Draft Submittal

CATAWBA OCTOBER 2004

EXAM 50-413, 414/2004-301
OCTOBER 4 - 8, 2004 &
OCTOBER 13, 2004 (WRITTEN)

1. Reactor Operator Operator Written Exam

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

Applicant Information	
Name:	
Date: October 16, 2004	Facility/Unit: Catawba Nuclear Station
Region: II	Reactor Type: Westinghouse
Start Time:	Finish Time:

Instructions

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

Applicant Certification

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

_____
Applicant's Signature

Results	
Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

1 Pt(s) Unit 1 is in a refueling outage. Given the following events and conditions:

- A full core off-load is in progress
- One spent fuel assembly is in the fuel transfer tube being transported to the spent fuel pool
- The following annunciators alarm:
  - SPENT FUEL POOL LEVEL HI/LO
  - 1EMF-17 REACTOR BLDG REFUEL BRIDGE

Which one of the following correctly describes the type of event and the required operator actions that should be performed first?

A. **Loss of refueling cavity or spent fuel pool level.**
Install the weir gate and inflate the seals.

B. **Loss of refueling cavity or spent fuel pool level**
Move the fuel transfer cart to the spent fuel side

C. **Loss of spent fuel pool level only**
Move the fuel transfer cart to the reactor side.

D. **Loss of refueling cavity level only**
Close 1KF-122 (KF Fuel Transfer Canal Isolation).

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1 Pt(s) Unit 1 is at 100% power with RC pumps 1A, 1C and 1D running. Given the following events and conditions:

- RC pump 1C breaker trips due to a motor phase to phase fault
- Unit 1 begins to lose vacuum.

Which one of the following statements correctly describes:
1. the expected plant power response and
2. the correct operator action(s)?

A. **1. Turbine power will decrease**
2. Start RC pump 1B

B. **1. Turbine power will remain constant**
2. Open the 1B RC pump discharge valve, start the 1B RC pump

C. **1. Turbine power will decrease**
2. Open the 1B RC pump discharge valve, start the 1B RC pump

D. **1. Turbine power will remain constant**
2. Start the 1B RC pump

1 Pt(s) Unit 2 is responding to a LOCA from a trip at full power. Given the following conditions:

- A safety injection has occurred
- Train B Sp signal failed (to actuate)
- The 2A NS pump started automatically
- The 'B' ECCS and ES load sequencer have been reset
- The 2B NS pump had to be started manually by an operator
- Both NS pumps were stopped by procedure prior to shifting suctions to the containment sump

If containment pressure is 2.6 psig, which one of the following statements describes the operation of the NS pumps upon completion of the swapover?

A. **Both NS pumps will restart automatically only if containment pressure increases above 3.0 psig.**

B. **Both NS pumps will restart automatically when their respective sump suction valve (2NS-18A, 2NS-1B) reaches full open.**

C. **When the sump suction valves (2NS18A, 2NS-1B) reach full open, the 2A NS pump restarts automatically, the 2B NS pump can be restarted manually.**

D. **When the sump suction valves (2NS18A, 2NS-1B) reach full open, the NS pumps will not restart automatically or manually.**

1 Pt(s)

Unit 2 is operating at 69 percent power, with all systems aligned for full power operations. Given the following events and conditions:

- During a routine board walkdown, the BOP operator reports that VI system pressure has dropped to 86 psig.

Which one of the following statements correctly describes the automatic actions that should have occurred?

A. 1VS-78 (*VS Supply to VI*) is open

B. 1VI-670 (*VI Dryer Auto Bypass*) is open

C. 1VI-500 (*VI supply to VS*) is closed

D. The VI compressor in "*standby*" is running

1 Pt(s) Unit 1 is operating at 73% power. Given the following events and conditions:

- Pressurizer Relief Tank (PRT) pressure, temperature and level are elevated due to suspected PORV seat leakage.
- The PRT is being cooled by spray from the RMWST.
- PRT pressure is 25 psig.
- PRT temperature is 115 °F.
- PRT level is 81%.
- Pressurizer pressure is 2235 psig.
- Pressurizer temperature is 653 °F.
- Pressurizer level is 47%.

What temperature would be indicated on the PORV tailpipe RTD if a PORV was leaking by?

REFERENCES PROVIDED

A. 220-239 °F

B. 240-259 °F

C. 260-279 °F

D. 280-350 °F

1 Pt(s) Unit 1 is operating at 100% power. An equalizing battery charge is in progress on battery 1EBD. Given the following events and conditions:

- Normal lineup for the 120 VAC Vital Instrument Busses
- The supply breaker to Bus 1ETB trips open on a ground fault
- No operator action is taken

Which statement correctly describes the effect of this failure on the 125 VDC Vital Instrument Bus, 1EDD?

A. The 1EDD bus is deenergized due to loss of power to the charger 1ECS.

B. The 1EDD bus will remain energized for about 4 hours from battery 1EBB.

C. The 1EDD bus will remain energized for about 2 hours from battery 1EBB.

D. The bus is automatically picked up by the charger 1ECS.

1 Pt(s) Unit 1 is responding to a LOCA. Given the following events and conditions:

- Completed E-0 (Reactor Trip or Safety Injection)
- Entered E-1 (Loss of Reactor or Secondary Coolant)
- The STA reported the following valid critical safety functions:
  - Subcriticality - orange path
  - Integrity - red path
  - Heat Sink - red path
  - All other CSFs are green or yellow

Which one of the following statements correctly describes the proper procedure flow path?

A. Remain in E-1 (Loss of Reactor or Secondary Coolant)

B. Transition immediately to FR-S.1 (Response to Nuclear Generation /ATWS)

C. Transition immediately to FR-P.1 (Response to Imminent Pressurized Thermal Shock Condition)

D. Transition immediately to FR-H.1 (Response to Loss of Secondary Heat Sink)

1 Pt(s)

Unit 1 was at full power when a steam break occurred in containment.

Given the following events and conditions:

- Reactor trip and safety injection
- Main steam line isolation actuation
- All equipment has operated as designed

Parameter / Time:	0200	0205	0210
Containment pressure (psig)	4.5	3.2	2.1
NC pressure (psig)	2000	1980	1945
Steam generator pressure (psig)			
S/G 1A	450	220	0
S/G 1B	750	790	785
S/G 1C	690	770	785
S/G 1D	1000	1050	1130

What is the earliest time, if at all; the operators can block and reset the main steam isolation signal (without the signal immediately reactivating)?

A. 0200

B. 0205

C. 0210

D. The main steam isolation signal cannot be reset

1 Pt(s)

Unit 2 was operating at 100% power when a tornado passed through the switchyard knocking out the transmission lines and causing a total loss of offsite power. Given the following conditions:

- The reactor tripped
- Diesel Generator 2A starts and provides power to 2ETA
- The load sequencer for Train 2B fails to operate

Which one of the following actions is the earliest action required?

REFERENCES PROVIDED:

A. Enter Tech Spec 3.0.3 immediately.

B. Restore the 2B D/G to operation within 2 hours.

C. Restore power to one train of the AC electrical distribution system within 8 hours.

D. Restore the Train 2B load sequencer within 12 hours.

1 Pt(s) Unit 1 is operating at 100% power when the following events occurred:

- Unit 1 OAC failed
- The following AFD readings are taken:
  - N41 – -22 %ΔI at 99% power.
  - N42 – -17 %ΔI at 100% power.
  - N43 – -15 %ΔI at 99% power.
  - N44 – -16 %ΔI at 100% power.

