: a) Manually trip reactor b) Check the following: • Rod bottom lights - LIT • Reactor trip and bypass breakers - OPEN • Neutron flux - DECREASING	IF reactor will NOT trip, THEN GO TO 1-FR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS.
[2]	__VERIFY TURBINE TRIP: a) Manually trip the turbine	
	b) Verify all turbine stop valves - CLOSED	b) IF turbine will NOT trip, THEN close MSTVs.
	c) Isolate reheaters by closing MSR steam supply SOV • 1-MS-SOV-104	c) IF reheater FCVs will NOT close, THEN close MSR steam supply MOVs.
	d) Verify generator output breakers - OPEN (Time Delayed)	d) IF Generator Output Breakers do NOT open within 30 seconds, THEN manually open output breakers AND verify open or open Exciter Field Breaker.
[3]	__VERIFY BOTH AC EMERGENCY BUSES - ENERGIZED	Do the following: a) IF no AC Emergency Bus is energized, THEN GO TO 1-ECA-0.0, LOSS OF ALL AC POWER. b) Try to restore power to deenergized AC Emergency Bus. Initiate 1-AP-10.07, LOSS OF UNIT 1 POWER.

4. LOW PRESSURIZER PRESSURE Initiation

a. The purpose of the Low Pressurizer Pressure SI signal is to provide protection for either a LOCA or a Steam Line Break.

Refer to/display H/T-3.4, SI Low Pressurizer Pressure.

b. This signal is initiated by 2/3 Pressurizer Pressure Protection channels sensing a low pressure of $\leq$ 1775 psig.

c. If 2/3 channels sense this low pressure and the signal is not blocked, then SI will be actuated.

5. HIGH STEAM HEADER/LINE DIFFERENTIAL PRESSURE Initiation

a. The purpose of the Header to Line Dp SI signal is to provide protection for a Steam Line Break located between the MS NRVs and the Steam Generator.

Refer to/display H/T-3.5, High Steam Line Differential Pressure.

b. The setpoint for the pressure comparators is when steam header pressure is 120 psig greater than steam line pressure.

c. The coincidence is when 2/3 Steam Header Pressures are greater than 2/3 Steam Line pressures in 1/3 Steam Lines.

d. This Header to Line Dp SI can be blocked by either of two ways:

(1) By turning the manual block switches when the proper conditions are met, or

(2) Automatically blocked by <u>both</u> the Th and the Tc loop stop valves in that loop being closed.

e. A minimum steam header pressure signal of 585 psig (idling signal) is used whenever header pressure is below this value, such as during S/U or S/D.

(1) This is to provide steam break protection when the reactor is critical and the MSTVs are shut.

(2) Steam header pressure indication in the control room will continue to indicate actual pressure; however, the pressure signal to the SI circuitry will not go below 585 psig.

(3) For this reason, the HDR/Line SI signal must be blocked during cooldowns and heatups. Otherwise, an SI signal would exist whenever line pressure is less than 465 psig.

6. HIGH STEAM LINE FLOW WITH EITHER LOW STEAM LINE PRESSURE OR LOW Tavg Initiation

a. The purpose of this SI signal is to provide steam line break protection for a steam break downstream of the MS NRVs.

Refer to/display H/T-3.6, Hi Steam Flow SI.

b. The setpoints for this SI signal are:

(1) High steam flow - variable from 38% to 109% of normal steam flow, depending on Turbine First Stage Impulse Pressure.

Have trainees explain the high steam flow setpoint as was discussed in the Steam Dump Control lesson plan:

Steam flow 38 - 109% of normal flow for a Turbine Pimp of 20 - 100%.

(2) Low steam line pressure of ≤ 525 psig.

(3) Low Tavg of ≤ 543°F.

c. The coincidences for this SI signal are:

(1) 1/2 channels High steam flow per steam line in 2/3 of the steam lines

IN COINCIDENCE WITH EITHER

(2) 2/3 steam lines low pressure (1 detector/ line)

OR

(3) 2/3 RCS loops low Tavg signal (1 detector/ loop)

QUESTION NUMBER: 91
TIER/GROUP: *RO* 1/2 *SRO* 1/2
K/A: 007EK3.01

Knowledge of the reasons for the following as they apply to a reactor trip: Actions contained in EOP for reactor trip

K/A IMPORTANCE: *RO* 4.0 *SRO* 4.6
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: PATH-1-05

DEMONSTRATE an understanding of the steps of PATH-1 which require outside assistance

REFERENCES: SD-006
FRP-S.1

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number PATH-1-05 003

JUSTIFICATION:

a. Plausible since the steamflow SI coincidence has not been exceeded, but the turbine is not considered tripped.

b. Plausible since the turbine valves have received a close signal, but the turbine is not considered tripped.

c. CORRECT The turbine is only considered to be tripped if both stop valves or all 4 governor valves are closed, but no SI setpoints have been reached.

d. Plausible since the turbine is not tripped, but no SI setpoint has been exceeded.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Comparison of abnormal response to reactor trip to determine equipment status and requirements

REFERENCES SUPPLIED:

*92.

