

Senior Reactor Operator Examination

SRO #	1
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The following conditions exist on Unit 1:

- Reactor power is 20% during a power increase.
- 11 CC Pump is out of service for motor repair.
- 11 RHR Heat Exchanger is isolated on RHR side to facilitate testing for a possible tube leak.
- 12 Charging Pump is out of service.

Which of the following, if found to be inoperable, would require that a plant shutdown for Unit 1 be commenced within ONE hour as directed by Technical Specifications?

- a. D1 Diesel Generator
- b. 11 Charging Pump
- c. 12 SI Pump
- d. 13 CFCU

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SRO #

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With Unit 1 in REFUELING Mode, which of the following conditions, if it occurs, requires entry into C1.6 AOP1 "CONTAINMENT EVACUATION"?

- a. A VALID Source Range At Shutdown High Flux Level alarm.
- b. A stuck fuel assembly in the transfer tube.
- c. A loss of audible count rate circuit in the control room.
- d. Loss of the high voltage power supply for one Source Range channel while placing a fuel assembly in the core.

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SRO #	3
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Given the following conditions on Unit 1:

- An ATWS has occurred AND E-0 "Reactor Trip OR Safety Injection" was entered
- The operators then initiated the actions of 1FR-S.1 " Response To Nuclear Power Generation / ATWS "
- NO Adverse Containment parameters exist

Which of the following conditions identify the parameter(s) that must be satisfied in order to transition back to 1E-0 "Reactor Trip OR Safety Injection"?

- a. The Cold Shutdown Boron Concentration value is achieved.
- b. ALL Control AND Shutdown Bank rods indicate fully inserted.
- c. BOTH reactor trip breakers AND BOTH trip bypass breakers are verified open.
- d. Power Range NIS channels indicate less than 5% AND Intermediate Range SUR is negative.

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SRO #	4
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The following conditions exist on Unit 1:

- Reactor power is 100%.
- All control systems are in automatic
- Red Pressurizer Pressure Channel (PT-429) was declared inoperable and taken out of service with the appropriate bistables placed in the tripped condition.
- Controlling Pressurizer Pressure Channel (PT-431) fails HIGH.

What is the expected plant Response to the channel failure? (**assume NO operator action**)

- a. BOTH PORVs AND BOTH spray valves OPEN resulting in a reactor trip from low Pressurizer pressure followed by SI actuation.
- b. The reactor will TRIP on high pressure, AND SI will ACTUATE on low pressure due to spray valve operation.
- c. Pressurizer proportional heaters will de-energize AND spray valves will OPEN resulting in an OT Δ T runback to 90% power prior to the reactor tripping, AND SI will ACTUATE due to low Pressurizer pressure.
- d. BOTH PORVs AND BOTH spray valves remain CLOSED while Pressurizer heaters de-energize.

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SRO #	5
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Given the following conditions on Unit 1:

- A LOCA has occurred
- Containment pressure has risen to 28 psig
- All Containment Fan Cooler Units are operating
- Train B Containment Spray is operating
- One of the Containment Vacuum Breakers has been determined to be leaking past its seat at the rate of 0.5 psig per hour at 28 psig

What would the effect over the next 4 hours be if NO Containment Spray were available?

- a. Containment pressure would be HIGHER AND the total release from containment would be HIGHER.
- b. Containment pressure would be HIGHER AND the total release from containment would be LOWER.
- c. Containment pressure would be LOWER AND the total release from containment would be HIGHER.
- d. Containment pressure would be LOWER AND the total release from containment would be LOWER.

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SRO #	6
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The following is a timeline of activities associated with the 121 ADT Monitor Tank:

- 1000 - 121 ADT Monitor Tank is placed on recirc
- 1200 - 121 ADT Monitor Tank is sampled
- 1230 - Gen. Supt. Radiation Protection & Chemistry authorizes the release.
- 1315 - Shift Supervisor approves Discharge Permit
- 1700 - Shift turnover
- 1910 - Commenced release of 121 ADT Monitor Tank to the river

What is the problem associated with these actions AND what action should be taken once the problem is identified?

- a. The current Shift Supervisor did NOT approve the release. **Stop** the release until the current Shift Supervisor has signed the Discharge Permit.
- b. The Chemistry sample was NOT representative of the Tank contents. **Stop** the release AND **place** 121 ADT Monitor Tank on recirc.
- c. Too much time has elapsed between approval of the Permit and initiation of the discharge. **Stop** the release AND **reprocess** 121 ADT Monitor Tank.
- d. Discharging directly from 121 ADT Monitor Tank is NOT allowed. **Stop** the release AND **transfer** the contents of the tank to 121 CVCS Monitor Tank for release.

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SRO #	7
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A LOCA in Containment is in progress and the Reactor operator has recorded Containment parameters as follows:

<u>Time</u>	<u>Cont. Radiation</u>	<u>Cont. Pressure</u>
0812	8.1E3 R/hr	3.8 psig
0815	1.2E4 R/hr	4.5 psig
0831	1.4E5 R/hr	4.9 psig
0838	5.0E5 R/hr	5.8 psig

When was the first time Adverse Containment parameters were required to be used, and for how long will use of the Adverse Containment numbers be in effect?

- Adverse Containment was first entered at 0815, AND is in effect for the entire time the crew is in the EOPs.
- Adverse Containment was first entered at 0815, AND is in effect until containment parameters drop below the Adverse Containment setpoints.
- Adverse Containment was first entered at 0838, AND is in effect for the entire time the crew is in the EOPs.
- Adverse Containment was first entered at 0838, AND is in effect until containment parameters drop below the Adverse Containment setpoints.

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SRO #	8
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Given the following:

The site tour coordinator has contacted the Unit 1 Shift Supervisor and asks if there are any extra operators available to act as escorts during a planned site tour for a group of 17 people.

The tour schedule is as follows:

- 10:00 AM – Tour of turbine floor
- 11:00 AM – Tour of Spent Fuel Pool

What is the MINIMUM number of escorts required for each leg of the tour?

- a. 4 escorts for the Turbine Floor tour
4 escorts for the Spent Fuel Pool tour
- b. 2 escorts for the Turbine Floor tour
4 escorts for the Spent Fuel Pool tour
- c. 2 escorts for the Turbine Floor tour
2 escorts for the Spent Fuel Pool tour
- d. 4 escorts for the Turbine Floor tour
2 escorts for the Spent Fuel Pool tour

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SRO #	9
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Given the following conditions on Unit 1:

- A LOCA has occurred
- The actions of 1E-0 "Reactor Trip Or Safety Injection" have been completed
- Entry in 1E-1 "Loss Of Reactor OR Secondary Coolant" was made
- 1FR-Z.1 "Response To High Containment Pressure" has been entered due to an ORANGE condition for the CONTAINMENT Critical Safety Function (CSF)
- Following completion of the actions of 1FR-Z.1, the ORANGE condition still exists
- NO other RED or ORANGE CSF conditions exist

What is the action that should be taken?

- a. **Repeat** the sequence of steps of 1FR-Z.1 ONCE, THEN **return** to 1E-1.
- b. **Return** to 1E-1 at the step in effect, AND 1FR-Z.1 does NOT need to be repeated again.
- c. **Return** to 1E-1 at the step in effect AND **repeat** actions of FR-Z.1 in 10 minutes.
- d. **Repeat** actions in 1FR-Z.1 UNTIL the ORANGE condition clears, OR a higher ORANGE or RED condition occurs.

Senior Reactor Operator Examination

SRO #	10
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Given the following conditions on Unit 1:

- The Unit is at 80% power
- The operators have entered 1C5 AOP5 "MISALIGNED ROD, STUCK ROD, AND/OR RPI FAILURE OR DRIFT"
- The operator is reviewing the symptoms that indicate a possibly misaligned RCCA.

Which indication would NOT be present if the problem is a stuck RCCA?

- RPI AND Group Step Counter in disagreement.
- Abnormal flux tilt indicated on Power Range NIS.
- Movement shown on the suspect rod RPI as the IN-HOLD-OUT switch is operated.
- Movement shown on the suspect rod Group Step Counter as the IN-HOLD-OUT switch is operated.

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SRO #	11
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Given the following conditions on Unit 1:

- A LOCA has occurred with degradation of core cooling
- Core cooling has been restored
- Actions of ES-1.1 "Post LOCA Cooldown And Depressurization" are in progress
- Containment pressure is 4.6 psig after peaking at 28 psig
- Containment hydrogen is reading 6.2%

Which action concerning the containment hydrogen recombiners is appropriate?

The hydrogen recombiners should...

- a. NOT be started since the hydrogen level is in EXCESS of the detonation limit.
- b. NOT be started until plant-engineering staff concurs since the hydrogen flammability limit is EXCEEDED.
- c. be STARTED immediately since the hydrogen level is LESS THAN the detonation limit for adverse containment conditions.
- d. be STARTED immediately since the hydrogen level is LESS THAN the flammability limit for normal containment conditions.

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SRO #	12
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Given the following conditions on Unit 1:

- A loss of all AC power has occurred.
- The operators are responding per 1ECA-0.0, "Loss Of All Safeguards AC Power".
- The Shift Supervisor directs that SG pressures should not be decreased to below 200 psig during the subsequent SG depressurization step.

What concern is the Shift Supervisor addressing by this direction?

- a. Ensuring that an adequate heat sink is maintained by NOT reducing SG levels out of the narrow range.
- b. Ensuring that the RCS cooldown rate does NOT exceed the Tech Spec limit of 100°F/hr.
- c. Ensuring that Reactor Vessel Upper Head voiding does NOT occur due to RCS depressurization.
- d. Ensuring that Natural Circulation flow is NOT impeded due to Accumulator nitrogen injection.

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SRO #	13
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Given the following conditions on Unit 2:

- Reactor power is 30%
- Pressurizer pressure Yellow Channel (PT-449) has FAILED LOW AND was removed from service in accordance with 2C51 "Instrument Failure Guide - Unit 2"

Which of the following additional bistable actuations in this condition would result in a reactor trip?