If the crew is directed to continue reactor operations at the highest power level possible, which one of the following statements describes the correct crew response required by Tech Specs?

REFERENCES PROVIDED

A. Maintain 100% power and monitor AFD hourly.

B. Maintain 100% power and monitor AFD every 7 days.

C. Reduce power to < 50% and monitor AFD hourly.

D. Reduce power to < 50% and take PR channel N43 out of service.

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1 Pt(s) Which one of the following statements describes the correct core temperature inputs/parameters used for determination of subcooling margin by the Inadequate Core Cooling Monitor Plasma Display?

A. **Highest of the following train related:**
- **Highest reading core exit T/C or**
- **Highest reading loop T_{hot}**

B. **Highest of the following train related:**
- **Highest reading core exit T/C or**
- **Average of the 2 loop T_{hot}s**

C. **Highest of the following train related:**
- **Average of the 5 highest reading core T/Cs or**
- **Highest reading loop T_{hot}**

D. **Highest of the following train related:**
- **Average of the 5 highest reading core T/Cs or**
- **Average of the 2 loop T_{hot}s**

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1 Pt(s) Unit 2 was operating at 100% power when one CF pump tripped. What is the expected response to this event?

A. **120 seconds after the trip, when median nuclear power > 65% and NR S/G level is > 55%, DFCS will maintain S/G reference level at 50% for 10 minutes then slowly ramp over 7 minutes to program level setpoint to prevent a hi-hi S/G level trip.**

B. **Initially, FRVs will open up to restore S/G level until actual level equals programmed level, then will close down rapidly as power decreases. A hi-hi S/G may occur if this transient happens to rapidly.**

C. **120 seconds after the trip, DFCS will maintain S/G programmed level at 50% for 7 minutes until the runback is over and programmed level has stabilized to ensure that the FRVs do not overfeed the S/Gs and reach a hi-hi S/G level trip**

D. **Initially, FRVs will be limited to 50% open position for 10 minutes until S/G level reaches DFCS programmed level and then will slowly ramp open over 10 minutes to prevent a plant trip on hi-hi S/G level.**

1 Pt(s)

Unit 1 is operating at 100% power. Given the following events and conditions:

- A loss of off-site power de-energizes 1ETA.
- D/G 1A starts but the D/G breaker will not close.
- The OSM desires to re-energize 1ETA from a Unit 2 power source.

Which of the following power sources can be aligned to re-energize 1ETA?

A. 2TC can be aligned through SATA.

B. 2TD can be aligned through SATB.

C. 2TA can be aligned through 2ATC (locally using pull cords).

D. 2TD can be aligned through 2ATD (locally using pull cords).

1 Pt(s)

Unit 2 was operating at 100% power with all systems in a normal lineup. Which one of the following conditions would cause the RN system to automatically align to supply the YV containment cooling loads?

A. Hi-Hi containment temperature

B. Phase A containment isolation actuation

C. Phase B containment isolation actuation

D. Loss of Off-site Power.

1 Pt(s) Unit 2 has experienced a large break LOCA from 70% power. Given the following conditions:

- The operator have entered ECA-1.1 (*Loss of Coolant Recirculation*)
- NCS subcooling is 0 degrees.
- FWST level is 3%
- NCPs are not running
- There is no indication of natural circulation.

Which one of the following selections correctly completes the description of the cooling flow path during this event?

Steam enters the ___(1)____ of S/G U-tubes where the steam condenses and re-enters the core area via the S/G __(2)____.

	(1)	(2)
A.	**hot leg**	**cold leg**
B.	**hot leg**	**hot leg**
C.	**cold leg**	**hot leg**
D.	**cold leg**	**cold leg**

1 Pt(s)

Unit 1 was in the process of removing spent fuel from the core when a design basis earthquake caused a loss of all AC power (station blackout). Given the following events and conditions:

- Spent fuel pool (SFP) makeup had been aligned from the FWST.
- FWST level was at 39 %.
- The operators are implementing ECA-0.0 (*Loss of All AC Power*)
- Spent fuel pool level was noted to have increased by 6 inches.

Which one of the following events could explain the increase in spent fuel pool level?

A. The loss of ND cooling to the reactor cavity would cause an increase in cavity water level.

B. The loss of containment purge fans caused a change in the differential pressure between the spent fuel pool and the reactor cavity.

C. The FWST gravity makeup line to the spent fuel pool isolation valves failed open and water was siphoned from the FWST.

D. The standby makeup pump was in operation.

1 Pt(s) Unit 1 was operating at 100% power while making preparations to release a waste gas decay tank. Given the following events and conditions:

- The pre-release surveillance test of 1EMF-50(L) *(Waste Gas Disch (Lo Range))* revealed that there was no response to the source check.
- IAE reported that the scintillation detector had failed.

What action is necessary to allow the release of the waste gas decay tank?

References Provided:

A. **Take manual grab samples of the waste gas decay tank prior to initiating any gaseous waste release and every 12 hours during the release.**

B. **Source check the GM detector for 1EMF-50(H) *(Waste Gas Disch (Hi Range))* prior to initiating any gaseous waste release.**

C. **Verify 1EMF-36(L) *(Unit Vent Gas (Lo Range))* is in service prior to initiating any gaseous waste release.**

D. **Repair 1EMF-50(L) prior to initiating any gaseous waste release.**

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1 Pt(s)

Unit 1 is operating at 99% power. Given the following events and conditions:

- A lightning strike onsite causes a loss of offsite power and fault lockout of bus 1ETB.
- EDG 1A does not start.

Which one of the following statements correctly describes the requirement and maximum allowable time to start the standby makeup pump during this event?

A. The crew must start the standby makeup pump within 10 minutes to provide makeup water to the NCS to prevent reaching the pressurizer low level alarm.

B. The crew must start the standby makeup pump within 10 minutes to provide makeup water to the NCP seals to minimize seal degradation.

C. The crew must start the standby makeup pump within 15 minutes to provide makeup water to the NCS to prevent reaching the pressurizer low level alarm.

D. The crew must start the standby makeup pump within 15 minutes to provide makeup water to the NCP seals to minimize seal degradation.

1 Pt(s)

Unit 1 was operating at 100% power. Given the following events and conditions:

- The feeder breaker to 600VAC MCC-1EMXA opens and the MCC is deenergized.

Which of the following NV loads have been lost?

A. Reactor makeup pump 1A and boric acid pump 1A

B. Boric acid pump 1A only

C. Reactor makeup pump 1A only

D. Centrifugal charging pump 1A auxiliary lube oil pump only

1 Pt(s)

Unit 2 was operating at 100% when a LOCA has occurred. Given the following events and conditions:

- The crew has determined that train A of the ND system must be used to supply containment spray.

Which one of the following statements correctly describes the electrical interlock that must be satisfied to allow an operator to open 2NS-43A (*ND PMP 2A TO CONT SPRAY HDR*)?