Given the following conditions:

- A reactor trip occurred due to a loss of offsite power.
- The plant is being cooled down on RHR per 1-ES-0.2, "Natural Circulation Cooldown."
- RVLIS upper range indicates greater than 100%.
- All CRDM fans have been running during the entire cooldown.
- RCS cold leg temperatures are 190°F.
- Steam generator pressures are 50 psig.

Which ONE (1) of the following indicates why steam should be dumped from all SGs?

a. To ensure boron concentration is equalized throughout the RCS prior to taking a sample to verify cold shutdown boron conditions.

b. To ensure all inactive portions of the RCS are below 200°F prior to complete RCS depressurization.

c. To ensure RCS and SG temperatures are equalized prior to any subsequent RCP restart.

d. To ensure RCS temperatures do **NOT** increase during the required 29-hour vessel soak period.

ANSWER: b

Reference: ND-95.3-LP-5, page 7.
Difference between Surry and Robinson: Changed EOP numbering to 1-ES-0.2. Changed both CRDM fans to All CRDM Fans – Surry has 3 fans.

Justification:

N/A

(b) With no CRDM fans running, certain actions must be taken to allow the upper head to cool before depressurizing to initial RHR conditions. When the proper RCS temperature and pressure criteria are met, the RHR system is placed in service to continue the cooldown.

(5) **COOLDOWN TO COLD SHUTDOWN.**

(a) While the RCS is being cooled down to CSD by the RHR system, the inactive portions of the RCS (i.e., upper head region & SG U-tubes) are also being cooled through the use of CRDM fans and dumping of steam from the SGs.

(b) When the entire RCS is cooled to less than 200°F, the RCS can [illegible] a transition to the appropriate procedure made.

B. Procedure Step Bases

Instruct trainees to following along in the procedure as the steps and other items are discussed.

Review with trainees the content of the ES-0.2 CAP. Since each CAP for a particular procedure is potentially unique, the operator should know what items comprise each continuous actions page. **(rk)**

ES-0.2 Continuous Actions Page

QUESTION NUMBER: 92

TIER/GROUP: *RO* 1/1 *SRO* 1/1

K/A: WE09/10EK3.1

Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations) Facility characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity

K/A IMPORTANCE: *RO* 3.3 *SRO* 3.6

10CFR55 CONTENT: *55.41(b) RO* 5 *55.43(b) SRO*

OBJECTIVE: EPP-005-03

EXPLAIN the basis for selected steps, precautions, and limitations associated with EPP-5.

REFERENCES: EPP-005

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number HNP-RO-1998 53

JUSTIFICATION:

a. Plausible since this action would have been performed in this procedure, but must be completed prior to depressurizing the RCS below 1900 psig.

b. **CORRECT** SG pressure above 0 psig indicates that the SGs are above 200 °F. Depressurizing the RCS under this condition will result in additional void formation in the SG u-tubes.

c. Plausible since RCP operation throughout NC Cooldown is desirable, but will not be performed at this point in the procedure.

d. Plausible since a soak period is addressed, but only if continued operation of both CRDM fans had not been maintained.

DIFFICULTY:

Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Application of plant conditions, using steam tables as needed, to determine if NC procedural requirements are met

REFERENCES SUPPLIED: Steam Tables

*93.

Given the following conditions:

- The unit is operating at 100% power.
- A release is in progress from Waste Gas Decay Tank "A".
- A loss of power to the process vent particulate radiation monitor occurs.
- "A" Process Vent Blower is in service.

Which ONE (1) of the following describes how the release is affected as a result of the loss of power?

a. Automatically terminates.

b. Must be manually terminated.

c. Unaffected.

d. Must be realigned through the "B" Process Vent Blower.

ANSWER: a

Reference: ND-93.5-LP-1, pages 18, 19, and 20.
Difference between Surry and Robinson: Concept remains the same. Changed to Surry Specific configurations and mark numbers.

Justification:

a. Correct Answer. On loss of power to a radiation monitor with automatic actions, these actions will occur. For the Process Vent Particulate Radiation Monitor, the WGDT discharge is isolated.

b. Plausible, since the annunciator response procedure directs manual isolation, but automatic isolation will already be completed.

c. Plausible, if misconception exists that WGDT release is not monitored by the Process Vents or that a power failure does not result in WGDT isolation.

d. Plausible, if misconception exists that the "B" Process Vent Blower is monitored by a different Radiation Monitor.

(5) Filter fault light - Indicates paper jam, out of paper, or take-up mechanism malfunction.

(6) Flow fault light - Indicates low flow condition for the monitor.

(7) Purge pushbutton - Operates valves to take suction from the Aux Building to purge the gas monitor. Valves are positioned to purge whenever the button in held in. Valves automatically return to normal when the button is released.