- White Channel Overtemperature Delta-T **2TC-405-C**, OVER TEMP TRIP
- Blue Channel Turbine Impulse Pressure **2PC-486-A**, TURBINE PRESS P13
- Blue Channel Overpower Delta-T **2TC-407-A**, OVER POWER TRIP
- Yellow Channel Nuclear Power Range Instrument Drawer **N44A**, OVERPOWER TRIP HIGH RANGE

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SRO #	14
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Which of the following is correct concerning an Orange Path (Containment Sump "B" level greater than 8ft) in the Containment Critical Safety Function Status Tree?

- a. Continued Core cooling CANNOT be assured since the entire contents of the RWST has been injected into Containment.
- b. Critical plant components needed for plant recovery could be damaged and rendered inoperable due to flooding in Containment.
- c. Auxiliary Feedwater to a SG faulted in Containment must remain isolated even if required for cooldown of the RCS.
- d. Cooling Water to CFCUs must NOT be isolated since CFCUs are required to maintain Containment pressure less than 46 psig.

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SRO #

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Which of the following will automatically CLOSE **CV-31414**, 11 Steam Generator Blowdown (SGB) Control Valve?

- a. LOW level in the SGB Flash Tank.
- b. HIGH failure of Radiation Monitor 1R-19.
- c. HIGH temperature on the outlet of the SGB Flash Tank.
- d. TRIP of either the 11 MD or the 12 TD Auxiliary Feedwater pump.

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SRO #	16
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Given the following conditions on Unit 1:

- Reactor power is 100%
- All CFCUs are in operation supplied by chilled water
- 11 and 21 Aux. Bldg. and Cont. Chillers and pumps are running split
- An inadvertent Train B (only) Safety Injection (SI) signal is generated

What is the expected status of cooling supplied to the CFCUs? (**Assume NO operator action is taken**)

- 21 Chilled Water Pump is supplying 12 and 14 CFCUs, AND 121 and 11 Cooling Water Pumps are supplying 11 and 13 CFCUs.
- 11 Chilled Water Pump is supplying 11 and 13 CFCUs, AND 21 and 22 Cooling Water Pumps are supplying 12 and 14 CFCUs.
- 21 Chilled Water Pump is supplying 11 and 13 CFCUs, AND 121, 11 and 22 Cooling Water Pumps are supplying 12 and 14 CFCUs.
- 11 Chilled Water Pump is supplying 12 and 14 CFCUs, AND 21 and 22 Cooling Water Pumps are supplying 11 and 13 CFCUs.

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SRO #	17
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Why are the Containment Spray Pumps stopped in E1, "LOSS OF REACTOR OR SECONDARY COOLANT" when Containment pressure is less than 20 psig?

- a. To conserve RWST water.
- b. To reduce Diesel Generator loading.
- c. To prepare for placing the Containment Spray pumps on recirculation flow.
- d. To stop hydrogen production due to the NaOH reaction with metals in Containment.

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SRO #	18
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Given the following conditions on Unit 1:

- The Unit is at 100% power
- The DC electrical system is aligned for normal at-power operations.
- A breaker FAULT on the MCC breaker supplying 11 Battery Charger has caused it to TRIP open.

Which of the following states the LCO action required for this condition?

- a. Power must be RESTORED to 11 Battery Charger within 8 hours.
- b. BOTH Instrument Panels 111 AND 113 must be ALIGNED to the Inverter bypass source within 8 hours
- c. Within one hour power reduction must be INITIATED AND the Unit placed in at least HOT SHUTDOWN within the next 6 hours.
- d. Diesel Generator D-1 is inoperable, D-2 must be RUN within the next 24 hours AND power RESTORED to 11 Battery Charger within 7 days.

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SRO #	19
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Given the following conditions on Unit 1:

- A LOCA has occurred
- SI has actuated
- The actions of 1E-0 "Reactor Trip Or Safety Injection" are being performed
- Both SG Narrow Range levels are offscale low
- 11 SG pressure is 835 psig AND decreasing slowly
- 12 SG pressure is 885 psig AND decreasing slowly
- Containment pressure is 4 psig
- 11 RCS cold leg temperature is 521°F AND decreasing slowly
- 12 RCS cold leg temperature is 530°F AND decreasing slowly

Which of the following is correct about the SG pressures?

- a. NO SG pressure is decreasing in an uncontrolled manner.
- b. ONLY 11 SG pressure is decreasing in an uncontrolled manner.
- c. ONLY 12 SG pressure is decreasing in an uncontrolled manner.
- d. BOTH SG pressures are decreasing in an uncontrolled manner.

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SRO #	20
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Given the following conditions:

- The plant is at 70% power
- Failure of automatic control results in one Main Feedwater valve going closed.
- The operator takes manual control and rapidly opens the valve to near its previous position.

Which of the following is the INITIAL response to re-opening the valve?

- a. Turbine power output INCREASES due to increase in steam temperature.
- b. Pressurizer level INCREASES due to increase in RCS Tavg.
- c. S/G level SWELLS due to the rapid addition of feedwater.
- d. Rods STEP IN due to the increase in reactor power.

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SRO #	21
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Given the following conditions:

- A LOCA outside containment has occurred
- The Shift Manager has assumed the role of the Emergency Director
- The faulted line was manually isolated locally, however the operator performing the task was injured and CANNOT leave the area on his own
- Initial dose rate estimates for the area are 75 R/hr
- The recovery time for the injured operator using a search and rescue team is estimated to take 10 minutes.

Which of the following describes the conditions concerning a rescue attempt?

- a. NO attempted rescue may be made since the exposure will exceed the allowed dose guidelines.
- b. NO special authorization is required since this exposure will NOT exceed 10CFR20 NRC limits.
- c. Individuals SELECTED by the Emergency Director may attempt the rescue WITH the approval of the Emergency Director.
- d. Only VOLUNTEERS, after being made aware of all risks, can attempt the rescue WHEN authorized by the Emergency Director.

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SRO #	22
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Given the following conditions on Unit 1:

- The Unit is at 80% power
- Steam Dump control is in Tavg mode
- The Main Steam Header Pressure Controller is in MANUAL AND set to ZERO

During a subsequent 100 MW load rejection, the RO reports that the red channel cold leg RTD FAILED HIGH AND the following conditions are noted for the Steam Dump System:

- Aqua Status Light **47014-0405**, LOSS OF LOAD INTERLOCK, is lit
- Aqua Status Light **47014-0502**, CDSR STEAM DUMP PREMISSIVE, is lit

What action should be taken with respect to the Steam Dumps to restore the system to normal conditions (ONCE CORRECTIVE ACTIONS ARE COMPLETED for the failed Tavg channel)?

- Momentarily **place** STEAM DUMP MODE selector to RESET.
- Momentarily **place** ONLY the STEAM DUMP CDSR VLV LO-LO TAVG INTLK B-P TRAIN A switch to OFF/RESET.
- Momentarily **place** BOTH STEAM DUMP CDSR VLV LO-LO TAVG INTLK B-P TRAIN A and TRAIN B switches to BYPASS INTERLOCK.
- Place** the STEAM DUMP MODE selector to STEAM PRESS.

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SRO #	23
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Given the following conditions on Unit 1:

- The crew is in the process of completing 1D8 "Unit 1 Filling And Venting The Reactor Coolant System".
- RCS Pressure is 360 psig
- RCS temperature is 118°F
- 11 and 12 SG skin temperatures are 75°F
- 12 RCP has been standing idle for 30 minutes after 2 unsuccessful attempts to complete the required 5-minute run due to RCS pressure drop.
- The RCS system engineer recommends an immediate third start to complete the 5-minute run and sweep air from the SG U-Tubes

Based on this information, what action should the operators take concerning 12 RCP?

- a. Immediately **start** 12 RCP since the RCS is within 50°F of 12 SG skin temperature.
- b. Do NOT start 12 RCP until the RCS is within 40°F of 12 SG skin temperature to minimize the RCS pressure transient.
- c. Do NOT start 12 RCP until at least 45 minutes has elapsed since the last start to prevent the motor windings from overheating.
- d. Immediately **start** 12 RCP since greater than 20 minutes has elapsed since the last start.

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SRO #

24

The following conditions exist on Unit 1:

- The unit is in HOT SHUTDOWN during a normal cooldown
- RCS temperature is at 520°F
- Pressurizer pressure is 1700 psig
- At this point, all Unit 1 4.16KV busses lose power (Loss of all AC power)

How would emergency procedure 1ECA-0.0 "Loss of Safeguards AC Power" be used in this situation?

- a. ENTER 1ECA-0.0 immediately upon verification of loss of power to buses 15 and 16.
- b. ENTER 1ECA-0.0 ONLY if RCS temperature rises above 540°F.
- c. ENTER 1ECA-0.0 ONLY if a safety injection signal occurs also.
- d. ENTER 1ECA-0.0 ONLY if power is NOT restored to EITHER bus 15 or bus 16 when RCS temperature reaches 350°F.

Incorrect - As discussed in the WOG and prairie Island EOP Users Guides, ECA-0.0 is to be entered immediately upon identifying that the safeguards buses are deenergized. The operator need not wait until a safety injection signal is generated before entering 1ECA-0.0.

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SRO #	25
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Given the following conditions on Unit 1:

- A steam line break has occurred on the "B" loop main steam header downstream of 12 MSIV
- A common mode failure has PREVENTED CLOSURE of both MSIVs
- RCS cooldown rate is 160°F/hr
- Both SG WR levels are less than 50%

When the appropriate actions are taken, what AFW flow will be established?

- 200 gpm to each SG.
- 200 gpm to 11 SG and 0 gpm to 12 SG.
- 160 gpm to 11 SG and 40 gpm to 12 SG.
- 40 gpm to each S/G.

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SRO #	26
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Given the following conditions on Unit 1:

- A LOCA has occurred
- The feeder breaker to 480V Bus 121 tripped open upon the LOCA
- Containment Pressure is 25 psig

What is the status of the Containment Spray system? (**Assume NO operator actions taken**)

- 12 CS pump is running normally, 11 CS Pump is running at shutoff head.
- 11 CS pump is running normally, 12 CS Pump is running at shutoff head.
- 11 CS pump is running normally, 12 CS Pump is NOT running.
- 12 CS pump is running normally, 11 CS Pump is NOT running.