A. Both 2ND-1B, and 2 ND-2A (*ND PUMP 2A SUCT FRM LOOP B*) must be closed.

B. Either 2ND-36B or 2ND-37A (*ND PUMP 2B SUCT FROM LOOP C*) must be closed.

C. Train B of the ND system must be operating in the Cold Leg Recirculation mode.

D. CPCS > 0.4 psig signal must be present.

1 Pt(s) Unit 1 was operating at 100%. Given the following events and conditions:

- An Emergency Diesel Generator is running in parallel with offsite power.
- The operator is preparing to shutdown the diesel in accordance with OP/1/A/6350/002 (*Diesel Generator Operation*) Encl 4.10 (*D/G 1A Startup and Shutdown from the D/G Room*)
- The operator manually unloads the Emergency Diesel Generator by:
  - Reducing the load to 200 KW using the "speed control"
  - Adjusting the power factor to 0.95 lagging by adjusting "voltage control"
  - Opening the output breaker promptly when load is reduced to 200 KW

Which one of the following statements correctly describes the basis for these actions?

A. To prevent diesel overspeed when the breaker is opened

B. To prevent breaker trip on reverse power

C. To prevent loss of power to the bus

D. To prevent breaker trip on generator differential

1 Pt(s) Unit 1 is responding to a small-break loss of coolant accident inside containment. Given the following events and conditions:

- Operators are preparing to transition from E-1 (*Loss of Reactor or Secondary Coolant*) to ES-1.2 (*Post LOCA Cooldown and Depressurization*)
- Containment hydrogen concentration is 7%
- The TSC has recommended purging containment to reduce hydrogen concentration to 3.5% before starting the recombiners.

Which one of the following statements correctly describes the method for performing this evolution to minimize the off-site dose prior to release from the unit vent stack?

A. Containment air is exhausted to the auxiliary building where it is filtered in the VA system, which will maintain the auxiliary building at a negative pressure referenced to containment.

B. Containment air is exhausted to the containment air release system where it is filtered by the VQ system, which will automatically terminate the release if containment pressure reaches 0 psig.

C. Containment air is exhausted to the containment purge system exhaust and is filtered by VP system, which maintains a flow balance between upper and lower containment in the "normal" mode.

D. Containment air is exhausted to the annulus via the VY system where it is filtered by the VE system, which maintains a 1.5 " water vacuum referenced to the containment.

1 Pt(s)

Unit 1 was operating at 100% power when a reactor trip occurred on low pressurizer pressure. Given the following events and conditions:

- Safety injection actuated
- Phase A isolation actuated
- Main steam isolation (MSI) failed to actuate automatically
- MSI was manually actuated after a delay of several minutes
- NC temperature initially decreased to 435°F then rose steadily
- NC pressure initially decreased to 1500 psig then rose steadily
- Pressurizer level initially decreased to 0% then rose steadily
- All steam generator pressures approximately 700 psig and stable
- All steam generator narrow range levels are off scale low, wide range levels are rising
- Containment temperature is 100°F
- Pressurizer tailpipe temperatures 120°F
- Containment EMF trip 1 lights are dark

Based on these indications, which one of the following events has occurred?

A. Steam line break upstream of the MSIVs

B. Small break LOCA

C. Steam line break downstream of the MSIVs

D. Pressurizer PORV opened and subsequently re-closed

1 Pt(s)

Unit 1 was operating at 100% power when a turbine trip occurred. Given the following events and conditions:

- The reactor trip failed
- The crew initiated emergency boration in accordance with FR-S.1 (*Response to Nuclear Power Generation/ATWS*).
- NC average temperature is 580°F.
- NC system pressure is 2300 psig.
- One boric acid pump is running.
- Charging flow indicated on 1 NVP 5630, (*CHRG LINE FLOW*) is 32 gpm.
- 1NV-309 (*SEAL WATER INJECTION FLOW*) is failed closed.

How much boric acid is being delivered directly into the NC system (and not into the VCT)?

A. The NV pump is delivering 0 gpm of the boric acid flow directly to the NC system.

B. The NV pump is delivering approximately 12 gpm of the boric acid flow directly to the NC system.

C. The NV pump is delivering approximately 20 gpm of boric acid directly to the NC system.

D. The NV pump is delivering 32 gpm of boric acid flow directly is to the NC system.

1 Pt(s) Unit 1 is shutdown in mode 6 for refueling.

What is the earliest time that the crew is required to start the CRDM vent fans during a plant startup?

A. **When the plant is in mode 5 prior to exceeding 140°F.**

B. **When the shutdown banks are withdrawn in mode 4.**

C. **When the plant enters mode 3 prior to exceeding 350°F.**

D. **When the control banks are withdrawn in mode 2.**

1 Pt(s) Which one of the following automatic "close" signals for 1NF-228A, (NF Supply Containment Isolation valve) may be bypassed?

A. Loss of air

B. Loss of power

C. Low-Low expansion tank level

D. Phase A containment isolation (St)

1 Pt(s) Unit 1 was operating at 25% power. Given the following events and conditions:

- 1A CF pump is out of service for maintenance
- 1B CF pump trips
- The crew manually trips the reactor on a total loss of feedwater
- Both motor driven CA pumps automatically started
- The crew manually started the turbine driven CA pump
- The CA control valves have not been reset
- No other actions have been taken regarding the CA system
- The following annunciators are received in the control room:
  - 1AD-5 E/1 (*CA PUMPS TRAIN A LOSS OF NORMAL SUCT)*
  - 1AD-5 E//2 (*CA PUMPS TRAIN B LOSS OF NORMAL SUCT)*

Which one of the following actions will occur?

A. All the CA pumps will trip in 5 seconds.

B. All the CA pumps continue to run – the suctions will shift to RN in 5 seconds.

C. In 5 seconds, the turbine driven CA pump will trip; the suctions for the motor driven CA pumps will then shift to the RN system.

D. The motor driven CA pumps immediately trip; the suction for the turbine driven CA pumps will shift to the RN system in 5 seconds.

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1 Pt(s)

A reactor startup is being performed in accordance with PT/0/A/4150/019 (*1/M Approach to Criticality*). During the outage Intermediate Range channel N35 is inadvertently under-compensated during detector replacement.

Which one of the following statements correctly describes the expected Intermediate Range response as power is raised from low in the intermediate range to 100% power?

A. **N35 will read higher than N36 for the entire intermediate range due to the addition of the gamma flux signal.**

B. **N35 will read higher than N36 for the first couple of decades but will read approximately the same as N36 when the neutron flux dominates the gamma flux.**

C. **N35 will read lower than N36 for the entire intermediate range due to the subtraction of gamma flux signal.**

D. **N35 will read lower than N36 for the first couple of decades but will read approximately the same as N36 when the neutron flux dominates the gamma flux.**

1 Pt(s)

Unit 1 was operating at 67% power. During a loss of RN flow, KC loop temperature is rising.

- Given the following trends on NC Pump 1C:

Time	1200	1205	1210	1215
Motor bearing temp (°F)	179	186	190	195
Lower pump bearing temp (°F)	221	226	229	235
#1 seal outlet temp (°F)	226	230	236	241
Motor winding temp (°F)	295	304	306	310

What is the earliest time at which the NC Pump 1C must be secured?

A. 1200

B. 1205

C. 1210

D. 1215

1 Pt(s) Unit 1 is conducting a reactor startup following a plant trip. Given the following data:

- Time of shutdown 1520 on 10/27/04
- Anticipated time of criticality 0100 on 10/28/04
- Core burnup 350 EFPD
- Xenon ratio at time of criticality 0.5
- NCS Boron 750 ppm
- Estimated critical position 105 steps on Bank C
- Control rod position at 0200 Bank C is at 40 steps

Which one of the following statements correctly describes the required operator actions when the operators begin to withdraw the rods at 0200 to achieve criticality?