6. Automatic Functions on High Radiation Alarms

a. Certain effluent processes have automatic functions associated with high radiation alarms from various radiation monitors. The automatic function is to isolate the effluent flowpath or to isolate specific inputs into the effluent flowpath.

b. Each of the radiation monitors listed on the transparency has an automatic function that a high alarm condition will activate.

Refer to/display H/T-1.9, Radiation Monitors Automatic Actions, to assist with the following information.

(1) Process vent particulate and gas monitors (Victoreen & Kaman) (RM-GW-101/102 and GW-130-1).

(a) Shuts FCV-GW-160 and 260 - Isolates both units containment vacuum pump discharge.

(b) Shuts FCV-GW-101 - Isolates WGDT discharge.

(2) Component cooling water monitor (CC-RI-105/106) - Shuts CC surge tank vent valve.

(3) Condenser air ejector monitor (SV-RI-111)

(a) Opens TV-SV-102, Lines up air ejector discharge to containment. This TV closes on Hi CLS, but will auto reopen when CLS reset if High Alarm still present.

(b) Shuts TV-SV-103, Isolates discharge to atmosphere.

(4) Containment particulate and gas (RM-RI-159/160); and manipulator crane monitors (RM-RI-162)

(a) Trips affected unit's purge supply fans (4A and 4B).

(b) Shuts MOV-VS-100A, B, C and D, purge isolation valves.

(c) Shuts suction valves for containment instrument air compressor (TV-IA-101 A/B) which opens the outside suction valve.

c. If the automatic actions did not occur for a high radiation alarm, the operator is responsible to manually perform the isolations.

d. For those monitors which have automatic actions, a loss of power will cause [illegible]

7. Technical Specifications

a. There are many Tech Specs associated with the operation of the radiation monitoring system. The following is a list the radiation monitoring Tech Specs.

b. Tech Spec 3.1.C, RCS Leakage, requires two means of detecting RCS Leakage; one of which must depend on detection of radionuclides.

c. Tech Spec 3.7

Refer the trainees to TS Table 3.7-5, Automatic Functions Operated from Radiation Monitor Alarms. Cover this Table on radiation monitoring automatic functions. TS Table 3.7-6, Accident Monitoring Instrumentation, lists actions for CHRRMS, RV, Vent-vent, MS TDAFW exhaust, and RS SW Radiation monitors.

d. Tech Spec 3.10 Refueling

(1) The containment vent and purge system and the area and airborne radiation monitors which initiate isolation of this system, shall be tested and verified to be operable immediately prior to refueling operations.

QUESTION NUMBER: 93

TIER/GROUP: ***RO*** 2/1 ***SRO*** 2/1

K/A: 071A2.05

Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System ; and (b) use procedures to correct, control, or mitigate the consequences: Power failure to the ARM and PRM systems

K/A IMPORTANCE: ***RO*** 2.5 ***SRO*** 2.6

10CFR55 CONTENT: ***55.41(b) RO*** 11 ***55.43(b) SRO***

OBJECTIVE: AOP-024-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of loss of an Instrument Bus as directed in AOP-024.

REFERENCES:
AOP-024
EDP-008
SD-019
AOP-005
RMS Lesson Plan

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number AOP-024-08 001

JUSTIFICATION:

a. **CORRECT** Instrument Bus 3 supplies power to R14. Loss of power to R14 will cause RCV-014 to close and terminate the release.

b. Plausible since Instrument Bus 3 supplies power to R14, but the release will terminate automatically.

c. Plausible since a WDBRP Trouble alarm is received, however no significant WDBRP power is lost and the release terminates automatically due to the loss of R14.

d. Plausible since a WDBRP Trouble alarm is received and the release is terminated automatically, however no significant WDBRP power is lost and the release terminates due to the loss of R14.

DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Comprehension of the effect of a loss of power during a gaseous release

REFERENCES SUPPLIED:

*94.

Which ONE (1) of the following conditions related to the Pressurizer would require entry into a Technical Specification action statement?

a. Pressurizer level is 68% with the plant operating at 8% power.

b. Pressurizer pressure is 2185 psig at 45% power.

c. "A" Pressurizer heater group breaker trips open.

d. 1-RC-PCV-1455A controller is in manual.

ANSWER: b

Reference: Tech Spec 3.12.f
Difference between Surry and Robinson: Changed to Surry Specific value and made (b) correct answer to match KA. Changed to Surry Specific Tech Spec wording.

Justification:

a. Plausible, since there is a Tech Spec limit for pressurizer level but it is greater than 68%.

b. Correct Answer. RCS pressure less than 2205 psig is a Tech Spec action statement.

c. Plausible, since there is a Tech Spec limit for minimum pressurizer heater capacity (125 kw) and the heater group, but loss of one group is not enough to drop below the minimum.

d. Plausible, since there is a Tech Spec limit for Pressurizer spray availability but putting the spray controller in manual does not require entry in to that Tech Spec.