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SRO #	27
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Given the following conditions on Unit 1:

- The Unit is at 100% power
- Component Cooling (CC) to 11 SI Pump has been isolated to stop a CC system leak
- A LOCA then occurred on Unit 1 reducing RCS pressure to 1400 psig
- 11 SI pump auto started on the SI signal
- All Safeguards Equipment responded as expected to the SI actuation signal

What is the preferred action regarding 11 SI Pump?

- a. **Allow** 11 SI pump to run as long as the Unit Coolers for the SI Pumps are operating.
- b. **Allow** 11 SI pump to run for up to three hours without CC flow.
- c. **Stop** 11 SI pump since the pump can NOT be operated without CC flow.
- d. **Stop** 11 SI pump since 12 SI Pump is operating properly.

Senior Reactor Operator Examination

SRO #	28
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Given the following conditions on Unit 1:

- Reactor power is 7%
- Steam dump to the condenser is OPEN maintaining Steam Header Pressure
- Turbine is latched and rolling at 1800 RPM
- 11 Main Feedwater Pump is running
- All Condensate Pumps have just TRIPPED due to low water level in the hotwell

What will occur in the SG feed systems?

- a. 11 Main Feedwater Pump **trips** IMMEDIATELY; the AFW pumps **start** WHEN the Main Feedwater pump trips.
- b. 11 Main Feedwater Pump **trips** IMMEDIATELY; the AFW pumps **start** WHEN SG level reaches the Lo-Lo setpoint.
- c. 11 Main Feedwater Pump **trips** after a 15-second time delay; the AFW pumps **start** WHEN the Main Feedwater pump trips.
- d. 11 Main Feedwater Pump **trips** after a 15-second time delay; the AFW pumps **start** WHEN SG level reaches the Lo-Lo setpoint.

Senior Reactor Operator Examination

SRO #	29
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(see reference)

Given the following conditions on Unit 1:

- The reactor tripped from 99.5% power due to a generator trip
- Buses 11 and 12 have FAILED TO TRANSFER to 1R transformer following the trip AND power cannot be restored to either bus for 4 days
- All CST levels are at 100,000 gallons AND makeup water is available
- All plant parameters stabilize at no-load conditions without SI actuation
- Following completion of the IMMEDIATE ACTION steps of 1E-0 "Reactor Trip Or Safety Injection" entry is made into 1ES-0.1 "Reactor Trip Recovery"

Which of the following describes the direction provided by the Unit 1 Shift Supervisor for controlling the plant over the period buses 11 and 12 remain out of service?

- a. **Transition** as directed to 1C1.2 "Unit 1 Startup Procedure" maintaining stable no-load conditions.
- b. **Remain** in 1ES-0.1 "Reactor Trip Recovery" maintaining stable no-load conditions until at least one RCP is available.
- c. **Transition** as directed to 1C1.3 "Unit 1 Shutdown" AND cooldown the RCS to 340°F.
- d. **Transition** as directed to 1ES-0.3A "Natural Circulation Cooldown With CRDM Fans" AND cooldown the RCS to 340°F.

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SRO #	30
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Which of the following pairs of annunciators would be indicative of a #2 ONLY seal failure of 11 RCP?

- a. - **47015-0206**, 11 RCP LABYRINTH SEAL LO DP
- **47015-0306**, 11 RCP SEAL LEAKOFF HI FLOW
- b. - **47012-0301**, 11 RCP STANDPIPE HI LVL
- **47015-0208**, 11 RCP NO. 1 SEAL INLT OR OUTL HI TEMP
- c. - **47015-0206**, 11 RCP LABYRINTH SEAL LO DP
- **47018-0605**, REACTOR COOLANT DRAIN TANK TEMP/PRESS/LVL
- d. - **47012-0301**, 11 RCP STANDPIPE HI LVL
- **47018-0605**, REACTOR COOLANT DRAIN TANK TEMP/PRESS/LVL

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SRO #	31
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Given the following conditions on Unit 1:

- At 2230 on 7/20/01, the operators recorded the incorrect number for the Boric Acid Tank placed on recirculation during that shift.
- At 2300 on 7/21/01, the operators realize that they had made the error concerning the Boric Acid Tank.

How do the operators make the required corrections?

- a. The correct number is inserted directly into the log for the previous night shift AND automatically prints the corrected legal copy of the log.
- b. The correct number is inserted directly into the log for the previous night shift, BUT the legal copy of the log for that day will NOT reflect the change.
- c. A corrected entry is made in the current shift log referring to the date and time of the incorrect log entry AND is printed out on the next legal copy of the log.
- d. A corrected entry is made in the current shift log that refers to the date and time of the incorrect log entry AND a handwritten change is made to the incorrect entry on the printed legal copy of the log.

Senior Reactor Operator Examination

SRO #	32
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Given the following conditions on Unit 1:

- A loss of all feedwater has occurred
- RCS temperature is 570°F and stable
- RCS pressure is 2290 psig
- 11 SG wide range level is 6%
- Condensate flow has just been established

Which of the following statements describes the possible result of initiating full feed flow to the 11 SG?

- a. Steam Generator tube failure could occur due to caustic stress corrosion.
- b. An overcooling event could occur due to excessive steaming.
- c. The RCS could be subjected to a Pressurized Thermal Shock (PTS) event.
- d. Steam Generator component degradation could occur due to significant thermal stresses.

Senior Reactor Operator Examination

SRO #	33
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Given the following conditions on Unit 1:

- Reactor power is 100%
- Red channel Thot RTD detector developed an open circuit
- Operator action has stabilized the plant

What function is DISABLED when the Red Channel is selected on the Tavg Defeat Switch AND taken to Pull Out?

- a. The continuous auto rod withdrawal signal.
- b. The high Pressurizer level control signal.
- c. The OP Δ T rod stop channel alert.
- d. The Tavg deviation alarm.

Senior Reactor Operator Examination

SRO #	34
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Given the following conditions on Unit 1:

- The Unit is in MODE 1 at normal operating pressure and temperature
- The operator has reported INCREASED charging pump speed AND charging flow
- Pressurizer level is 20% AND slowly trending down
- VCT level is 24% AND trending down
- R-15, Condenser Air Ejector Gas monitor AND R-19, SG Blowdown Liquid monitor show an increasing trend

What is the first action that requires the NRC Resident Inspector to be notified?

- a. Following entry into 1C4 AOP2 "Steam Generator Tube Leak".
- b. Following determination of the leak rate AND Action Level 2 steps for SG tube leakage are initiated.
- c. When the leak rate is determined to have EXCEEDED 10 gpm.
- d. When the leak rate is determined to have EXCEEDED the charging pump capacity AND the event has been classified.

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SRO #	35
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Which of the following events results in a LOCA in the Auxiliary Building if it occurs AFTER SI actuation with NO operator action taken?

- a. **MV-32202**, SI Test Line to RWST FAILS to CLOSE during recirculation following a LOCA, AND a RUPTURE of the 11 RWST.
- b. 11 RCP Thermal Barrier Heat Exchanger tube RUPTURE coincident with a LOSS of instrument air to Unit 1 Containment AND a PIPING BREAK at the CCW Surge Tank outlet.
- c. A steam generator TUBE RUPTURE in 12 SG coincident with a LOCKOUT of Bus 16 AND a RUPTURE of 11SGB Flash Tank.
- d. FAILURE of "Train A" Containment Isolation during a small-break LOCA with Excess Letdown in service, AND a PIPING BREAK at the Seal Water Heat Exchanger outlet.

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SRO #	36
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Given the following conditions:

- Unit 2 is at 50% power
- A load decrease is in progress per 2C1.4 "Unit 2 Power Operation"
- A lift coil fuse blows for a Control Bank "D", Group 1 rod

Which of the following describes the response of the rod control system to the next "outward" control rod demand signal?

- The affected rod will DROP while the rest of Control bank "D" will MOVE OUT.
- The affected rod will MOVE IN while the rest of Control bank "D" will MOVE OUT.
- The affected rod will NOT MOVE while the rest of Control bank "D" will MOVE OUT.
- ALL of Control Bank "D" rods will NOT MOVE AND an "urgent failure" alarm will come in.

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SRO #	37
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(see reference)

Given the following conditions on Unit 1:

- Reactor power is 80%
- Control Bank 'D' demand position is 185 steps
- Following a control rod exercise at 0200, rod position indication (RPI) for a Control Bank C rod was 200 steps
- Actual rod position was determined to be 225 steps
- At 0400 the following rod position indication were noted for Control Bank D rods after demand position was changed to 200 steps:
 - G-3 RPI, 200 steps
 - C-7 RPI, 185 steps
 - G-11 RPI, 200 steps
 - K-7 RPI, 175 steps
- It is determined all Control Bank D rods are at 200 steps

What ACTION would be required?

- a. Immediately **trip** the reactor AND enter E-0, "Reactor Trip and Safety Injection".
- b. **Reduce** reactor power to less than 50% by 1200 that day AND maintain power below 50% until all RPIs are repaired.
- c. **Place** the Unit in HOT SHUTDOWN by 1000 that day if EITHER ALL Bank D RPIs OR the Bank C RPI is NOT repaired.
- d. **Place** the Unit in HOT SHUTDOWN by 1000 the next day if ONE Bank D RPI is NOT repaired.

Senior Reactor Operator Examination

SRO #	38
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A 21 year old male licensed operator with a June birthday has the following exposure history:

- A Committed Effective Dose Equivalent (CEDE) of 0 mRem
- A Current YEARLY whole body Deep Dose Equivalent (DDE) of 625 mRem
- A LIFETIME Total Effective Dose Equivalent (TEDE) of 5 Rem

Assuming his exposure is properly documented, what is the maximum ADDITIONAL whole body exposure this operator can receive this Year and still comply with the Prairie Island administrative limit?

- 375 mRem
- 1375 mRem
- 2375 mRem
- 4375 mRem

Senior Reactor Operator Examination

SRO #

39

The plant was in the "normal electrical configuration" when it experienced an unplanned loss of 10 Bank and 1R Transformer. Assuming that all other conditions are normal, which transformer is now supplying each of the 4.16 KV safeguards buses?