REFERENCES PROVIDED:

A. **Recalculate the ECP if the reactor is not yet critical because criticality was not achieved by +750 PCM above the ECP.**

B. **Recalculate the ECP if the reactor is critical because criticality was achieved at -750 PCM below the ECP.**

C. **Insert the rods and recalculate the ECP if the reactor is critical because criticality was achieved below rod insertion limits.**

D. **Recalculate the ECP at 0200 because it is now one hour past the anticipated criticality time.**

1 Pt(s) Unit 1 was operating at 100%. Given the following events and conditions:

- 0200 - reactor tripped due to a LOCA outside containment
- 0210 – crew enters ECA-1.2, *(LOCA Outside Containment)*
- 0220 – crew enters ECA-1.1, (*Loss of Emergency Coolant Recirc)*
- 0240 – The crew is performing step 18 in ECA-1.1.
  - Current conditions:
    - NCS pressure is 1400 psig
    - 1 NI pump running, indicating 130 gpm
    - 1 NV pump running, indicating 410 gpm
    - Both ND pumps off
    - No NS pumps running
    - Subcooling is 35°F

Which one of the following statements correctly describes the required actions (if any) to establish minimum SI flow?

A. Minimum flow is 380 gpm, stop the running NI pump.

B. Minimum flow is 408 gpm, stop the running NI pump.

C. Minimum flow is 442 gpm, neither pump may be secured at this time.

D. Minimum flow is 494 gpm, neither pump may be secured at this time.

1 Pt(s)

Unit 2 is conducting a plant startup at 6% power. Given the following events and conditions:

- Intermediate range channel N-35 begins to operate erratically.
- Rod motion was stopped.
- A troubleshooting plan is implemented.
- The N-35 channel "LEVEL TRIP" switch is in "BYPASS".

Which one of the following statements correctly describes the N-35 fuses (if any) that can be removed without resulting in a reactor trip?

A. Control power fuses only

B. Instrument power fuses only

C. None of the fuses can be removed

D. Either the instrument power or control power fuses but not both at the same time

1 Pt(s) Which one of the following statements correctly describes the effect (if any) that time in core life has on the pressure transient associated with the design basis ATWS event?

A. NCS pressure increase will be greater at BOL than at EOL.

B. NCS pressure increase will be greater at EOL than at BOL.

C. NCS pressure increase will be greater at BOL for an ATWS at hot zero power (HZP) and greater at EOL for an ATWS at hot full power (HFP).

D. There is relatively little difference between BOL and EOL ATWS pressure response.

1 Pt(s) Unit 1 is operating at 83% power. Given the following events and conditions:

- A loss of offsite power occurs.
- The reactor trip breakers open
- Control rod H-8 is stuck at 17 steps.
- One turbine stop valve is not closed.
- All other systems have responded normally to the event.

Which of the following is the first reactor operator immediate action required for these conditions?

A. Insert control rod H-8

B. Trip the reactor

C. Runback the main turbine

D. Close the MSIVs and MSIV bypass valves

1 Pt(s) Unit 2 is operating at 51% power. Given the following events and conditions:

- CF Pump 2B is out of service for maintenance
- An electrical transient causes a loss of offsite power
- CF Pump 2A trips
- All systems respond normally
- Operators take appropriate immediate actions
- The following S/G levels occurred:

	S/G A	S/G B	S/G C	S/G D
S/G Level (NR)	35 %	35 %	40 %	39 %

Which one of the following statements correctly describes the complete CA system alignment for these conditions?

A. No CA pumps are running

B. The 2A MDCA pump is running feeding S/Gs A and B

C. The 2A MDCA pump is running feeding S/Gs A and B
The 2B MDCA pump is running feeding S/Gs C and D

D. The 2A MDCA pump is running feeding S/Gs A and B
The 2B MDCA pump is running feeding S/Gs C and D
The CAPT pump is running feeding all four S/Gs

1 Pt(s)

Unit 1 is responding to a total loss of feedwater accident from 100% power.

Step 22 of FR-H.1 (*Respond to a Loss of Secondary Heat Sink*) requires aligning N_2 to the PZR PORVs.

Which one of the following statements correctly describes:
1. The source of the N_2 pressure, and
2. The correct EOP bases for this step?

A. **1. N_2 pressure comes from dedicated accumulators**
2. PORVs are required to respond to NC system pressure changes and provide a bleed and feed path.

B. **1. N_2 pressure comes from dedicated accumulators**
2. PORVs are required for depressurizing the NC system to protect the S/G tubes from creep failure.

C. **1. N_2 pressure comes from the cold leg accumulators**
2. PORVs are required to respond to NC system pressure changes and provide a bleed and feed path.

D. **1. N_2 pressure comes from the cold leg accumulators**
2. PORVs are required for depressurizing the NC system to protect the S/G tubes from creep failure.

1 Pt(s) Unit 1 is responding to a loss of all feedwater event at 100% power. Given the following events and conditions:

- The crew is implementing FR-H.1 (*Response to Loss of Secondary Heat Sink)*
- NCS pressure is 2335 psig
- Incore thermocouples indicate 545 °F
- Step 18 of FR-H.1 requires operator to "*Perform Steps 19 through 23 quickly ... by NC bleed and feed.*"

Which one of the following statements describes the correct action, time requirement and bases for initiating bleed and feed?

A. **The crew must have feed and bleed in service through at least one PORV within 30 minutes to prevent damage to the NV pumps by deadheading.**

B. **The crew must have feed and bleed in service through at least one PORV within 30 minutes of meeting the initiation criteria to assure enough flow to remove decay heat.**

C. **The crew must have feed and bleed in service through at least two PORVs within 4 minutes to prevent damage to the NV pumps by deadheading.**

D. **The crew must have feed and bleed in service through at least two PORVs within 4 minutes of meeting the initiation criteria to assure enough flow to remove decay heat.**

1 Pt(s)

Unit 1 was operating at 96% power. Given the following events and conditions:

- 1NV-309 (*Seal Water Injection Flow*) failed shut.
- The operators entered AP/1/A/5500/12 Case I (*Loss of Charging*).
- They transitioned to Case II to place excess letdown in service.
- Enclosure 4.12 to OP/1/A/5500/12 (*Establishing/Securing Excess Letdown*) contains a requirement to initially limit the opening of 1NV-124B (*Excess Letdn Press Ctrl*) to 6%.

Which one of the following statements correctly characterizes the reason for this procedural limitation and describes the responsibilities of the operator assigned?

A. To prevent thermal shock of the VCT thermal sleeve during initiation of excess letdown flow.

B. To minimize any change in VCT boron concentration caused by the initiation of flow through the excess letdown piping.

C. To prevent thermal shock of the excess letdown heat exchanger during initiation of excess letdown flow.

D. To minimize the backpressure fluctuation on the NCP seals, and prevent water hammer in the piping to the VCT.

1 Pt(s)

Unit 1 is responding to a LOCA inside containment. Given the following conditions:

- Reactor trip and safety injection actuated
- Containment pressure peaked at 3.2 psig
- FWST level dropped to 41%

Which one of the following statements correctly describes the basis for the automatic alignment of the KC system?