3. If more than one rod position indicator channel per group or two rod position indicator channels per bank are inoperable during control bank motion to achieve criticality or POWER OPERATION, then the unit shall be placed in HOT SHUTDOWN within 6 hours.

F. DNB Parameters

1. The following DNB related parameters shall be maintained within their limits during POWER OPERATION:

   - Reactor Coolant System $T_{avg} \leq 577.0°F$
   - Pressurizer Pressure ≥ 2205 psig
   - Reactor Coolant System Total Flow Rate ≥ 273,000 gpm

   a. The Reactor Coolant System T_{avg} and Pressurizer Pressure shall be verified to be within their limits at least once every 12 hours.

   b. The Reactor Coolant System Total Flow Rate shall be determined to be within its limit by measurement at least once per refueling cycle.

2. When any of the parameters in Specification 3.12.F.1 has been determined to exceed its limit, either restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED POWER within the next 4 hours.

3. The limit for Pressurizer Pressure in Specification 3.12.F.1 is not applicable during either a THERMAL POWER ramp increase in excess of 5% of RATED POWER per minute or a THERMAL POWER step increase in excess of 10% of RATED POWER.

QUESTION NUMBER: 94
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 010 2.1.33

Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications (Pressurizer Pressure).

K/A IMPORTANCE: *RO* 3.4 *SRO* 4.0
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: PZR-12

STATE the Technical Specification Limitations and explain the bases for the PZR and PRT.

REFERENCES:
TS 3.4.1
TS 3.4.9
TRMS 3.4
SD-059

SOURCE: *New* [X] *Significantly Modified* [ ] *Direct* [ ]

Bank Number NEW

JUSTIFICATION:

a. CORRECT TS limit is 63.3% for Mode 1 operation and 92% for Mode 2 and 3. Since the plant is operating at 8%, the Mode 1 limit applies.

b. Plausible since this would require an entry into TS 3.4.1 if the plant was in Mode 1, but at 2% power the plant is in Mode 2 where the TS does not apply.

c. Plausible since at least 125 KW of heaters capable of being supplied by an emergency source are required, but this condition only renders one set of the heaters inoperable and the other can still provide > 125 KW.

d. Plausible since a limit exists for both the differential temperature between spray and the steam space and a cooldown limit, but both limits (320 °F spray differential and 200 °F per hour cooldown) are met.

DIFFICULTY:
Comprehensive/Analysis [X] *Knowledge/Recall* [ ] *Rating* 3

Analysis of conditions to determine if TS and / or TRM limits for pressurizer are met

REFERENCES SUPPLIED:

*95.

Given the following conditions:

- The unit is operating at 75%.
- Rod Control is in AUTO.
- Bank "D" control rods are at 195 steps.
- Tref is 566.9°F.
- Loop Tavgs are:

LOOP	T-AVG
"A"	569°F
"B"	567°F
"C"	566°F

Which ONE (1) of the following failures will cause control rods to step inward?

a. Loop A Thot fails high

b. Loop A Tcold fails low

c. Loop B Tcold fails high

d. Loop C Thot fails low

ANSWER: c

Reference: N/A
Difference between Surry and Robinson: Changed reactor power to 75% to give correct value for Tref.

Justification:

N/A

QUESTION NUMBER: 95
TIER/GROUP: *RO* 2/2 *SRO* 2/2
K/A: 016K3.01

Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: RCS

K/A IMPORTANCE: *RO* 3.4 *SRO* 3.6
10CFR55 CONTENT: *55.41(b) RO* 6 *55.43(b) SRO*

OBJECTIVE: AOP-001-02

EXPLAIN the basis of selected steps, cautions, and notes in AOP-001.

REFERENCES: SD-007

SOURCE: *New* ☒ *Significantly Modified* ☐ *Direct* ☐

Bank Number NEW

JUSTIFICATION:

a. Plausible if misconception is that average Tavg is used as average Tavg will increase, but median Tavg is used which will still be loop 2.

b. Plausible since this will cause loop 3 to be the median Tavg, but loop 3 is below Tref so no rod motion will occur.

c. CORRECT Rod control uses median Tavg. Currently, loop 2 is the median. When loop 2 Tcold fails high, loop 2 will become the high channel and loop 1 will be the median. Loop 1 is more than 2 degrees above Tref, so inward rod motion will occur.

d. Plausible if misconception is that average Tavg is used as average Tavg will increase, but median Tavg is used which will still be loop 2.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Analysis of the effect of a temperature failure on the Rod Control system

REFERENCES SUPPLIED:

5A7
573

*96.

Given the following conditions:

- The unit is operating at 30% power.
- A dropped control rod has just been re-aligned.
- While attempting to reset the Rod Control Urgent Failure alarm, the operator inadvertently pushes the Rod Control STARTUP button.

Which ONE (1) of the following describes the effect of operating the incorrect button?

a. Only Control Bank control rods drop into the core, causing an automatic reactor trip.

b. All rods, including Control Bank and Shutdown Bank rods, drop into the core, causing an automatic reactor trip.

c. All rods remain in their current position and there is **NO** effect on the Rod Control System circuitry.

d. All rods remain in their current position, but the Rod Control System circuitry senses all rods are fully inserted.