- a. Bus 15 from CT12
Bus 16 from CT12
Bus 25 from 2R
Bus 26 from 2R
- b. Bus 15 from 2R
Bus 16 from CT11
Bus 25 from 2R
Bus 26 from CT11
- c. Bus 15 from CT11
Bus 16 from CT11
Bus 25 from 2R
Bus 26 from CT12
- d. Bus 15 from CT11
Bus 16 from CT11
Bus 25 from 2R
Bus 26 from 2R

Senior Reactor Operator Examination

SRO #	40
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Given the following conditions on Unit 1:

- The operators are evaluating the Critical Safety Function Tree F-0.2, "Core Cooling"
- One RCP is currently running
- The operators are evaluating RVLIS Dynamic Head reading against the Table listing of 32%

What is the basis for verifying the value of the RVLIS Dynamic Head Indication?

- a. A RVLIS reading GREATER THAN 32% means RVLIS Upper Head Range will be on scale if the RCP is stopped.
- b. A RVLIS reading GREATER THAN 32% means core inventory has recovered to the point that SI accumulators may be isolated.
- c. A RVLIS reading LESS THAN 32% means actual RCS voiding is greater than 50% and if the RCP is stopped, the core may not remain covered or adequately cooled.
- d. A RVLIS reading LESS THAN 32% means RCS voiding will cause RCP cavitation, requiring stopping of the RCP in FR-C.2, "Response to Degraded Core Cooling".

Senior Reactor Operator Examination

SRO #	41
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Given the following conditions on Unit 2:

-Inadequate Core Cooling Monitor (ICCM) Train A is OOS

The following events then occur:

- Loss of offsite power with reactor trip
- Loss of power to 2EMB
- Natural Circulation conditions are being verified in 2ES-0.1, "Reactor Trip Recovery".

How will the operators determine Subcooling and Core Exit Thermocouple Temperatures under these conditions?

- a. Subcooling from ERCS, CETC temperatures from Train A on ERCS.
- b. Subcooling from the Train A Subcooling monitor, CETC temperatures by local readings on the junction boxes.
- c. Subcooling by comparing HIGHEST hot leg temperature to RCS wide range pressure, CETC temperatures by Upper Head Thermocouple readings.
- d. Subcooling by comparing HIGHEST hot leg temperature to RCS wide range pressure, CETC temperatures by local readings on the junction boxes.

Senior Reactor Operator Examination

SRO #	42
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Given the following conditions on Unit 1:

- The Unit is at 10E-8 Amps in the Intermediate range during a startup
- Intermediate Range (IR) N35 FAILS HIGH

What action is required to be taken AND what is the basis for this action?

- a. N35 Level Trip bypass switch is **placed** in BYPASS AND power escalation can then continue above 10% power since the Intermediate range NIs are not required above 10% power.
- b. The reactor must be **placed** in HOT SHUTDOWN within one hour since BOTH Intermediate range NIs are required for start up.
- c. The reactor trips and BOTH Source Range channels immediately reenergize. The SR High Voltage must be removed by **holding** the SR Block/Reset switches to BLOCK to prevent burning out the SR detectors.
- d. The reactor trips AND the Source Range channels must be manually **reenergized** because the required coincidence to reenergize the SR detectors is NOT met.

Senior Reactor Operator Examination

SRO #	43
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(see Reference)

The following conditions exist on Unit 1:

- The Unit has been shut down for 10 days
- 11 RHR Pump has tripped
- 12 RHR Pump is running but indicated flow and discharge pressure are fluctuating
- RCS Tavg has just increased to 200°F
- RCS level is currently indicated at 88.25" level (At Reactor Vessel Flange during drain down for refueling operations)
- The stem for **RC-21-1**, RX VSL HEAD VENT JUMPER VENT, has broken with the valve in the open position
- 11 SG level is 5% wide range with the secondary side handhole cover removed
- 12 SG level is 50% wide range during gravity drain down (in progress when RHR Pump tripped).

What action(s) would the Shift Supervisor direct performing for these conditions?

- a. Fully **open** 12 SG PORV.
- b. **Reset** the 11 RHR pump Lock Out AND **restart** the pump.
- c. **Evacuate** containment AND **initiate** Containment Closure.
- d. **Open** BOTH Pressurizer PORVs AND **commence** feed and bleed.

Senior Reactor Operator Examination

SRO #	44
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Given the following conditions on Unit 1:

- A small break LOCA has occurred
- 1ES-1.1 "Post LOCA Cooldown And Depressurization" is being performed
- ADVERSE Containment conditions do NOT exist
- Subcooling has been maintained ABOVE 25°F while in 1 ES-1.1
- Pressurizer level has been maintained ABOVE 28% while in 1 ES-1.1
- Level in the RWST has been maintained ABOVE 50% while in 1 ES-1.1

Which of the following describes the expected status of the plant when the actions of 1ES-1.1 are complete (Tavg at 200°F)?

- a.
 - ONE SI Pump RUNNING
 - SI accumulators UNISOLATED
 - One train of RHR ALIGNED for recirculation
- b.
 - BOTH SI Pumps STOPPED
 - SI accumulators UNISOLATED
 - ONE train of RHR ALIGNED for shutdown cooling
- c.
 - ONE SI Pump RUNNING
 - SI Accumulators ISOLATED
 - ONE train of RHR ALIGNED for shutdown cooling
 - ONE train of RHR ALIGNED for injection
- d.
 - BOTH SI Pumps STOPPED
 - SI Accumulators ISOLATED
 - ONE train of RHR ALIGNED for injection
 - ONE train of RHR ALIGNED for shutdown cooling

Senior Reactor Operator Examination

SRO #	45
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Given the following conditions on Unit 1:

- The reactor has been shutdown from 100% power
- Steam Dumps have been placed in the "STEAM PRESSURE" mode
- The Shift Supervisor has directed that RCS Tavg be controlled 4°F above the LO-LO TAVG STEAM DUMP INTERLOCK setpoint prior to initiating a cooldown

What value would be required to be set on the MAIN STM HDR PRESS controller in auto to maintain Tavg?

- a. 71.8%
- b. 70.0%
- c. 67.7%
- d. 65.4%

Senior Reactor Operator Examination

SRO #	46
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Given the following conditions on Unit 1:

- The operators are performing FR-H.1, "Response to Loss of Secondary Heat Sink"
- RCS Tavg is 530°F
- Pressurizer pressure is 1900 psig
- SI has been reset and the initiating condition cleared
- Reactor trip breakers are open

Which of the following describes ALL the actions, in CORRECT ORDER, required to feed the SGs using the Feedwater Bypass valves?

- a.
 - **Start** ONE main FW pump
 - **Depress** BOTH sets of FW BYPASS RESET pushbuttons
 - **Throttle** OPEN the FW Bypass valves in MAN
- b.
 - **Reset** Containment Isolation
 - **Open** FW containment isolation valves
 - **Start** ONE main FW pump
 - **Throttle** OPEN the FW Bypass valves in MAN
- c.
 - **Reset** Containment Isolation
 - **Open** FW containment isolation valves
 - **Depress** BOTH sets of FW BYPASS RESET pushbuttons
 - **Start** ONE main FW pump
 - **Throttle** OPEN the FW Bypass valves in MAN
- d.
 - **Cycle** the reactor trip breakers
 - **Open** FW containment isolation valves
 - **Start** ONE main FW pump
 - **Depress** BOTH sets of FW BYPASS RESET pushbuttons
 - **Throttle** OPEN the FW Bypass valves in MAN

Senior Reactor Operator Examination

SRO #	47
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The following conditions exist on each Unit:

- The control room has been evacuated due to a hostile environment
- Unit 1 was at 50% power and Unit 2 was in COLD SHUTDOWN when the control room was evacuated
- Unit 1 operators were able to perform all the listed control room operations of 1C1.3 AOP1 "SHUTDOWN FROM OUTSIDE THE CONTROL ROOM - UNIT 1" prior to exiting
- S/G levels are currently at 12% and 16% narrow range for 11 and 12 S/Gs, respectively
- The operators are taking the actions to control S/G levels per 1C1.3 AOP1

Which of the following describe the local actions the operators will take to control the AFW Pumps?

- Place ONLY 11 TD AFW control to LOCAL, AND check** the TD AFW pump continues to run.
- Place ONLY 12 MD AFW control to LOCAL, AND press** the local start pushbutton to restart the MD AFW pump.
- Place BOTH 11 TD AFW and 12 MD AFW Pump controls to LOCAL, AND check** both pumps continue to run.
- Place BOTH 11 TD AFW and 12 MD AFW Pump controls to LOCAL, check** the TD AFW pump continues to run AND **press** the local start pushbutton to restart the MD AFW pump.

Senior Reactor Operator Examination

SRO #	48
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Given the following conditions on Unit 1:

- A plant heatup is in progress following a refueling outage
- RCS temperature is 230°F
- Both RCPs are running
- 11 RHR pump is in service with RCS heatup being controlled using 11 RHR heat exchanger
- 11 CC surge tank level is +8 inches and rising
- 1R-39, CC SYSTEM LIQUID MONITOR, is indicating normally

Which of the following actions should be taken to correct this condition?

- a. **Verify MV-32088**, 11 CC SURGE TANK VENT, is CLOSED.
- b. **Close CV-31245 AND CV-31246**, RCP THERM BARRIER CLNT OUTL.
- c. **Verify** both CC pumps are operating **AND initiate** CC flow through 12 RHR heat exchanger.
- d. **Open 1HC-624**, 11 RHR HX RC OUTLET FCV, to limit heatup rate.

Senior Reactor Operator Examination

SRO #	49
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Given the following conditions on Unit 1:

- A reactor trip and safety injection have occurred due to a small RCS leak
- The operators are performing action of 1ES-0.1 "SI Termination" directing reset of SI
- Reactor trip breaker RTA is CLOSED AND reactor trip breaker RTB is OPEN
- RCS Tcold is 510°F AND decreasing
- RCS wide range pressure is 1750 psig AND steady
- Containment pressure is 3.6 psig AND slowly increasing

When the SI RESET buttons are depressed AND released, which of the following occurs?