A. Safety injection actuation isolates the non-essential KC headers to maximize cooling to the essential loads.

B. Phase B actuation isolates the non-essential KC headers to maximize cooling to the essential loads.

C. Phase B actuation isolates the non-essential KC headers to prevent KC pump run-out.

D. Safety injection actuation isolates the non-essential KC headers to prevent KC pump run-out.

1 Pt(s)

Unit 1 is operating at 50% power. Given the following events and conditions:

- Annunciator 1AD-6 B/7 *(PZR LIQUID HI TEMP)* alarms.
- Pressurizer liquid temperature reads 668 °F.
- WR NC pressure reads 2208 psig.
- Pressurizer backup heaters are on.
- Pressurizer spray valves are closed.
- Pressurizer level reads 40%.

REFERENCES PROVIDED

Which one of the following statements correctly describes the cause of the alarm, and any required actions?

A. The PZR pressure controller has failed; take manual control of the controller.

B. The PZR pressure controller has failed; secure all PZR heaters and initiate spray.

C. The PZR temperature instrument has failed; secure the PZR backup heaters.

D. The PZR temperature instrument has failed; no action is required.

1 Pt(s) Unit 1 was operating at 100 % power. Given the following events and conditions:

- A runback causes a power reduction to 81%.
- Control rod H-8 in bank D failed to move with the rest of the bank.
- Rod control urgent failure alarm has NOT actuated
- 1AD-2 B/3 (*COMPARATOR P/R CHANNEL DEVIATION)* is lit
- Bank D is at 210 steps
- Rod H-8 in bank D is at 228 steps

Which one of the following statements correctly describes the crew's immediate actions, and the reason for the requirement to realignment rod H-8 within one hour?

A. **Turbine power is held constant and reactor power is adjusted to match to the turbine. The core is in an unanalyzed condition and the safety analysis will be invalidated.**

B. **Reactor power is held constant and the turbine is adjusted to match reactor power. The core is in an unanalyzed condition and the safety analysis will be invalidated.**

C. **Turbine power is held constant and reactor power is adjusted to match to the turbine. Local xenon redistribution may become significant, causing excessive power peaking and DNBR will be degraded.**

D. **Reactor power is held constant and the turbine is adjusted to match reactor power. Local xenon redistribution may potentially cause power peaking and DNBR degradation.**

1 Pt(s) Unit 1 is operating at 97% power when a reactor trip occurred. Given the following conditions:

Channel	Flux Level	SUR
PR N44	0 %	
PR N43	11%	
PR N42	0 %	
PR N41	12%	
IR N36	$9x10^{-11}$	-1/3 DPM
IR N35	$5x10^{-11}$	-1/3 DPM
SR N32	0 CPS	0 DPM
SR N31	0 CPS	0 DPM

Which one of the following statements correctly describes why the source range instruments are not indicating?

A. IR channel N36 has not reached P-6.

B. Loss of power to bus 1ERPB.

C. PR channel N41 has not reached P-10.

D. Loss of power to bus 1ERPB.

1 Pt(s) Unit 2 is operating at 93% power. Given the following events and conditions:

- There is a 40 GPM tube leak in steam generator (S/G) 2C.
- 2EMF-33 (Condenser Air Ejector Exhaust) Trip 2 alarms.

Which one of the following statements correctly describes the most sensitive EMF indication to identify the affected S/G and the type of activity monitored by that EMF?

A. 2EMF- 12 (*Steamline C*) monitors primarily N16 gamma emissions

B. 2EMF- 12 (*Steamline C*) monitors primarily gaseous activity emissions

C. 2EMF-34 (L) (*S/G Sample (Low Range)*) monitors primarily beta-gamma activity

D. 2EMF-73 (*S/G C Leakage*) monitors primarily N16 gamma emissions

1 Pt(s)

Unit 1 was operating at 98% power when a steam generator over pressure event occurred. Given the following events and conditions:

- The crew has entered FR-H.2 (*Response to S/G Overpressure*).
- Step 4 of FR-H.2 states:

  "IF AT ANY TIME affected S/G(s) N/R level increases to greater than 92%, THEN steam should not be released from affected S/G(s)."

Which one of the following statements does **NOT** describe a reason for this prohibition during this event?

A. Two-phase flow to the main steam line could damage the main turbine.

B. The main steam safety valves are not designed to vent/pass water.

C. Two-phase flow to the main steam line could damage the CA pump turbine.

D. The main steam lines are not designed to carry water.

1 Pt(s) Unit 1 is operating at 79% power. Given the following events and conditions:

- The steam line from S/G 1B ruptured inside containment at 0615
- NS pump 1B did not start
- All other systems responded normally
- Containment temperature is 150°F
- Containment level is 2.5 feet
- Containment pressure is 3.5 psig, decreasing slowly
- Nominal T_{hot} is 250 °F
- Nominal T_{cold} is 245 °F, increasing slowly
- PZR level is 30%, increasing
- PZR pressure is 1700 psig, increasing

When the crew completes E-0 (*Reactor Trip*) at 0623 what is the correct procedure transition to address this event?

REFERENCES PROVIDED

A. Enter ES-1.1 (*Safety Injection Termination)*

B. Enter E-2 (*Faulted Steam Generator Isolation)*

C. Enter FR-P.1 (*Response to Imminent Pressurized Thermal Shock)*

D. Enter FR-Z.1 (*Response to High Containment Pressure)*

1 Pt(s)

Unit 1 is in a refueling outage and Unit 2 is operating at full power. Given the following conditions:

- VI has been manually isolated from VS due to high demand.
- The `A' VS compressor is aligned for base load service.
- The 'B' VS compressor is in standby.
- The SRO directs you to shift to the `B' VS compressor for base load service.

Which one of the following steps are the complete set of actions and control locations that will accomplish this task?

A.
1. Turn the both VS compressor mode select switches to OFF
2. Select the `B' VS compressor for base loading on the `A' VS compressor control panel
3. Turn the `B' VS compressor mode select switch to AUTO
4. Start the `B' compressor

B.
1. Start the `B' VS compressor
2. Select the `B' VS compressor for base loading on the `A' VS compressor control panel
3. Turn the `B' VS compressor mode select switch to AUTO
4. Turn the 'A' VS compressor mode select switch to OFF

C.
1. Turn the `B' VS compressor mode select switch to OFF
2. Select the `B' VS compressor for base loading on the `B' VS compressor control panel
3. Turn the `B' VS compressor mode select switch to AUTO
4. Turn the `A' VS compressor mode select switch to OFF

D.
1. Turn the `B' VS compressor mode select switch to AUTO
2. Select the `B' VS compressor for base loading on the `B' VS compressor control panel
3. Turn the `A' VS compressor mode select switch to OFF
4. Start the 'B' VS compressor

1 Pt(s)

Unit 1 is operating at full power and Unit 2 is refueling. The 'C' waste decay tank is being released in accordance with an approved gaseous waste release permit.

Which one of the following alarms are valid indications that the release control valve 1WG-160 has closed to terminate the release?