ANSWER: d

Reference: N/A

Difference between Surry and Robinson: Identical Question.

Justification:

N/A

QUESTION NUMBER: 96
TIER/GROUP: *RO* 2/1 *SRO*
K/A: 001K6.11

Knowledge of the effect of a loss or malfunction on the Location and operation of CRDS fault detection (trouble alarms) and reset system, including rod control annunciator

K/A IMPORTANCE: *RO* 2.9 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 6 *55.43(b) SRO*

OBJECTIVE: RDCNT-07

EXPLAIN the purpose and location of the Rod Control System controls and indications.

REFERENCES: SD-007

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number HNP-RO-2000 24

JUSTIFICATION:

a. Plausible since improper operation of correct button could result in rods dropping into core, but operated button only resets starting points for rod control circuitry.

b. Plausible since improper operation of correct button could result in rods dropping into core, but operated button only resets starting points for rod control circuitry.

c. Plausible if misconception that effect is nothing if performed at power since button is normally only operated prior to withdrawing any rods, but operated button resets starting points for rod control circuitry.

d. **CORRECT** Operating button at power does not affect actual rod position, but resets rod control such that circuitry senses rods are at "full inserted" position.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 3

Knowledge of the function of rod control system controls

REFERENCES SUPPLIED:

*97.

The following conditions exist on Unit 1:

- "J" 4160 Volt emergency bus is de-energized due to a fault on the bus.
- A Hi-Hi CLS is initiated due to a Large Break LOCA occurring after "J" Bus was de-energized.

Which ONE (1) of the following describes the Service Water (SW) alignment to the Recirc Spray Heat Exchangers (RSHXs)?

a. All RSHXs will have SW aligned since all SW flowpaths are parallel and redundant.

b. One Inside RSHX and one Outside RSHX will have SW flow aligned through them.

c. Both Inside RSHXs will have SW flow aligned through them.

d. Both Outside RSHXs will have SW flow aligned through them.

ANSWER: b

Reference: ND-91-H/T-6.4; ND-89.5-LP-2, page 19.
Difference between Surry and Robinson: NEW Surry Question.

Justification:

a. Plausible, since the supply header valves are parallel and have redundant power supplies, but individual heat exchangers have only one supply and return valve.

b. Correct Answer. "B" and "D" heat exchangers remain isolated due to loss of "J" Bus. "A" and "C" heat exchanger valves align supplying one IRS pump and one ORS pump.

c. Plausible, since two heat exchangers will have SW flow, but it is not both of the IRS heat exchangers.

d. Plausible, since two heat exchangers will have SW flow, but it is not both of the ORS heat exchangers.

(a) Intake canal level 23 feet, 6 inches

(b) High-high CLS with a blackout

(3) A time delay allows these valves to be reopened 5 minutes after initiation of a high-high CLS with a blackout.

c. MOV-SW-103A, B, C, and D (RS H/X's)

(1) Operated from benchboard 1-1.

(2) Upon receipt of a HI-HI CLS signal, the service water recirculation cooler inlet isolation valves (MOV-SW-103A, B, C, and D) open and admit SW to each of the coolers.

(3) The MOV-SW-104's and 105's are normally closed and automati- [illegible] to provide the SW flowpath through the RS H/Xs.