- a. The Train "A" SI actuation signal RESETS, THEN ACTUATES when the buttons are released.
- b. The Train "A" SI actuation signal RESETS THEN ACTUATES when containment pressure exceeds 4 psig.
- c. The Train "A" SI actuation signal will NOT RESET until reactor trip breaker RTA open signal is generated.
- d. The Train "A" SI actuation signal will NOT RESET unless the Train "A" SI BLOCK switch is taken to BLOCK.

Senior Reactor Operator Examination

SRO #	50
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Given the following conditions on Unit 1:

- The Unit is in MODE 4 at 250°F
- 11 Inverter has FAILED
- Instrument Panel 111 is powered from Interruptible Panel 117
- 14 Inverter experiences an internal POWER FAILURE

In performing the actions of 1C20.8 AOP1 "Abnormal Operation, Instrument AC Inverters", why is it PROHIBITED to also power Instrument Panel 114 from Panel 117 simultaneously?

- a. To assure Panel 117 is not overloaded.
- b. To prevent paralleling BOTH trains of battery chargers with each other.
- c. To assure adequate power would be available to start both Diesel Generators.
- d. To prevent a single fault condition from defeating MORE THAN ONE set of a plant protection system features.

Senior Reactor Operator Examination

SRO #	51
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Given the following conditions on Unit 1:

- The reactor is at 75% steady state power.
- All systems are in automatic control.
- Main turbine control is in "IMP IN" with the valve position limiter set at 95%.

Under these conditions, what would be the response if the condenser steam dump **CV-31100** failed OPEN due to a valve regulator failure AND what can the operator do from the control room to stop dumping steam?

- Turbine load **decreases** by 5% AND reactor power remains **constant**. The operator can stop dumping steam by taking either Bypass Interlock switch to OFF/RESET.
- Turbine load remains **constant** AND reactor power **increases** by 5%. The operator can stop dumping steam by taking the Steam Dump Mode Selector switch to STEAM PRESSURE.
- Turbine load **decreases** by 7.5% AND reactor power remains **constant**. The operator can stop dumping steam by taking the Steam Dump Mode Selector switch to STEAM PRESSURE.
- Turbine load remains **constant** AND reactor power **increases** by 7.5%. The operator can stop dumping steam by taking either Bypass Interlock switch to OFF/RESET.

Senior Reactor Operator Examination

SRO #	52
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Given the following conditions on Unit 1:

- A natural circulation cooldown is in progress per 1ES-0.4 "Natural Circulation Cooldown With Steam Void In Vessel"
- RCS pressure is 1200 psig
- RCS subcooling is 140°F
- Pressurizer level is 32%
- RVLIS Full Range reads 88%
- 12 RCP seal DP reads 325 psid
- 12 RCP #1 seal leakoff flow reads 0.8 gpm
- 12 RCP is reported to now be available for starting (power restored to bus)

Which of the following must be completed prior to attempting to start 12 RCP?

- a. **Raise** Pressurizer level to GREATER THAN 84%.
- b. **Raise** RCS pressure to GREATER THAN 1250 psig.
- c. **Raise** seal injection flows to INCREASE seal DP to GREATER THAN 400 psid.
- d. **Raise** #1 seal leakoff flow to GREATER THAN 1 gpm by **opening** the No. 1 Seal Bypass Isolation Valve.

Senior Reactor Operator Examination

SRO #	53
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During a Control Room evacuation, what are the designated Sound Power Communications channels used by plant personnel as directed in 1C1.3 AOP1 "SHUTDOWN FROM OUTSIDE THE CONTROL ROOM - UNIT 1" and 2C1.3 AOP1 "SHUTDOWN FROM OUTSIDE THE CONTROL ROOM - UNIT 2"?

- a. Unit 1 uses Channel 1 preferred and Channel 2 alternate while Unit 2 uses Channel 3 preferred and Channel 4 alternate.
- b. Unit 1 uses Channel 1 preferred and Channel 3 alternate while Unit 2 uses Channel 2 preferred and Channel 4 alternate.
- c. Unit 1 and Unit 2 use Channel 1 preferred while Unit 1 Uses Channel 2 alternate and Unit 2 uses Channel 3 alternate.
- d. Unit 1 and Unit 2 use Channel 1 preferred and Channel 2 alternate.

Senior Reactor Operator Examination

SRO #	54
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If CC flow to a RCP is lost, the RCP is tripped to prevent damage to which of the following components?

- a. RCP motor bearing
- b. RCP radial bearing
- c. Motor stator windings
- d. Thermal barrier heat exchanger

Senior Reactor Operator Examination

SRO #	55
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(See Reference)

Which of the following conditions requires entry into C12.5 AOP1, "EMERGENCY BORATION OF THE REACTOR COOLANT SYSTEM"?

- a.
 - The Unit is at 50% power
 - Instrument Air is lost to the CVCS makeup valves
 - Annunciator **47013-0207** CONTROL BANKS LO-LO LIMIT is in alarm

- b.
 - The Unit is at 20% power
 - A loss power to Bus 15 has occurred
 - Annunciator **47013-0107** BANK D ROD WITHDRAWAL HI LIMIT is in alarm

- c.
 - The Unit is in MODE 3 at normal operating temperature and pressure
 - Core exposure is 12 GWD/MTU
 - A loss of Train A DC power has occurred
 - RCS boron concentration is reported at 1220 ppm

- d.
 - The Unit is in MODE 5
 - Core exposure is 12 GWD/MTU
 - Two charging pumps are operating
 - Instrument Air is lost to the CVCS charging pumps
 - RCS boron concentration is reported at 1800 ppm

Senior Reactor Operator Examination

SRO #	56
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As pressure in the Low Level Waste Gas common vent header INCREASES, which of the following auto actions occur to prevent excess pressure?

- a. The hydrogen recombiner inlet CLOSES at 2.7 psig.
- b. The backup waste gas compressor STOPS at 2.3 psig.
- c. The Low Level GDT to CVCS HUT pressure control valve **CV-31272** OPENS fully at 2.5 psig.
- d. The waste gas compressor discharge is directed to the standby gas decay tank at 3.0 psig.

Senior Reactor Operator Examination

SRO #	57
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Given the following conditions on Unit 1:

- A steam space LOCA has occurred on the pressurizer
- Operators have just stopped RHR and SI pumps in 1ES-0.2 "SI Termination"
- Subcooling on ERCS now indicates 5° superheat
- Pressurizer level indicates 98%

What action is required?

- Increase** RCS pressure using pressurizer heaters AND stay in 1ES-0.2 "SI Termination".
- Actuate** Safety Injection AND return to step 1 of 1ES-0.2 "SI Termination".
- Dump** steam using steam dumps AND transition to 1ES-0.0 "Rediagnosis".
- Start** SI pumps as necessary AND go to 1E-1 "Loss Of Reactor Or Secondary Coolant".

Senior Reactor Operator Examination

SRO #	58
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The following conditions exist on unit 1:

- A steam line rupture UPSTREAM of 11 Main Steam Line Flow Nozzle has occurred
- Containment Pressure has increased to 10 psig
- Tavg has decreased to 535° F

Based on the above conditions, what prevents an uncontrolled depressurization of both SGs?

(assume no operator action)

- 11 SG non-return valve.
- Automatic MSIV isolation based on Containment pressure.
- Automatic MSIV isolation based on a SI with high steam flow and low-low Tavg.
- 12 SG non-return valve.

Senior Reactor Operator Examination

SRO #	59
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The following conditions exist:

- Operators are performing an approved procedure on a Safety related system.
- Step 23 of the procedure, has a temporary change notice, TCN, signed by the Unit 1 SS (Reviewer) and Unit 2 SS (Approver) requiring Valve "A" to be throttled OPEN to obtain a flow rate of 200 gpm.
- The design limit specified in the Precautions and Limitations Section is 175 gpm.

Which of the following actions must be taken with regard to performing step 23?

- a. Do NOT perform the step. TCNs that change the intent or scope are NOT permitted unless signed by the OC or assigned approver.
- b. **Perform** the step as written AND **submit** a TCN to modify the Precautions and Limitations Section.
- c. **Perform** the step as written AND have the Shift Supervisor **initial** the step.
- d. Do NOT perform the step UNTIL TWO Licensed Senior Reactor Operators view AND approve ANOTHER TCN.

Senior Reactor Operator Examination

SRO #	60
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Given the following conditions:

- Both units are at 100% power
- RCS activity is elevated in unit 2 due to a pin-hole fuel leak
- The following activities are occurring in the Aux Building:
 - Fuel handling in the Spent Fuel Pool for top nozzle inspections
 - Replacement of 22 Seal Water Return filter.
 - TN-40 Cask decon and drying activities in the Cask Decon area
 - Transfer of water from the ADT Collection Tanks to the ADT Condensate Receiver Tanks
- An automatic actuation of 122 Aux Building Special Ventilation has occurred

Which of the following events has caused the actuation of 122 Aux Building Special Exhaust?

- a. DAMAGE to a spent fuel assembly due to failure of the handling tool.
- b. FILLING and VENTING of 22 Seal Water Return Filter.
- c. FAILURE of the TN-40 Cask Vacuum Drying System vacuum hose.
- d. FAILURE of the ADT Collection Tank Pump seal.

Senior Reactor Operator Examination

SRO #	61
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Given the following conditions on Unit 1:

- Safety Injection has actuated
- A LOCA has been identified at the flange for flow transmitter 1FE-626 (inputs control for positioning RHR Heat Exchanger Bypass valve) on the RHR return line to loop B RCS

Which of the following must be performed to ISOLATE the leak, while MINIMIZING the affect on the ECCS system operation?

- **Stop** 11 RHR Pump
 - **Close** valve **MV-32065**, RHR TO RX VSL
 - **Close** **CV-31235**, 11RHR HX RC OUTLET FLOW
- **Stop** 12 RHR Pump
 - **Verify** **MV-32066**, RHR TO RC LOOP B COLD LEG is closed
 - **Close** **MV-32065**, RHR TO RX VSL
 - **Close** **CV-31236**, 12 RHR HX RC OUTLET FLOW
- **Stop** BOTH of the RHR Pumps
 - **Verify** **MV-32066**, RHR TO RC LOOP B COLD LEG is closed
 - **Close** **MV-32065**, RHR TO RX VSL.
- **Verify** valve **MV-32066**, RHR TO RC LOOP B COLD LEG is closed
 - **Open** **RH-2-5** AND **RH-2-6**, 11/12 RHR HX CROSSOVER, OUTLET valves.

Senior Reactor Operator Examination

SRO #	62
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Given the following conditions on Unit 1:

- A reactor trip and Safety Injection has occurred
- The operators have completed the actions of 1E-0 "Reactor Trip Or Safety Injection" and transitioned to 1E-3 "Steam Generator Tube Rupture" based on radiation indications for 11 SG
- SI has been reset
- RCS pressure is 1500 psig
- RCS core exit temperature is 535°F
- 11 SG pressure is 1050 psig
- 12 SG pressure is 875 psig
- RCS cooldown has been initiated to 505°F as directed by 1E-3 using 12 SG and condenser steam dump

If a loss of offsite power occurs to Bus 15 at this time, what would the RHR Pump control switch indications be following sequencing of loads?

	<u>11 RHR Pump</u>	<u>12 RHR Pump</u>
a.	RED light lit	RED light lit
b.	RED light lit	GREEN light lit
c.	GREEN light lit	RED light lit
d.	GREEN light lit	GREEN light lit

Senior Reactor Operator Examination

SRO #

63

Given the following conditions on Unit 1:

- Reactor power is 100%
- Reactor Protection Logic testing is being performed with Reactor Trip Bypass Breaker B (BYB) racked in AND CLOSED
- Both Reactor Trip Breakers (RTA and RTB) are CLOSED
- An electrician inadvertently OPENS DC panel breaker 16-2 "B Train DC To Reactor Switchgear Cabinet".

What is the expected reactor response AND the required operator action for the above conditions?

- a. The reactor will automatically trip. The Control Room Operators will enter E-0, "Reactor Trip or Safety Injection", to establish stable plant conditions.
- b. The reactor must be manually tripped from the Control Room if a trip signal comes in. The Control Room Operators will enter E-0 to establish stable plant conditions.
- c. The reactor must be manually tripped locally by opening Reactor Trip Bypass Breaker B (BYB) if a trip signal comes in. The Control Room Operators will enter FR-S.1, "Response To Nuclear Power Generation/ATWS", to establish stable plant conditions.
- d. The reactor will trip automatically if a train "A" trip signal comes in BUT may remain in operation for up to 4 hours with BYB closed provided stable plant conditions exist.

Senior Reactor Operator Examination

SRO #	64
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Which of the following would PREVENT Containment In-Service Purge from being placed in operation on Unit 1?

- a. Containment Pressure gauge **4127901** is reading 0.47 psig.
- b. Annunciator **47021-0301**, CVI TRAIN A DC FAILURE, is lit.
- c. The **1R11/12** Sample Selector Switch is in the "VENT" position.
- d. The **1R-22** setpoint is below the calculated setpoint listed in the Containment Pre-release Authorization.

Senior Reactor Operator Examination

SRO #	65
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(see reference)

Given the following conditions for BOTH Units:

- RWST Water Cleanup is in progress for 21 RWST
- An operator is currently performing the operations to transfer SFP cooling from 121 SFP heat exchanger (HX) to 122 SFP heat exchanger (HX)
- 121 SFP HX has been isolated and 122 SFP HX placed in service
- The operator then begins to throttle open **SF-14-17**, SFP DEMIN OUT to 121 FLTR

What is the effect of this action on SFP level?

- a. SFP level quickly rises as the content of the 21 RWST is dumped to the SFP.
- b. SFP level slowly rises as the water from the 21 RWST is transferred to the SFP.
- c. SFP level slowly decreases as the water from the SFP is transferred to the 21 RWST.
- d. SFP level remains constant since the SFP Cooling remains isolated from the purification loop.

Senior Reactor Operator Examination

SRO #	66
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Given the following conditions:

- A fire in the Relay Room causes a reactor trip
- The crew enters 1E-0, "Reactor Trip or Safety Injection"
- The fire then makes the Control Room uninhabitable and the decision is made to evacuate the Control Room.

What should be done regarding the performance of actions as directed by 1E-0?

- a. **Complete** immediate actions of 1E-0.
- b. **Exit** 1E-0 AND implement F5 App B, "Control Room Evacuation (Fire)".
- c. **Enter** F5 App B AND perform 1E-0 actions in parallel.
- d. **Continue** with 1E-0, substituting LOCAL actions for Control Room actions.

Senior Reactor Operator Examination

SRO #	67
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Given the following conditions on Unit 1:

- A Pressurizer level control malfunction has occurred causing Pressurizer level to decrease to 5%.
- Operators have manually tripped the reactor and actuated SI.
- Pressurizer level decreased to off-scale low following the trip but has recovered to 10% and is stable.

When would be the appropriate time to implement 1FR-I.2, "Response to Low System Inventory".

- a. Immediately after transitioning to 1ES-0.1, "Reactor Trip Recovery" from step 4 of 1E-0, "Reactor Trip or Safety Injection".
- b. Immediately after Pressurizer level decreased to below the entry conditions specified for Low System Inventory.
- c. After stopping both SI pumps in 1ES-0.2 "SI Termination".
- d. After completion of 1ES-0.1, "Reactor Trip Recovery".

Senior Reactor Operator Examination

SRO #	68
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During the performance of 1E-1, "LOSS OF REACTOR OR SECONDARY COOLANT", the STA notifies the SS of two Red Path conditions-one in Heat Sink the other in Integrity.

Which of the following describes the procedure implementation hierarchy associated with this condition?

- a. **Remain** in 1E-1 until directed to transition to another E-series procedure then address the Red Path conditions.
- b. **Transition** to 1FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK".
- c. **Transition** to 1FR-P.1, "RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS".
- d. **Transition** to 1ES-0.0, "REDIAGNOSIS" to determine which FR procedure to implement.

Senior Reactor Operator Examination

SRO #	69
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(see reference)

Using the reference provided, identify the radiation monitor first affected if the inservice Gas Decay Tank (127) relief valve lifts?

- a. **R-35**, Rad Waste Building monitor
- b. **R-41**, Waste Gas High Level monitor
- c. **2R-22**, Shield Building vent stack monitor
- d. **1R37**, Aux Bldg vent stack train A monitor

Senior Reactor Operator Examination

SRO #	70
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(see reference)

D1 diesel generator is loaded onto its respective bus for testing following an overhaul. The following conditions were just established.

- Generator power is 3100 KW
- Reactive load is 1400 KVAR delivered

Which of the following is the LONGEST amount of time the generator can remain at the above conditions without exceeding the machine ratings?

- 0.25 hours
- 0.75 hours
- 900 hours
- 1100 hours

Senior Reactor Operator Examination

SRO #	71
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Given the following conditions on Unit 1:

- The Unit is in MODE 2 with reactor startup in progress
- Reactor power has been stabilized at 1×10^{-8} amps and critical data has been recorded
- I & C is troubleshooting the erratic indication that has developed on Intermediate Range channel N-35
- At the NIS rack, the Level Trip switch for N-35 has been placed in BYPASS

What occurs if the technician then pulls one of the Control Power fuses for N-35?

- a. The reactor trips on Intermediate Range High Flux Level.
- b. The power increase is limited to 2% power until N-35 is restored.
- c. BOTH Source Range NIS channels unblock resulting in a reactor trip.
- d. Control Rod withdrawal is blocked but the rods may be inserted in manual.

Senior Reactor Operator Examination

SRO #	72
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Given the following conditions on Unit 1:

- RCS Tavg is 150°F
- RCS pressure is 280 psig
- Testing is in progress on Pressurizer pressure channel 1PT-449A with the channel bistables tripped
- OPPS is in ENABLE

If 1PT-419, wide range loop pressure transmitter, FAILS HIGH, how do the pressurizer PORVs respond and what is the reason for this response?

- a. Neither PORV opens because the coincidence is 2/2.
- b. Only 1PCV-430 (PORV "A") opens because the failed transmitter is in its train.
- c. Only 1PCV-431C (PORV "B") opens because the bistable to the PORV interlock is tripped.
- d. Both PORVs open because the coincidence is 1/2.

Senior Reactor Operator Examination

SRO #	73
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Given the following conditions on Unit 1:

- The Unit is at 88% power AND holding for a calorimetric during a power ascension to 100% power
- Control rods were in auto when a single RCCA in Bank D began stepping out at maximum speed
- The operators have initiated actions of 1C5 AOP1"UNCONTROLLED WITHDRAWAL OF AN RCCA"
- Control rod motion stopped when the Rod Bank Selector was taken to MAN
- The following readings were taken from the Power Range NIS cabinets:

	<u>N41</u>	<u>N42</u>	<u>N43</u>	<u>N44</u>	
Det. A (upper)	375.0	360.0	365.0	360.0	(microamperes)
Det. B (lower)	350.0	345.0	370.0	340.0	(microamperes)

- A full power current on all detectors is known to be 400.0 microamperes.

Which detector has the highest quadrant power tilt ratio (QPTR)?

- N41 upper
- N42 upper
- N43 lower
- N44 lower

Senior Reactor Operator Examination

SRO #	74
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(see reference)

Which of the following alarms, actuated by a single valid input condition, would require the earliest shutdown of the reactor if that condition continues to exist?
(Assume conditions do not result in an automatic reactor trip.)

- a. **47010-0105**, 11TD AFWP ACCUMULATOR LO AIR PRESSURE
- b. **47010-0305**, 11TD AFWP LOCAL CONTROL SI AUTO START BLOCKED
- c. **47011-0205**, 11 OR 12 MAIN STEAM RELIEF VALVE LOCAL CONTROL
- d. **47011-0505**, 11 OR 12 STM GEN ISOLATION VALVE LO AIR PRESS

Senior Reactor Operator Examination

SRO #	75
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(see reference)

Given the following conditions on Unit 1:

- The Unit was at 92% power during a power ascension to 100% power
- Control Rod Bank D began stepping out at maximum speed
- The operators have initiated actions of 1C5 AOP1 "UNCONTROLLED WITHDRAWAL OF AN RCCA"
- Control rod motion stopped when the Rod Bank Selector was taken to MAN
- Pressurizer pressure is 2330 psig
- Tavg is 570°F
- ΔT is 70°F
- ΔI is + 6.2% of target ΔI
- QPTR is 1.02

What action is required?

- a. RCS pressure MUST be **reduced** to LESS THAN 2250 psig within 5 minutes.
- b. ΔI MUST be **reduced** to +/- 5% of target ΔI within 15 minutes.
- c. Tavg MUST be **decreased** below 565°F AND the Unit placed in MODE 3 within ONE hour.
- d. Reactor power MUST be **reduced** to AND maintained below 50% within 2 hours.

Senior Reactor Operator Examination

SRO #	76
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Given the following conditions for Unit 2:

- The unit was at 100% power when a reactor trip occurred
- The operator is performing the immediate action steps of 2E-0 "Reactor Trip Or Safety Injection"
- Pressurizer pressure is 2200 psig
- Containment pressure is 0.5 psig
- Steamline pressure is 950 psig with both MSIVs open
- Pressurizer level is 20%
- Subcooling is 100° F
- The operator reports safeguards bus 25 ONLY is deenergized

What is the proper action to take?

- a. **Initiate** action to restore power to Bus 25 per 2C20.5 AOP1, "REENERGIZING 4.16 KV BUS 25".
- b. **Continue** immediate actions of 2E-0 for SI Actuation AND manually **actuate** SI.
- c. **Transition** to 2ECA-0.0 "Loss Of All Safeguards AC Power".
- d. **Place** the feed breaker controls in MANUAL AND **place** the affected components controls in PULL OUT.

Senior Reactor Operator Examination

SRO #	77
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Given the following conditions on Unit 1:

- The reactor tripped from 100% power
- One Code Safety Valve on 11 SG OPENED AND failed to reclose
- SI was manually actuated
- 12 AFW pump could NOT be started
- 12 SG experienced a pipe shear inside containment
- The crew is performing the actions of 1ECA-2.1 "Uncontrolled Depressurization of Both Steam Generators"
- SG pressures are currently: 600 psig for 11 SG and 450 psig for 12 SG

What action should be taken concerning feed to the SGs?

- a. **Isolate** all feed and steam paths to Both SGs THEN **Align** the Unit 1 Condensate system to provide feed to the SGs.
- b. **Isolate** all feed and steam paths to Both SGs THEN **enter** FR-H.1 "RESPONSE TO LOSS OF SECONDARY HEAT SINK".
- c. **Maintain** the steam supply to 11 AFW Pump from 11 SG OPEN AND **feed** SGs using 11 AFW pump until a different source of feedwater can be aligned.
- d. **Open** both Pressurizer PORVs to provide a feed and bleed path THEN **isolate** all feed and steam paths to BOTH SGs.

Senior Reactor Operator Examination

SRO #	78
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Given the following conditions on Unit 2:

- The reactor has TRIPPED from 50% power
- RCS Tavg is 550°F and stable
- RCS Press is 2235 psig and stable
- Both S/G Press are 1010 psig and stable
- 21 S/G level is 25% narrow range
- 22 S/G level is 36% narrow range

Which of the following conditions describes the expected condition of the Feedwater Regulating Valves (FRV) AND the demand position on its associated controller?

	21 FRV	21 FRV	22 FRV	22 FRV
	<u>POSITION</u>	<u>DEMAND</u>	<u>POSITION</u>	<u>DEMAND</u>
a.	OPEN	OPEN	CLOSED	CLOSED
b.	CLOSED	OPEN	CLOSED	OPEN
c.	CLOSED	OPEN	CLOSED	CLOSED
d.	CLOSED	CLOSED	CLOSED	CLOSED

Senior Reactor Operator Examination

SRO #	79
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Given the following conditions on Unit 1:

- The Unit is at 15% power
- The following annunciators are in alarm:
 - **47015-0206** 11 RCP LABYRINTH SEAL LO DP
 - **47015-0207** 12 RCP LABYRINTH SEAL LO DP
 - **47015-0208** 11 RCP NO. 1 SEAL INLT OR OUTL HI TEMP
 - **47015-0209** 12 RCP NO. 1 SEAL INLT OR OUTL HI TEMP
 - **47015-0409** SEAL WATER INJECTION FILTER HI DP
- Seal injection flows to each RCP indicate LESS THAN 1 gpm
- **CV-31245**, 11 RC Pump Thermal Barrier Clnt Outl valve has failed CLOSED
- RCP lower bearing water temperatures indicate:
 - 211°F AND increasing for 11 RCP
 - 181°F AND increasing for 12 RCP

Per C3 AOP2, "Loss of Reactor Coolant Pump Seal Cooling", which of the following actions are required at this time?

- a. **Trip** the reactor AND **stop** both RCPs.
- b. **Trip** the reactor, **stop** 11 RCP only AND **monitor** 12 RCP bearing water temperature.
- c. **Shutdown** the reactor within ONE hour AND then **stop** both RCPs.
- d. **Stop** 11 RCP only, **shutdown** the reactor within ONE hour AND **monitor** 12 RCP bearing water temperature.

Senior Reactor Operator Examination

SRO #	80
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Given the following conditions on Unit 1:

- The Unit is at 80% power
- RCS boron concentration is 450 ppm
- CVCS Makeup control is in AUTO and set for makeup at 440 ppm
- All other control systems are in AUTO
- Rods begin to step in
- As rod motion stops, RCS Tavg is noted to continue to rise

What was the event that initiated this transient? (**Assume no operator action was taken**).

- a. Power Range Channel N41 FAILED HIGH.
- b. VCT level transmitter LT-141 FAILED LOW.
- c. Controlling Pressurizer level channel LT-428A FAILED LOW.
- d. Main turbine impulse pressure controller PM-485A FAILED HIGH.

Senior Reactor Operator Examination

SRO #	81
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Given the following conditions on Unit 1:

- A LOCA has occurred
- Containment Spray has actuated
- RWST level currently reads 40%
- CA to CS **31941** and **31938** status lights are NOT lit on the SI active panel
- Caustic Addition Standpipe level currently reads 100%

What action must be taken by the operator to establish flow from the CA Standpipe to the Containment Spray System AND what is the effect if this action is NOT taken?

- a. The operator must **open** EITHER **CV-31938** OR **CV-31941**, CAUSTIC ADDITION VALVE to establish flow. If the action is not taken the concentration of radioactive iodine in containment atmosphere will be higher.
- b. The operator must **open** BOTH **CV-31938** AND **CV-31941**, CAUSTIC ADDITION VALVES, to establish flow. If the action is not taken containment pressure peaks at a higher value due to the reduced heat removal capacity of the CS spray.
- c. The operator must **start** the CARF Pump AND **open** EITHER **CV-31938** OR **CV-31941**, Caustic Addition valve, to establish flow. If the action is not taken corrosion of components in containment increases due to higher pH value of the containment sump fluid.
- d. The operator must **start** the CARF Pump AND **open** BOTH **CV-31938** AND **CV-31941**, Caustic Addition valves, to establish flow. If the action is not taken containment radiation levels are higher due to the increased radioactive noble gas production.

Senior Reactor Operator Examination

SRO #	82
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What is the basis for INITIALLY placing Unit 1 in HOT SHUTDOWN if 12 RHR Pump exceeds its Technical Specification allowed LCO time?

- a. In the HOT SHUTDOWN condition there is no possibility of a loss-of-coolant accident that would release fission products.
- b. In the HOT SHUTDOWN condition the mass available in the RCS is maximized for decay heat removal.
- c. The HOT SHUTDOWN condition provides a reduction of cooling requirements after a postulated loss-of-coolant accident.
- d. The HOT SHUTDOWN condition provides assurance with high reliability that the safety system will function properly if required to do so.

Senior Reactor Operator Examination

SRO #	83
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A Quarterly Surveillance test has a due date of June 15th. What is the latest date this test could be performed and still be within the required test interval time?
(June has 30 days)

- a. June 22nd
- b. July 6th
- c. July 15th
- d. July 28th

Senior Reactor Operator Examination

SRO #

84

(see reference)

Given the following conditions on Unit 1:

- A LOCA has occurred
- 1FR-C.1 was entered due to an inadequate core cooling condition.
- Containment pressure is 8 psig
- Containment temperature prior to the LOCA was 90 degrees F.
- Containment hydrogen concentration is 0.45%

Based on these indications, using the references provided, what is the required power setting for placing 12 hydrogen recombiner in service?

- 52.0
- 53.2
- 57.8
- 59.1

Senior Reactor Operator Examination

SRO #	85
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When performing the actions of ECA-0.0 "Loss of All Safeguards AC Power" during a Total Loss of All AC Power Event, why does the procedure direct the operator to reset the SI signal?

- a. To PREVENT isolation of the RCP No. 1 seal leakoff flow path.
- b. To ALLOW for another start attempt of the Emergency Diesel Generators.
- c. To PREVENT automatic loading of the power supply once power restoration has been completed.
- d. To ALLOW the operator to transition to ECA-0.1 "Loss of All AC Power Recovery Without SI Required" REGARDLESS of RCS conditions.

Senior Reactor Operator Examination

SRO #	86
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Given the following conditions on Unit 1:

- Reactor power is 100%
- **CV-31202**, LTDN TEMP CONT, FAILS CLOSED due to a controller malfunction.
- After approximately 2 minutes the local operator was able to correct the problem and normal flow was restored through **CV-31202**.
- LTDN temperature rises to 160°F AND then returns to normal.

Assuming NO other operator action was taken, how is normal letdown flow restored?

- Manually **open CV-31203** using **1HC-135A**, LTDN PRESS CONT, UNTIL letdown pressure is approximately 275 psig, AND THEN **return 1HC-135A** to AUTO.
- Position** ONE Control Switch for **CV-31325**, OR **CV-31326** OR **CV-31327**, LTND ORIFICE ISOL, to OPEN, AND THEN **return** Control Switch to AUTO.
- Position** Control Switch for **CV-31204** "LTDN DIVERT TO PURIF" valve to DIVERT, AND THEN **return** Control Switch for **CV-31204** to AUTO.
- Position** Control Switch for **CV-31205**, LTDN DIVERT TO HOLDUP TNK, to the VC TANK position AND THEN **return** Control Switch for **CV-31204** to AUTO.

Senior Reactor Operator Examination

SRO #	87
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Given the following conditions on Unit 1:

- Unit 1 is at 100% power
- RCS Tavg is stable at 560°F
- VCT level is stable at 33%
- VCT pressure is 20 psig
- Annunciator **47020-0203** 11 CC SURGE TANK HI/LO LVL is in alarm
- 11 CC Surge Tank indicates -10"

Which of the following is a correct action based on the given conditions?

- a. Within one hour **close CV-31245 OR CV-31246**, the affected RCP THERM BARRIER CLNT OUTL valve AND **initiate** shutdown of Unit 1.
- b. Within one hour **initiate** shutdown of Unit 1 due to exceeding the total RCS leakage limit via the letdown heat exchanger.
- c. **Initiate** boration of the RCS to maintain the reactor core safety limits due to leakage in the seal water heat exchanger.
- d. **Initiate** sampling of the Spent Fuel Pool to verify the required boron concentration due to leakage in the spent fuel pool heat exchanger.

Senior Reactor Operator Examination

SRO #	88
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The following conditions exist on Unit 1:

- The plant is at 100% power
- Flux mapping is in progress
- The Personnel Airlock inner air lock has FAILED its leak rate test AND maintenance is awaiting parts for repair
- THREE personnel are planning to enter containment to take local vibration readings on 13 CFCU

Under these conditions when is Containment entry allowed?

- a. Containment entry can be made only when continuous RPS monitoring of radiation levels at 13 CFCU is available.
- b. Containment entry can be made only when flux mapping is completed.
- c. Containment entry can be made only when reactor power is reduced to less than 50%.
- d. Containment entry can be made only when the Personnel Airlock door is repaired AND tested.

Senior Reactor Operator Examination

SRO #	89
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Which of the following describes the response of the Containment Cleanup fans following a loss of offsite power?

- a. The fans LOSE all sources of power on a loss of offsite power AND CANNOT be started.
- b. The fans are PROVIDED with power by diesel generators AND can be manually started.
- c. The fans are PROVIDED with power by diesel generators AND will automatically start if a SI signal is generated.
- d. The fans are PROVIDED with power by diesel generators BUT are blocked from starting by a SI signal.

Senior Reactor Operator Examination

SRO #	90
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The following conditions exist on unit 1:

- Reactor Protection Logic Testing is being performed causing numerous repetitive alarms

What is the correct response concerning the alarms?

- a. The operator may use a pre-job brief in place of individual alarm notifications after the first notification.
- b. The operator shall reference the alarm response procedures for ALL alarms received.
- c. The operator may prioritize alarms NOT associated with the logic testing AND announce these alarms only if operationally significant.
- d. The operator does NOT need to treat the alarms as valid until proven valid.

Senior Reactor Operator Examination

SRO #	91
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Given the following conditions on Unit 2:

- The Unit is at 100% power
- Pressurizer pressure is 2235 psig
- One backup heater group ON, variable heater group ON
- Pressurizer Pressure Control Selector switch is in the 2-1 position
- Pressurizer Pressure Control in AUTO

What would be the response of Pressurizer pressure control to a single Pressurizer Spray Valve controller FAILURE to 100% output?

- a. Pressurizer pressure does NOT decrease because the spray valves do NOT open below 2260 psig.
- b. Pressurizer pressure decreases to 2215 psig where the variable heater stabilizes pressure.
- c. Pressurizer pressure decreases to 2210 psig, where all backup heaters turn on and stabilize pressure.
- d. Pressurizer pressure decreases to 1900 psig where an automatic reactor trip occurs.

Senior Reactor Operator Examination

SRO #

92

Given the following conditions for both Units:

- Unit 1 is at 5% power
- Unit 2 is at 100% power
- 12 MD AFW Pump has indications of steam binding AND is isolated
- 11 TD AFW Pump failed its surveillance AND was declared inoperable
- 21 MD AFW discharge was cross-connected to Unit 1
- Following the cross-tie, 21 SG level falls to 10% Narrow Range due to a feedwater valve problem

What is the response of the AFW System?

(assume NO operator action)

AFW flow is automatically initiated to Unit 2 SGs from...

- a. 22 AFW Pump only AND will indicate greater than 100 gpm to each Unit 2 SG.
- b. 22 AFW Pump only AND will indicate less than 100 gpm to each Unit 2 SG.
- c. BOTH 21 and 22 AFW Pumps AND will indicate greater than 100 gpm to each Unit 2 SG.
- d. BOTH 21 and 22 AFW Pumps AND will indicate less than 100 gpm to each Unit 2 SG.

Senior Reactor Operator Examination

SRO #	93
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The minimum allowable Spent Fuel Pool temperature of 68°F is based on which of the following?

- a. 68°F is the minimum analyzed temperature to ensure Adequate Shutdown Margin in the Spent Fuel Pool.
- b. 68°F is the minimum allowed temperature to ensure the Spent Fuel Pool Demineralizers will remove Sulfates.
- c. 68°F is the minimum analyzed temperature to ensure Brittle Fracture Prevention of the Spent Fuel Pool liner.
- d. 68°F is the minimum allowed temperature to ensure the solubility of Boric Acid in the Spent Fuel Pool.

Senior Reactor Operator Examination

SRO #	94
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Given the following conditions on Unit 1 and Unit 2:

- A Total Loss of All AC Power Event has occurred
- The actions of ECA-0.0 "Loss of All Safeguards AC Power" are being performed
- RCS Core Exit Thermocouple temperature is 500°F
- RCS pressure is 1950 psig
- Attempts to restore bus power are underway but not immediately expected
- RCS cooldown and depressurization has been initiated by depressurizing intact SGs.

What is the cooldown rate restriction AND its basis?

- a. The RCS cooldown rate SHALL NOT exceed 10°F in any one-hour period to minimize the formation of voids in the reactor vessel head.
- b. The RCS cooldown rate SHALL NOT exceed 25°F in any one-hour period to prevent the formation of voids in the reactor vessel head.
- c. The RCS cooldown rate SHALL NOT exceed 100°F in any one-hour period to minimize the thermal stresses across the reactor vessel wall and prevent crack propagation.
- d. The RCS cooldown rate MAY exceed 100°F in any one-hour period to allow depressurization of the SGs to designated pressure as quickly as possible to minimize RCS inventory loss.

Senior Reactor Operator Examination

SRO #	95
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(see reference)

The following conditions exist on Unit 2:

- Refueling operations are in progress
- Refueling cavity boron concentration was measured at 1950 ppm
- The calculated Keff is 0.94

What action is required to be taken concerning fuel movement?

- a. Fuel movement May CONTINUE since NO reactivity conditions are violated.
- b. Fuel movement May CONTINUE BUT boration must be initiated to restore required boron concentration.
- c. Fuel movement Shall CEASE AND boration must be initiated to restore the required shutdown margin.
- d. Fuel movement Shall CEASE AND boration must be initiated to restore the required boron concentration.

Senior Reactor Operator Examination

SRO #	96
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Given the following conditions on Unit 2:

- A plant calorimetric has been performed to indicate the Unit is at 15.2% power
- Power range N-41 indicates 15.1%
- Power range N-42 indicates 15.4%
- Power range N-43 indicates 15.2%
- Power range N-44 indicates 15.3%
- Intermediate range N-35 indicates 7E -5 amps
- Intermediate range N-36 indicates 7E -6 amps

Which of the following conditions is indicated by these readings?

- a. N-35 compensation voltage is too HIGH.
- b. N-36 detector voltage is too LOW.
- c. N-43 detector voltage is too LOW.
- d. N-42 channel was incorrectly adjusted during the last calorimetric.

Senior Reactor Operator Examination

SRO #	97
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What is the response expected for the Source Range NIS audio output during a LOCA as the reactor vessel downcomer voids?

- a. The count rate will RISE.
- b. The count rate will DROP.
- c. The count rate will REMAIN THE SAME.
- d. The count rate will Initially RISE then quickly DROPS as steam fills the downcomer.

Senior Reactor Operator Examination

SRO #	98
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Which of the following radiation monitors could STOP a RADIOACTIVE waste discharge if a HIGH alarm condition exists?

- a. **R-21**, Circulating Water Discharge Monitor
- b. **1R-15**, Unit Condenser Air Ejector Gas Monitor
- c. **2R-19**, Unit 2 Steam Generator Blowdown Monitor
- d. **R-16** Containment Fan Coils Cooling Water Discharge Monitor

Senior Reactor Operator Examination

SRO #	99
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Given the following conditions on Unit 1:

- Reactor power is stable at 30%
- RCS Tavg is 551°F
- Pressurizer pressure is 2230 psig
- Pressurizer level is 25%
- Pressurizer Level Control Transfer Switch is in the NORMAL 2-3 position
- Charging Pump Speed Controller (**1LC-428F**) output FAILS LOW

What automatic action(s) will occur over time as a result of this failure assuming NO operator action is taken?

- a. Pressurizer level will rise to 50% AND stabilize.
- b. Pressurizer level will drop to 21% AND stabilize.
- c. Letdown will isolate AND the reactor will trip on high Pressurizer level.
- d. Backup heaters will energize AND the reactor will trip on high Pressurizer pressure.

Senior Reactor Operator Examination

SRO #	100
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Given the following conditions on Unit 1:

- A LOCA has occurred
- The Emergency Director has declared an ALERT
- The crew is performing the actions of 1ES-1.1 "Post LOCA Cooldown And Depressurization"
- Annunciators **47016-0204** 11 RWST LO LVL and **47019-0503** 11 RWST LO LVL have just alarmed

What action must be taken?

- a. A Site Evacuation must be **ordered** AND the people **directed** to assemble at the PI Training Center.
- b. A plant **announcement** must be made warning personnel to restrict entry into the Auxiliary Building due to potential high radiation.
- c. The event must be **reclassified** as a GENERAL EMERGENCY AND the NRC, State and local governments **notified** within 15 minutes.
- d. Protective Action Guidelines (PAGs) **determined**, AND the State and local governments **notified** within 15 minutes following evaluation.