A. 1RAD-1; B/3 (EMF-41 Aux Bldg Vent Hi Rad) alarms.

B. 1RAD-1; F/3 (EMF-50 Waste Gas Disch Loss of flow) alarms.

C. 1RAD-2; A/2 (1EMF 36 Unit Vent Gas Hi Rad) alarms.

D. 1RAD-2;D/5 (1EMF 35/36/37 Unit Vent Loss of Flow) alarms.

1 Pt(s)

Unit 1 is at 5% power preparing for a plant startup following a refueling outage. Given the following events and conditions:

- The TSAIL has no outstanding LCOs.
- Maintenance is scheduled to perform PMs to calibrate the torque switches for 1NI-173A (*ND TRN 1A HDR to COLD LEG ISOL*).
- The work order specifies 1NI-173A shall be red tagged shut.
- The SWM requests OSM approval to tag-out 1NI-173A to calibrate the MOV.

Which one of the following statements correctly describes the operating restrictions and implications of tagging 1NI-173A?

REFERENCES PROVIDED

A. 1NI-173A may be tagged out for 72 hours, because 100% of the ECCS flow is available from the B-train.

B. 1NI-173A may not be tagged out because this would make both trains of ND inoperable.

C. 1NI-173A may be tagged out for up to 240 hours, provided the NSWS upgrades on Unit 1 have not been completed.

D. 1NI-173A may not be tagged out, but can be cycled closed for valve testing for up to 2 hours.

1 Pt(s) Units 1 and 2 are at 100% power. Given the following events and conditions:

- The mechanical seal has failed on 2B ND pump.
- Seal repair will take 4 hours.
- The 2B NI pump room general area is 430 mrem/hr due to fuel pin failures.
- The worker has an accumulated annual dose of 800 mrem.

Which one of the following statements correctly describes the worker's capability to complete this job within the site radiation exposure requirements?

A. The worker must obtain a dose extension from the Radiation Protection Supervisor to exceed the DE alert flag dose limit.

B. The worker must obtain a dose extension from the Radiation Protection Manager to exceed the DE exclusion flag dose limit.

C. The worker must obtain a dose extension from the Radiation Protection Manager to exceed the DE Maximum Allowable Exposure.

D. The worker must obtain a dose extension from the Site vice President to exceed the DE Maximum Allowable Exposure.

1 Pt(s)

Unit 2 was operating at 81% power. Given the following events and conditions:

- Annunciator 2FO-1; F/5 (TURB TRIP CAUSES RX TRIP) alarms.
- Reactor power is zero.
- Intermediate range channel N35 reads 10^{-9} amps, lowering.
- Intermediate range channel N36 reads off scale high.
- Reactor trip breaker (RTB) A is OPEN.
- RTB B is frozen CLOSED.
- All rod bottom lights are lit, except rod M-8.

If the reactor operator follows all guidance for emergency response, which one of the following statements correctly describes the required immediate operator actions before the Unit 2 supervisor reads the first emergency procedure step?

A. The reactor operator will manually rotate the reactor trip handles <u>once</u> in E-0.

B. The reactor operator will manually rotate the reactor trip handles <u>twice</u> in E-0.

C. The reactor operator will manually rotate the reactor trip handles <u>three times</u> - twice in E-0 and once again after transitioning to FR-S.1.

D. The reactor operator will manually rotate the reactor trip handles <u>four times</u> - twice in E-0 and twice again after transitioning to FR-S.1.

1 Pt(s)

Unit 1 is operating at 77% power. Given the following events and conditions:

- CA pump 1A is out of service
- A tube rupture occurs in the 1B S/G
- The crew is isolating the 1B S/G in E-3 *(Steam Generator Tube Rupture)*
- At Step 4.b of E-3, the steam supply valve(s) to the CAPT is (are) isolated.

Which one of the following statements correctly describes the required action if the SRO dispatches operators to the auxiliary building to isolate the CAPT steam supply?

A. **1SA-1 (*Main Steam 1B to CAPT Maint Isol*) is closed in Room 227.**

B. **1SA-3 (*S/G 1B SM to CAPT Stop Check*) is closed in Room 217.**

C. **1SA-1 and 1SA-4 (*Main Steam 1C to CAPT Main Isol*) are closed in Room 227.**

D. **1SA-3 and 1SA-6 (*S/G 1C SM to CAPT Stop Check*) are closed in Room 217.**

1 Pt(s) Unit 1 is in the process of shutting down for a refueling outage. Given the following conditions and events:

Time	0200	0201	0202	0203
NI-41	11%	9%	8%	7%
NI-42	12%	11%	9%	8%
NI-43	11%	9%	8%	7%
NI-44	12%	11%	10%	9%

Which one of the following statements correctly describes the required action, time and reason for this action?

A. **Manually unblock the power range neutron flux-low (25%) trip at 0201. This trip provides protection against a reactivity excursion while in low power or subcritical conditions and is required in Modes 1 through 5.**

B. **Manually unblock the power range neutron flux-low (25%) trip at 0202. This trip provides protection against a reactivity excursion while in low power or subcritical conditions in Modes 1 and 2 but is not required in modes 3-5.**

C. **Verify the power range neutron flux-low trip (25%) is automatically unblocked at 0201. This trip provides protection against a reactivity excursion while in low power or subcritical conditions in Modes 1 through 5.**

D. **Verify the power range neutron flux-low trip (25%) is automatically unblocked at 0202. This trip provides protection against a reactivity excursion while in low power or subcritical conditions in Modes 1 and 2 but is not required in modes 3-5.**

1 Pt(s)

Unit 2 is preparing to conduct a plant heat up in mode 4 during the winter. Given the following containment parameters as shown below:

Containment	**1500**	**1800**	**2100**	**2400**
Temperature (°F)				
Upper	60	59	58	57
Lower	64	63	62	61
Containment pressure (psig)	-0.09	-0.1	-0.11	-0.12

What is the first time at which Technical Specification limits are exceeded?

References Provided:

A. 1500

B. 1800

C. 2100

D. 2400

1 Pt(s)

Unit 2 was operating at 71% power. Given the following events and conditions:

- The unit experienced a loss of vital control power.
- The unit tripped when the MSIVs closed.
- The crew is performing E-0 (*Reactor Trip or Safety Injection)* and AP/29 (*Loss of Vital or Aux Control Power)* concurrently.
- 2ETB has retained control power.

Which one of the following statements correctly describes the bus failure(s) that caused this event?

A. There was a loss of bus 2EPB.

B. There was a loss of bus 2EPD.

C. There was a loss of busses 2EPB and 2EDF.

D. There was a loss of busses 2EPD and 2EDF.

1 Pt(s)

Unit 1 was operating at 100% power when a VI header rupture occurred. Given the following events and conditions:

- The reactor was tripped
- The VI system was isolated from the VS system
- VI pressure was 5 psig.
- The steam generators pressures were at 1125 psig and increasing

Which one of the following statements correctly describes the capability to control the S/G pressure control?

A. **The PORVs will cycle in AUTO mode to maintain S/G pressure between 1125 and 1092 psig using backup N_2 pressure.**

B. **The PORVs are controlled in MANUAL from the control room using backup N_2 pressure to maintain S/G pressure.**

C. **The PORVs are controlled in MANUAL from the CAPT Panel in "Local" control using backup N_2 pressure to maintain S/G pressure.**

D. **The PORVs cannot be operated from either the control room or the CAPT panel. The S/Gs pressure will be controlled by the lowest set safety valve lifting at 1175 psig and reseating.**

1 Pt(s)

Unit 1 was operating at 100% power. Given the following events and conditions:

- The following CA control valves associated with CA pump #1 are closed in preparation for a pump performance test:
  - 1CA-64 (*CA Pump #1 Flow to S/G 1A*)
  - 1CA-52 (*CA Pump #1 Flow to S/G 1B*)
  - 1CA-48 (*CA Pump #1 Flow to S/G 1C*)
  - 1CA-36 (*CA Pump #1 Flow to S/G 1D*)
- 1SA-5 (*S/G 1C SM to CAPT*) opens
- CA Pump #1 starts

1. What is the reason that 1SA-5 opened and the CAPT started?
2. What is the status of the CA flow control valves?

A. **1. Failure of the 1B S/G WR level transmitter offscale low.**
2. CA flow control valves remain closed.

B. **1. Failure of the 1B S/G WR level transmitter offscale low.**
2. CA flow control valves reposition to full open.

C. **1. Loss of power to the SSF.**
2. CA flow control valves remain closed.

D. **1. Loss of power to the SSF.**
2. CA flow control valves reposition to full open.

1 Pt(s) Unit 1 had just attained 100% power following a restart one day after a reactor trip. Given the following events and conditions:

- Peak Xenon is burning out rapidly

Which one of the following statements correctly describes:
1. The change in AFD, and
2. The reactor trip protective feature that will protect the core from exceeding thermal limits due to excessive local power density if ΔI is not corrected?

A. **1. AFD is becoming more negative**
2. Neutron high flux trip will trip the reactor if AFD is not corrected.

B. **1. AFD is becoming more positive**
2. Neutron high flux trip will trip the reactor if AFD is not corrected.

C. **1. AFD is becoming more negative**
2. OPΔT trip will trip the reactor if AFD is not corrected.

D. **1. AFD is becoming more positive**
2. OPΔT trip will trip the reactor if AFD is not corrected.

1 Pt(s) Unit 1 was operating at 100% power when a small break LOCA occurred. Given the following events and conditions:

- Cooldown and depressurization is in progress in ES-1.2 (*Post Cooldown and Depressurization*)
- NC system pressure has stabilized at 410 psig
- FWST level is 70% and slowly decreasing
- The operators attempt to place 1A ND train in the RHR mode
- 1ND-1B and 1ND-2A (*ND Pump 1A Suct from Loop B*) will not open

Which one of the following statements correctly describes why 1ND-1B and 1ND-2A will not open?

A. The NC system pressure is too high

B. 1NI-185A (*ND pump 1A Suct from CNMT Sump*) is closed

C. ECCS train A has not been reset

D. 1NI-147B (*NI Pumps Recirc to FWST Isol*) is open

1 Pt(s) Unit 1 was operating at 100% when a turbine trip occurred. Given the following conditions and events:

- The turbine trip caused a reactor trip
- The transient caused a large break in the NC cold leg
- A subsequent loss of all ECCS results in transition to FR-C.2 (Response to Degraded Core Cooling)
- The Hydrogen analyzers have been placed in service
- The ice condenser AHUs have been secured
- Hydrogen concentration is 6.9%

Which one of the following statements correctly describes the proper approach for reducing Hydrogen concentration?

A. Energize the Hydrogen igniters ONLY

B. Dispatch operators to place the Hydrogen recombiners in service ONLY

C. Energize the Hydrogen Igniters AND dispatch operators to place the Hydrogen recombiners in service

D. Do NOT energize the Hydrogen igniters or place the Hydrogen recombiners in service. Consult with Station management to evaluate the correct mitigation strategy.

1 Pt(s) Unit 1 is in mode 5 preparing for a plant startup.

- The NC system is aligned for vacuum refill in preparation for drawing a bubble in the pressurizer.
- Current PRT level is 8%

Which one of the following statements correctly describes the effect of drawing a bubble in the pressurizer on the PRT?

A. **Normal input lines from the NC system are isolated for vacuum refill. Any leakage through these lines will cause backflow from the waste gas system into the PRT.**

B. **Normal input lines from the NC system are isolated for vacuum refill. Any leakage through these lines will cause PRT level to decrease as water is drawn from the PRT into the NC system.**

C. **All Pzr PORVs and reactor vessel head vents are open during vacuum refill. PRT pressure will equalize with NC system pressure.**

D. **All Pzr PORVs and reactor vessel head vents are open during vacuum refill. PRT level will decrease as water is drawn from the PRT into the NC system.**

1 Pt(s) Unit 1 is in mode 3 with all shutdown banks withdrawn in preparation for startup when the following occur:

- 1AD-6 E/3 (*NCP Thermal Barrier KC Outlet Hi/Lo Flow*) is lit
- The BOP determines from OAC indications that KC flow to NCP 1C is 75 gpm.

What effects will this have on NCP 1C and what action should be taken to address the alarm?

A. NCP 1C seal cooling is being provided by the NV system. Verify 1KC-345A (*NC Pump 1C Therm Bar Otlt*) closes immediately.

B. NCP 1C seal cooling is being provided by the NV system. Verify 1KC-345A (*NC Pump 1C Therm Bar Otlt*) closes after a 30 second time delay.

C. All seal cooling to NCP 1C is lost. Open the #1 seal bypass valve for the 1C NCP to restore cooling.

D. All seal cooling to NCP 1C is lost. Trip NCP 1C to prevent seal failure.

1 Pt(s) Unit 1 was operating at 100% power. Given the following events and conditions:

- The pressurizer pressure master controller slowly drifts over the course of 30 minutes such that NC system pressure was being controlled at 2285 psig.
- A secondary system transient causes actual NC system pressure to increase from 2285 to 2325 psig.

What is the status of the pressurizer pressure control system?

A. Pzr spray valve closed, Pzr PORVs closed

B. Pzr spray valves throttles, Pzr PORVs closed

C. Pzr spray valves full open, Pzr PORVs closed

D. Pzr spray valves full open, Pzr PORVs open

1 Pt(s)

Unit 1 as operating at 80% power and steady awaiting NI calibrations. Given the following events and conditions:

- The CF heater bypass valve on the high pressure heater strings is inadvertently left partially open following a refueling outage due to a limit switch problem.
- An operator on rounds notes locally that valve indicates mid-position and notifies the control room.
- The control room operator places rods in manual and does not move them during the evolution.
- The control room instructs the operator to manually close the valve.

What is the effect on the reactor power and reactor coolant temperature as the valve is closed?

A. Reactor power increases - NC T_{avg} increases

B. Reactor power increases - NC T_{avg} decreases

C. Reactor power decreases - NC T_{avg} increases

D. Reactor power decreases - NC T_{avg} decreases

1 Pt(s)

Unit 1 is operating at 13% power and preparing to increase power with condensate/feedwater status as follows:

	1A	1B	1C
Hotwell pump	Tagged out for PMs.	Not running. Control switch in "AUTO"	Running
Condensate booster pump	Running	Tagged out for PMs.	Not running. Control switch in "AUTO"
Main feedwater pump	Running	Tagged out for PMs.	N/A

The 1C hotwell pump breaker trips due to an overcurrent relay actuation.

What is the status of:

1. The 1B hotwell pump and the 1A CF pump.
2. The turbine and reactor.

A. **1. 1B hotwell pump will automatically start and clear the low condensate flow condition within the 20-second time delay; 1A CF pump will continue to run.**
2. The turbine trips on AMSAC, the reactor will remain at ~14% power.

B. **1. 1B hotwell pump will automatically start and clear the low condensate flow condition, but not within the 20 second time delay; 1A CF Pump will trip after 20 seconds.**
2. The turbine and reactor will automatically trip.

C. **1. 1B hotwell pump will not start; 1A CF pump will immediately trip.**
2. The turbine and reactor will automatically trip.

D. **1. 1B hotwell pump will not start; 1A CF pump will immediately trip.**
2. The turbine will trip automatically, the reactor will be manually tripped.

1 Pt(s)

Inadvertent operation of the containment air return system can cause excessive depressurization (implosion) of the containment building.

Which of the following protective interlocks prevents an inadvertent start of the air return fans?

A. **The fans will not start for 9 minutes thereby providing time to reverse an inadvertent start action.**

B. **The fans will not start if the isolation damper is not open, requiring two separate actions before an inadvertent start.**

C. **The fans will not start if there is > 0.5 psid across the isolation damper indicating the potential to open the lower ice condenser doors.**

D. **The fans will not start without a valid CPCS permissive signal indicating an actual need for air return system operation.**

1 Pt(s) Unit 1 was operating at 100% when a SGTR rupture occurred. Given the following events and conditions:

- The 1C S/G develops a large tube leak
- Operator enter AP-10 (*Reactor Coolant Leak*) Case I (*Steam Generator Tube Leak*)
- The leak rate slowly increases until the tube finally ruptures

Which one of the following statements correctly describes the steam flow and feedwater flow characteristics of the ruptured S/G prior to the reactor trip and safety injection?

A. Steam flow decreases, feedwater flow increases.

B. Steam flow increases, feedwater flow decreases.

C. Steam flow decreases, feedwater flow increases.

D. Steam flow decreases, feedwater flow decreases.

1 Pt(s)

Unit 1 is operating at 100% power. Given the following events and conditions:

- "A" and "B" RL pumps are in service.
- "C" RL pump is tagged out while the pump is being rebuilt.
- RL Pressure Controller malfunctions and causes all turnaround valves to fail full open.

Which one of the following statements correctly describes the consequences of this situation?

A. RL flow to the KR heat exchangers increases resulting in the temperature control valves closing to maintain KR temperature constant.

B. RL flow to the KR heat exchangers decreases resulting in the temperature control valves opening to maintain KR temperature constant.

C. RL flow to the IPB air coolers will increase which may result in condensation in the IPBs during low load conditions.

D. RL flow to the IPB air coolers will decrease which may require a load reduction to prevent the IPBs from overheating.

1 Pt(s)

Unit 1 was operating at 100% power with all operating parameters in a stable condition. Given the following events and conditions:

- The pressurizer pressure and level control systems are in a normal alignment.
- 1NV-294 is in auto control
- The spray valve develops a slight seat leak
- Pressurizer pressure stabilizes at 2220 psig with all heaters on.

If the operators take all required procedural actions, what changes will occur for the valve positions on 1NV-294 and 1NV-309?

A. 1NV-294 opens – 1NV-309 opens

B. 1NV-294 opens – 1NV-309 closes

C. 1NV-294 closes – 1NV-309 opens

D. 1NV-294 closes – 1NV-309 closes

1 Pt(s) Unit 1 was operating at 80% power when a small steam leak occurred in the turbine building.

What trends will occur for Tavg and reactor power 10 minutes after the leak starts?

A. Tavg increases - reactor power increases

B. Tavg increases – reactor power remains constant

C. Tavg decreases – reactor power increases

D. Tavg decreases – reactor power remains constant

1 Pt(s)

Unit 1 was operating at 100% NC system pressure increases. Given the following conditions and events:

- The master pressure controller develops an output bias that results in a step increase of +30 psig over the nominal value.
- NC system pressure stabilizes at 2255 psig.
- 1NV-294 (*NV Pumps A&B Disch Flow Ctrl*) is in manual control and set at 87 gpm.
- 1NV-148 (*Letdn Press Control*) is in manual and set to 350 psig.
- 1NV-849 (*Letdn Var Orif Ctrl*) is set to control at 75 gpm.

Which one of the following statements correctly describes the initial effect of this pressure increase on the make up / letdown balance with no operator action?

A. The make up / letdown balance changes because the increase in NC pressure causes charging flow to decrease and letdown flow to increase.

B. The make up / letdown balance changes because the increase in NC pressure causes charging flow to increase and letdown flow to decrease.

C. The make up / letdown balance does not change because the increase in NC pressure causes charging flow and letdown flow to decrease by the same amount.

D. The make up / letdown imbalance does not effect charging flow and letdown flow as the NV system automatically compensates for the change in pressure.

1 Pt(s)

Units 1 and 2 were operating at 100% power with a liquid release from the WL system in progress. Given the following events and conditions:

- EMF-49(L) (*Liquid Waste Disch (Lo Range)* (a RP86A digital module) shows the following indications:
  - Green light - LIT
  - Amber light - LIT
  - Red light – NOT LIT

Which one of the following statements correctly describes the dose rate being monitored by this digital module?

A. The dose rate is below the TRIP-2 setpoint

B. The dose rate is between the TRIP 1 and TRIP 2 setpoints

C. The dose rate is above the TRIP 2 Setpoint

D. The EMF module has malfunctioned and the dose rate is unknown

1 Pt(s)

Unit 1 is in the process of performing a reactor startup. Given the following conditions and events:

- Control Bank "A" is at 28 steps withdrawn when the following alarms are received:
  - 1AD-6, A/5 (*NCP HI VIBRATION*)
  - 1AD-6, B/5 (*NCP HI-HI VIBRATION*)
- The BOP validates that the 1C NC Pump vibration level on the frame is at 6.5 mils using the NC Pump vibration monitor panel.

Which one of the following selections is the list of the correct actions based on this situation?

A. Reinsert Control Bank "A" rods.
Trip 1C NC Pump.
Go to AP-4 (*Loss of Reactor Coolant Pump*).

B. Trip 1C NC Pump.
Go to AP-4 (*Loss of Reactor Coolant Pump*).

C. Trip the reactor.
Trip 1C NC Pump.
Go to E-0 (*Reactor Trip or Safety Injection*).

D. Pump trip criteria is not yet met.
Go To AP-8 (*Reactor Coolant Pump Malfunction*).

1 Pt(s)

Tech Spec 3.1.1 requires adequate shutdown margin shall be maintained when shutdown cooling is in service in modes 4 and 5 in order to mitigate a boron dilution accident. Fill in the blanks to correctly complete the following sentence regarding this accident.

The most limiting boron dilution accident is one initiated from Mode (__A__) at (__B__) of core life.

A. **4** **Beginning**

B. **4** **End**

C. **5** **Beginning**

D. **5** **End**

1 Pt(s)

Unit 1 was operating at 100% power when a small break LOCA occurred. Given the following events and conditions:

- Containment pressure reaches 0.5 psig

Which one of the following statements correctly describes the response of the containment ventilation system?

A. Upper containment air handling units and return fans go to MAX cool.

B. Lower containment air handling units shift to high speed.

C. Lower containment air handling units cooling bypass valves open.

D. Incore air handling units are placed in MAX cool.