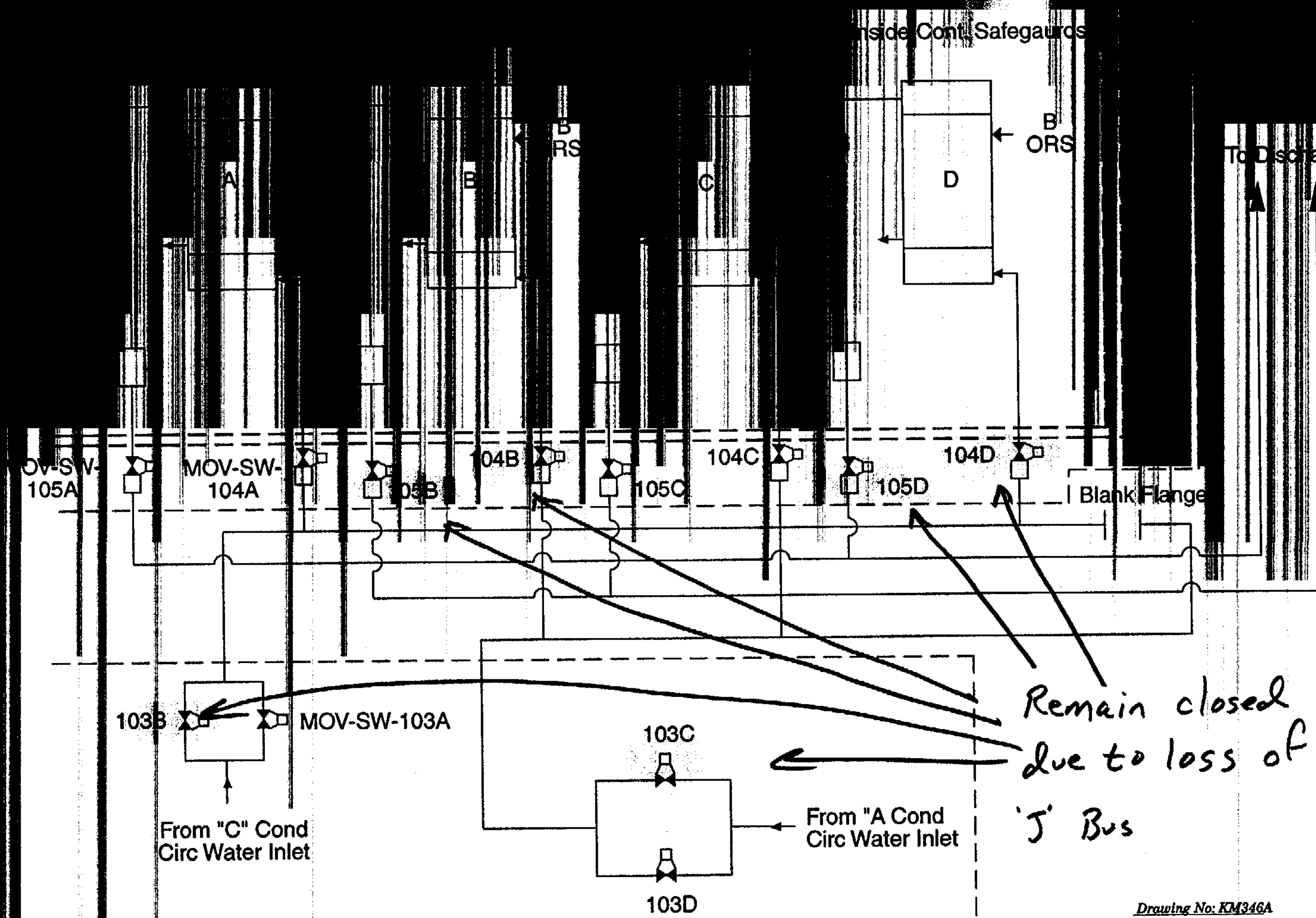
d. 1-SW-P-4 A, B (Turbine Bldg. SW)

(1) Operated by HAND-OFF-AUTO switch on vertical board 1-2 in Control Room

(2) In AUTO, pump starts automatically if low discharge pressure is sensed.

(3) Pumps cannot be started in HAND or AUTO unless at least one of the suction MOVs is fully open.

G. System Technical Specifications (TS 3.14)



RSH/X SERVICE WATER

QUESTION NUMBER: 97
TIER/GROUP: ***RO*** 2/3 ***SRO***
K/A: 076K2.01

Knowledge of bus power supplies to the following: Service water

K/A IMPORTANCE: ***RO*** 2.7 ***SRO***
10CFR55 CONTENT: ***55.41(b) RO*** 4 ***55.43(b) SRO***

OBJECTIVE: SW-06

LIST power supplies for the major SERVICE WATER System components as listed in the EDPs.

REFERENCES: EDP-002

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number SW-06 005

JUSTIFICATION:

a. Plausible if misconception regarding power supply, but normal supply is E-2 and alternate supply is DS Bus.

b. Plausible since normal supply is E-2, but can also be powered by alternate supply of DS Bus.

c. Plausible since alternate supply is DS Bus, but normal supply is E-2.

d. **CORRECT** Normal supply to SW Pump D is E-2 and alternate supply is DS Bus.

DIFFICULTY:
Comprehensive/Analysis ☐ ***Knowledge/Recall*** ☒ ***Rating*** 2

Knowledge of power supplies to SW Pump

REFERENCES SUPPLIED:

*98.

Which ONE (1) of the following combinations of Radiation Monitors will automatically isolate Containment Purge on a High Radiation Alarm?

a. RM-161, Containment Hi Range Gamma Area Monitor **(or)** GW-RI-101, Process Vent Particulate Monitor.

b. RM-162, Manipulator Crane Area Monitor **(and)** RM-163, Reactor Containment Area Monitor.

c. RM-162, Manipulator Crane Area Monitor **(or)** RM-RI-159, Containment Particulate Monitor.

d. GW-RI-102, Process Vent Gas Monitor **(and)** RM-RI-160, Containment Particulate and Gas Monitor.

ANSWER: c

Reference: ND-88.4-LP-6, page 8.
Difference between Surry and Robinson: NEW Surry Question.

Justification:

a. Plausible, since RM-161 monitors Containment radiation but it does not provide an automatic isolation function and GW-RI-101 has an automatic isolation function but not for Containment activity.

b. Plausible, since RM-162 will isolate Containment purge, but RM-163, which monitors Containment radiation, will NOT isolate purge.

c. Correct Answer. Either RM-162 or RM-RI-159 will isolate Containment purge on a high radiation alarm.

d. Plausible, since RM-RI-160 will isolate Containment purge, but GW-RI-102 will not.

4. The exhaust air is drawn from containment and discharges through two motor operated butterfly valves connected to the safety-related charcoal filter trains through two isolation dampers installed in series. The outer containment exhaust valve has an 8-inch bypass valve to permit reduced purge flow if required. The exhaust air is drawn from the containment across the charcoal filter by the 58A or B fan and discharged to the ventilation stack.

5. System valves

   a. An 18-inch vacuum breaker valve is installed on the outside of the containment structure between the supply system penetration valves to bring the containment up to atmospheric pressure after unit shutdown.

   b. Motor operated butterfly valves are located on either side of the containment penetrations for containment integrity.

   c. The two isolation trip dampers in series are air operated and are designed to fail in the closed position on loss of air. The air is supplied from either station instrument air system or an air accumulator sized to store sufficient air to keep the dampers open for two hours on loss of normal air.

6. A high radiation signal on the containment particulate and gas radiation monitor or [illegible] radiation monitor will trip the purge supply fans and close the [illegible] containment isolation MOVs. This is to prevent releasing activity to [illegible]

7. A safety injection signal will trip the purge supply fans and shut the isolation valves and the dampers to the auxiliary ventilation system to cool the SI components and process the air from the SI components.

QUESTION NUMBER: 98

TIER/GROUP: ***RO*** 2/2 ***SRO***

K/A: 029K4.03

Knowledge of design feature(s) and/or interlock(s) which provide for the following: Automatic purge isolation

K/A IMPORTANCE:	***RO***	3.2	***SRO***	
10CFR55 CONTENT:	***55.41(b) RO***	9	***55.43(b) SRO***	

OBJECTIVE: ESF-09

EXPLAIN the normal operation of the ESFAS control systems. Include function, instrumentation, interlocks, annunciators, and setpoints.

REFERENCES:
TS Table 3.3.2-1
TS Table 3.3.6-1
SD-006

SOURCE: ***New*** ☐ ***Significantly Modified*** ☐ ***Direct*** ☒

Bank Number ESF-04 006

JUSTIFICATION:

a. Plausible since these would both cause a CVI if the SI signals were not blocked, but under these conditions the steamline differential pressure will not cause a CVI.

b. Plausible since the low pressure would cause a CVI if the SI signals were not blocked, but under these conditions the the low pressure will not cause a CVI.

c. **CORRECT** CVI is caused by manual actuation (same actuation as Phase A), containment radiation (gaseous and particulate), or safety injection. The SI blocks initiated by GP-007 include all signals except manual and high containment pressure.

d. Plausible since manual actuation will cause a CVI, but R-14C only isolates any waste gas release.

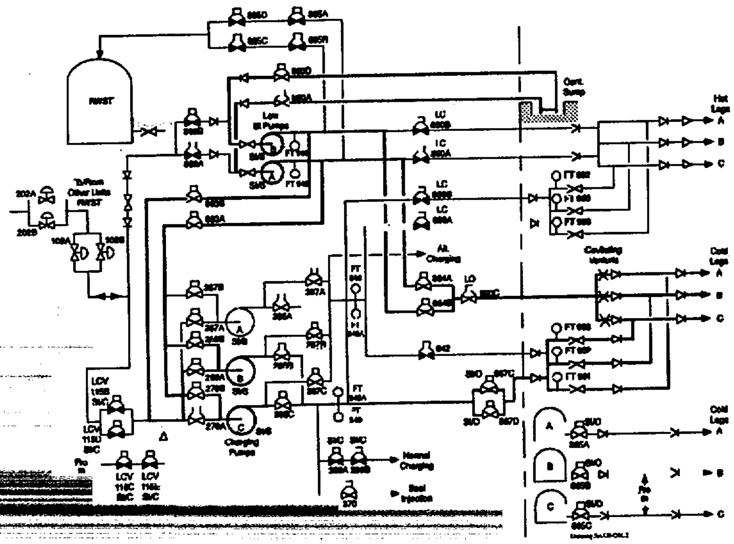
DIFFICULTY:
Comprehensive/Analysis ☒ ***Knowledge/Recall*** ☐ ***Rating*** 3

Comprehension of when ESF signals causing a CVI are blocked

REFERENCES SUPPLIED:

*99.

Given the following drawing containing an ECCS alignment:



Which ONE (1) of the following describes the ECCS alignment?

a. Cold leg injection

b. Cold leg recirculation

c. Hot leg injection

d. Cold leg redundant flowpath

ANSWER: b

Reference: N/A
Difference between Surry and Robinson: Changed to Surry Specific ECCS alignment. Surry has LHSI pumps and not RHR pumps for ECCA.

Justification:

a. Plausible, since flow is going to the cold legs, but suction is from the Containment sump instead of the RWST.

b. Correct Answer. Flow is from the Containment sump and being recirculated back through the cold legs.

c. Plausible, since Hot Leg Injection is a procedurally controlled flowpath but not one shown by this drawing.

d. Plausible, since SI flow is going to the cold legs but not through the redundant flowpath.

QUESTION NUMBER: 99

TIER/GROUP: *RO* 2/2 *SRO*

K/A: 006A3.06

Ability to monitor automatic operation of the Valve lineups

K/A IMPORTANCE: *RO* 3.9 *SRO*

10CFR55 CONTENT: *55.41(b) RO* 8 *55.43(b) SRO*

OBJECTIVE: RHR-03

DESCRIBE the major flow path through the RHR Systems.

REFERENCES: SD-002
EPP-010

SOURCE: *New* ☐ *Significantly Modified* ☒ *Direct* ☐

Bank Number RHR-03 007

JUSTIFICATION:

a. Plausible since flow is going to the cold legs, but suction is from sumps instead of RWST.

b. Plausible since flow is going to the cold legs, but additional flow from SI pumps is going to hot legs.

c. Plausible since flow is going to the hot legs, but suction is from sumps instead of RWST.

d. CORRECT RHR pumps are taking a suction from sump, providing flow to the cold legs, and providing a suction source to the SI pumps which are providing flow to the hot legs.

DIFFICULTY:
Comprehensive/Analysis ☒ *Knowledge/Recall* ☐ *Rating* 3

Analysis of ECCS flowpath to determine core cooling method

REFERENCES SUPPLIED:

*100.

Given the following conditions:

- A Large Break LOCA has occurred.
- 1-E-1, "Loss of Reactor or Secondary Coolant," is being implemented.
- The Unit SRO directs you to "Verify Cold Leg Recirculation Capability."

Which ONE (1) of the following describes the actions permitted during performance of "Verifying Cold Leg Recirculation Capability"?

a. Restoring a flowpath from the containment sump to the LHSI pumps.

b. Aligning a flowpath from the LHSI pumps to the HHSI pumps.

c. Restoring power to SI valves that operate during Recirc Mode Transfer.

d. Aligning a flowpath from SI pumps to the hot legs.

ANSWER: c

Reference: 1-E-1, Loss of Reactor or Secondary Coolant.
Difference between Surry and Robinson: Changed RHR pumps to LHSI pumps. Changed Path 1 to 1-E-1, Loss of Reactor or Secondary Coolant. Changed Supplement D, Emergency Recirculation Equipment to Verifying Cold Leg Recirculation Capability.

Justification:

a. Plausible, since this flowpath is part of Cold Leg Recirc but is not allowed as part of verifying capability.

b. Plausible, since this flowpath is part of Cold Leg Recirc but is not allowed as part of verifying capability.

c. Correct Answer. Step does not direct flowpath alignment, just flowpath capability. Restoring power to valves is allowed for verifying capability.

d. Plausible, since this flowpath is part of Cold Leg Recirc but is not allowed as part of verifying capability.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17.	__INITIATE EVALUATION OF PLANT STATUS:	
	a) Verify cold leg recirculation capability:	a) IF cold leg recirculation capability can NOT be verified, THEN GO TO 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.
	1) Power to LHSI pumps - AVAILABLE	
	2) Power to the following SI valves - AVAILABLE • 1-SI-MOV-1863A and B • 1-SI-MOV-1885A and D • 1-SI-MOV-1885B and C • 1-SI-MOV-1860A and B • 1-SI-MOV-1862A and B • 1-CH-MOV-1115B and D	

(STEP 17 CONTINUED ON NEXT PAGE)

QUESTION NUMBER: 100
TIER/GROUP: *RO* 1/2 *SRO*
K/A: 011 2.4.17

Knowledge of EOP terms and definitions (LBLOCA).

K/A IMPORTANCE: *RO* 3.1 *SRO*
10CFR55 CONTENT: *55.41(b) RO* 10 *55.43(b) SRO*

OBJECTIVE: OMM-022-08

Given plant conditions EVALUATE the appropriate actions to mitigate consequences of early action steps related to OMM-022.

REFERENCES: OMM-022

SOURCE: *New* ☐ *Significantly Modified* ☐ *Direct* ☒

Bank Number OMM-022-14 004

JUSTIFICATION:

a. Plausilbe since this is a flowpath that will be required for recirculation, but no valves are to be repositioned using Supplement D.

b. Plausible since this is a flowpath that will be required for recirculation, but no valves are to be repositioned using Supplement D.

c. **CORRECT** Supplement D is not used as permission to realign valves. It is acceptable, however, to restore control power to SI valves on the RTGB.

d. Plausible since this is a flowpath that will be required for long term recirculation, but no valves are to be repositioned using Supplement D.

DIFFICULTY:
Comprehensive/Analysis ☐ *Knowledge/Recall* ☒ *Rating* 2

Knowledge of procedural requirements for EPP Supplements

REFERENCES SUPPLIED: