

U.S. Nuclear Regulatory Commission Site-Specific SRO Written Examination	
Applicant Information	
Name:	
Date: September 22, 2009	Facility/Unit: Crystal River
Region: I / II / III / IV	Reactor Type: W / CE / BW / GE
Start Time:	Finish Time:
Instructions	
Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.	
Applicant Certification	
All work done on this examination is my own. I have neither given nor received aid.	
_____ Applicant's Signature	
Results	
RO/SRO-Only/Total Examination Values	_____ / _____ / _____ Points
Applicant's Scores	_____ / _____ / _____ Points
Applicant's Grade	_____ / _____ / _____ Percent

Name: _____

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Form: 0

Version: 0

1. The plant was at 100% power when the PZR Spray valve fails open. Efforts to close the PZR Spray Block valve have been unsuccessful. When RCS pressure reached 2000 psig the CRS directed a manual reactor trip.

Which ONE of the following describes the impact of the PZR spray valve malfunction on plant safety limits and whether an EAL declaration is required IAW EM-202, Duties of the Emergency Coordinator, for the manual reactor trip?

- A. (1) DNBR will rise.
 (2) EAL declaration is required.
- B. (1) DNBR will lower.
 (2) EAL declaration is NOT required.
- C. (1) DNBR will rise.
 (2) EAL declaration is NOT required.
- D. (1) DNBR will lower.
 (2) EAL declaration is required.

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2. The following plant conditions exist:

- A cooldown is in progress with Reactor Coolant System temperature at 210° F.
- RCV-11 (PORV Block vlv) is closed and de-energized due to a hot short in its motor operator.

Which ONE of the following describes the impact of inadvertent closure of DHV-3, (Motor-Operated Iso.-RC System) on plant safety functions and the mitigation strategy for maintaining or restoring the safety function?

Closure of DHV-3 will result in loss of the:

A. ECCS safety function.

Initiate OTSG cooling IAW AP-404, Loss of Decay Heat Removal.

B. DHR safety function.

Initiate OTSG cooling IAW AP-404, Loss of Decay Heat Removal.

C. ECCS safety function.

Initiate HPI Cooling IAW AP-404, Loss of Decay Heat Removal.

D. DHR safety function.

Initiate HPI Cooling IAW AP-404, Loss of Decay Heat Removal.

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3. The following plant conditions exist:

- Reactor power is 100% RTP.
- SP-110A, Reactor Protection System Functional Test, is in progress.
- Maintenance is preparing to test the RB pressure reactor trip setpoints.

Which ONE of the following is a procedural requirement while performing this test and the reason for the action?

Establish a:

- A. dedicated valve operator
to open pressure switch isolation valves if a transient occurs.
- B. designated valve operator
to open pressure switch isolation valves if a transient occurs.
- C. dedicated valve operator
to comply with ITS 3.6.3, Containment Isolation Valves, for restoration of RB Integrity.
- D. designated valve operator
to comply with ITS 3.6.3, Containment Isolation Valves, for restoration of RB Integrity.

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4. The following plant conditions exist:

- The plant is at 100% power.
- Control rod 7-4 drops fully into the core.

Which ONE of the following describes how absolute and relative rod position indications are aligned and the operability status, with respect to SDM, of the dropped control rod?

- A. Manipulate the "Position Select Raise/Lower" switch.
The rod is *inoperable*.
- B. Withdraw the dropped rod to the average height of the other group 7 rods.
The rod is *inoperable*.
- C. Manipulate the "Position Select Raise/Lower" switch.
The rod is *operable*.
- D. Withdraw the dropped rod to the average height of the other group 7 rods.
The rod is *operable*.

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5. The following plant conditions exist:

- Reactor is operating at 100%.
- RCS pressure is 2120 psig and lowering.
- RCS Tave is 579° F and stable.
- RM-A6 is stable at normal values.
- Total RCP Seal Injection flow is indicating 20 gpm.

Which ONE of the following describes the event and the appropriate path to implement within AP-520, Loss of RCS Coolant or Pressure?

- A. Small PZR steam space leak
"RCS Pressure Lowering"
- B. Small PZR steam space leak
"Significant Rise in RCS Leakage"
- C. Makeup line leak
"RCS Pressure Lowering"
- D. Makeup line leak
"Significant Rise in RCS Leakage"

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6. The following plant conditions exist:

- EOP-5, Excessive Heat Transfer, is in progress.
- "A" OTSG has been isolated and has blown down.
- The EHT event has been terminated.
- Rule 2, HPI Control, is in progress.
- ES MCC 3AB is de-energized due to a bus fault.
- RCS Tave is 535° F.
- Subcooling Margin (SCM) is 60° F.

Which ONE of the following components will be used to minimize adequate SCM and the reason for this action?

- A. PZR Spray valve to prevent PTS.
- B. PZR Spray valve to minimize tube stresses.
- C. PORV to prevent PTS.
- D. PORV to minimize tube stresses.

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7. The following plant conditions exist:

- Fuel shuffling activities are in progress with the plant at 100% power.
- A leak has occurred in the pool liner and Spent Fuel Pool level is lowering.
- While attempting to place a suspended fuel assembly back into the storage racks an error occurs and the fuel assembly is dropped.
- The fuel assembly is laying horizontally across the top of the fuel rack.
- There is no apparent damage to this fuel assembly or to any other fuel assemblies.
- Spent Fuel Pool level has stabilized at 15 feet above the top of the fuel racks.
- "Aux Bldg Sump Level High" annunciator is in alarm.
- Water is seeping through the Aux Bldg entrance door on the 95' elevation.

Which ONE of the following choices correctly completes the statement below?

The iodine removal factor used in the off-site dose calculations will (1) be met. Additionally entry is required into (2) .

- A. (1) NOT
 (2) AP-1080, Refueling Canal/Spent Fuel Pool Level Lowering,
 ONLY
- B. (1) STILL
 (2) AP-1080, Refueling Canal/Spent Fuel Pool Level Lowering,
 ONLY
- C. (1) NOT
 (2) AP-1080, Refueling Canal/Spent Fuel Pool Level Lowering,
 and AP-1040, Aux Building Flooding
- D. (1) STILL
 (2) AP-1080, Refueling Canal/Spent Fuel Pool Level Lowering,
 and AP-1040, Aux Building Flooding

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8. The following plant conditions exist:

- A tube rupture has occurred in the "A" OTSG.
- The reactor has been manually tripped due to low PZR level.
- RCS Tave is 520° F with a cooldown in progress.
- Initial Dose Equivalent I-131 is 0.010 μ ci/g.
- "A" OTSG level is at 50% and rising due to the tube rupture.
- "B" OTSG level is at LLL.

Which ONE of the following states the required cooldown rate and describes the applicable OTSG steaming guidance IAW EOP-06, Steam Generator Tube Rupture?

A. Emergency Cooldown Rate

Steam BOTH OTSGs equally to achieve the Emergency Cooldown Rate

B. Emergency Cooldown Rate

Preferentially steam the "B" OTSG to achieve the Emergency Cooldown Rate

C. Normal Cooldown Rate

Steam BOTH OTSGs equally to achieve the Normal Cooldown Rate

D. Normal Cooldown Rate

Preferentially steam the "B" OTSG to achieve the Normal Cooldown Rate

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9. The following plant conditions exist:

- The plant is in Mode 3 following a reactor trip caused by a loss of ALL offsite power.
- EOP-02, Vital System Status Verification, followup steps are in progress.
- The following annunciator windows are in alarm:

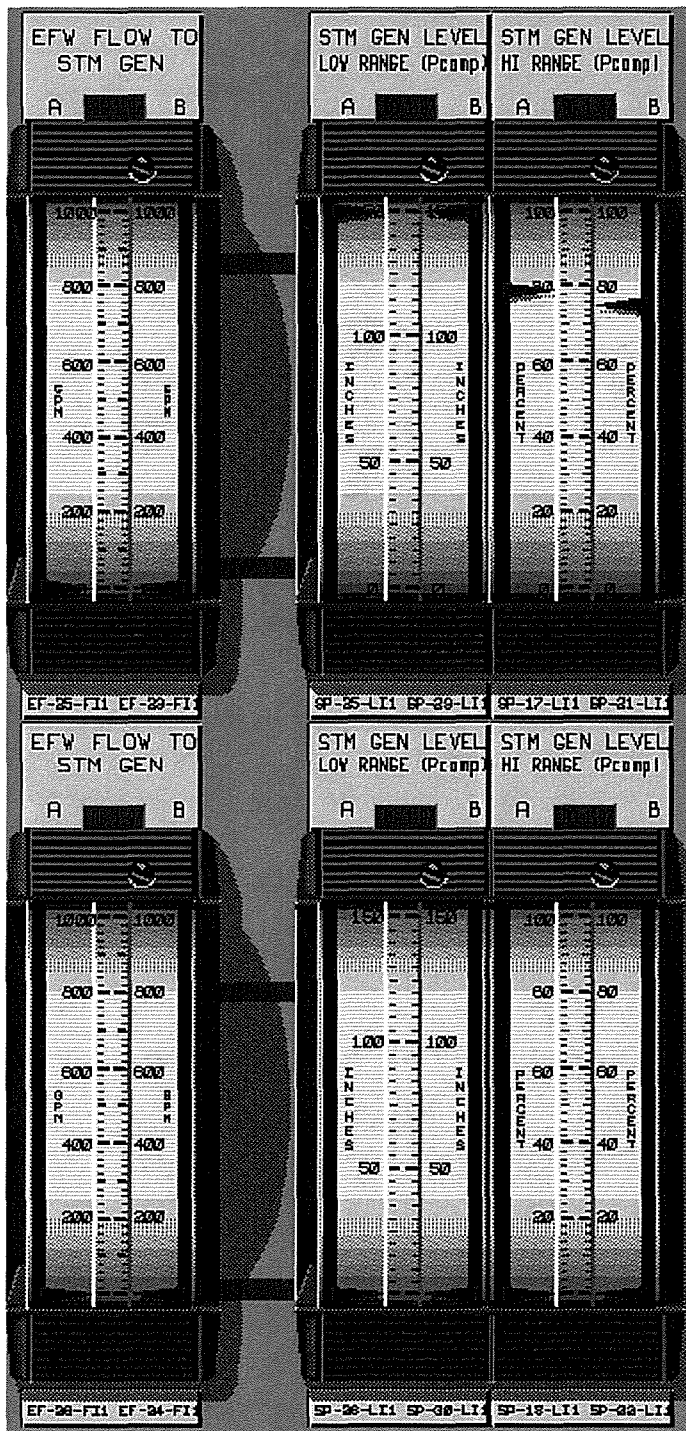
B-06-01, Makeup PP B Trip
C-01-11, RB Fan A/B/C Clg Wtr Flow Low
C-03-05, SW RW System Press Low
H-05-04, Letdown Press High

Which ONE of the following identifies the priority that the alarms above will be addressed IAW AP-770, Emergency Diesel Generator Actuation, and whether the alarms are expected or NOT expected for this failure?

- A.
 - 1. Makeup PP B Trip; NOT expected
 - 2. RB Fan A/B/C Clg Wtr Flow Low; NOT expected
- B.
 - 1. Letdown Press High; Expected
 - 2. SW RW System Press Low; Expected
- C.
 - 1. Makeup PP B Trip; Expected
 - 2. RB Fan A/B/C Clg Wtr Flow Low; Expected
- D.
 - 1. Letdown Press High; Expected
 - 2. SW RW System Press Low; NOT expected

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10. Use the picture below to answer the following question.



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10. At 1000 the following plant conditions exist:

- Reactor power is 100%
- EFP-3 is OOS
- A bus failure occurs
- EFW flow and OTSG levels are per the attached picture

At 1005 the following plant conditions exist:

- A reactor trip occurs due to a loss of both MFWPs

Which bus was lost at 1000 and which Emergency Feedwater Pump must be started to establish controlled EFW flow?

- A. (1) VBBDP-10
(2) EFP-1
- B. (1) VBBDP-11
(2) EFP-1
- C. (1) VBBDP-10
(2) EFP-2
- D. (1) VBBDP-11
(2) EFP-2

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11. The following plant conditions exist:

- A core offload is in progress.
- A failure alarm is received in the MCR for RM-G14, area radiation monitor for the Spent Fuel Storage Pool.

Which ONE of the following choices describes actions *required* IAW FP-203, Defueling and Refueling Operations, and AI-500, Conduct of Operations, Form Appendix 7-07 "SRO Checklist for Unplanned Equipment Status Changes"?

The core offload may continue if _____ (1) _____, and _____ (2) _____ MUST independently concur with the required actions using ITS, ODCM, Fire Plan, CP-365 and CP-500.

- A. (1) continuous Health Physics coverage is provided and an alarming dosimeter is stationed in the affected area
 (2) a second SRO
- B. (1) local surveys of the spent fuel storage area are performed using portable monitoring instrumentation at least once per 24 hours
 (2) a second SRO
- C. (1) continuous Health Physics coverage is provided and an alarming dosimeter is stationed in the affected area
 (2) the Refueling Manager
- D. (1) local surveys of the spent fuel storage area are performed using portable monitoring instrumentation at least once per 24 hours
 (2) the Refueling Manager

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12. Initial Plant Conditions:

- Plant startup was in progress with reactor power at 25%.
- The Offsite Power Transformer (OPT) is removed from service.
- EFP-3 is OOS with expected return to service in 4 hours.

Current Plant Conditions:

- The plant is maintaining 25% power awaiting OPT restoration.
- Annunciator window P-01-01, Startup XFMR Fault, has annunciated.
- EFP-2 experienced an overspeed trip.

Based on these conditions which ONE of the following predicts the impact on the plant and the preferred EFW / AFW source IAW EOP-14, Enclosure 7, EFWP Management?

A. Turbine Trip ONLY

FWP-7

B. Reactor Trip

FWP-7

C. Turbine Trip ONLY

EFP-1

D. Reactor Trip

EFP-1

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13. IAW TS 3.8.7, Inverters - Operating, a loss of the following will cause the inoperability of Vital Bus Inverter 1C (VBIT-1C)?

- A. AC input from ES MCC 3A1
- B. AC input from ES MCC 3B1
- C. DC input from DPDP-1A
- D. DC input from DPDP-1B

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14. The following plant conditions exist:

- RCS temperature is 250° F.
- The personnel hatch door interlock is inoperable.

Which ONE of the following describes the correct TS 3.6.2 Action Statement that must be entered and whether or not RCS temperature can be raised to 300° F IAW TS 3.0.4? **(reference provided)**

- A. (1) TS 3.6.2, Condition C
(2) RCS temperature is allowed to be raised to 300° F
- B. (1) TS 3.6.2, Condition C
(2) RCS temperature is NOT allowed to be raised to 300° F
- C. (1) TS 3.6.2, Condition B
(2) RCS temperature is allowed to be raised to 300° F
- D. (1) TS 3.6.2, Condition B
(2) RCS temperature is NOT allowed to be raised to 300° F

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15. The following plant conditions exist:

- OP-208, Power Shutdown, is in progress with reactor power at 5% RTP.
- Annunciator M-02-05, Screen Wash Trouble, alarms.
- Circulating Water Traveling Screens, CWTS-1A and CWTS-2, are both clogged with their shear pins failed.
- CWTS-1B through 1G are operating with no evident clogging.
- The affected flume level(s) is/are almost empty.
- RB Cooling is in Mechanical mode.
- NO immediate operator actions have been taken.

Which ONE of the following describes an impact caused by the above conditions and the actions required?

A. Rising CRD stator temperatures.

The UHS is inoperable. Trip the reactor and perform EOP-02, Vital System Status Verification.

B. Rising RB temperatures.

The UHS is inoperable. Trip the reactor and perform EOP-02, Vital System Status Verification.

C. Rising CRD stator temperatures.

The UHS is operable. Start RWP-2A and continue in OP-208, Power Shutdown.

D. Rising RB temperatures.

The UHS is operable. Start RWP-2A and continue in OP-208, Power Shutdown.

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16. The following plant conditions exist:

- SP-354A, Monthly Functional Test of the Emergency Diesel Generator EGDG-1A, has been started concurrently with SP-907A, Monthly Functional Test of 4160V ES Bus "A" Undervoltage.
- The "A" ES 4160V Bus stripping signal has been defeated IAW SP-907A.
- A dedicated operator is stationed to perform Enclosure 2, Emergency Restoration of EGDG-1A.
- A severe weather alert has been declared with lightning causing disturbances on the 500 and 230 KV power lines.
- A lightning strike is observed near the switchyard.

Which ONE of the following describes actions that will be performed by the crew?

- A. Discontinue relay testing and perform SP-907A, Enclosure 2, then ensure EGDG-1A is in ES standby.
- B. Complete relay testing, then ensure EGDG-1A is in ES standby.
- C. Discontinue relay testing and perform SP-907A, Enclosure 2, then complete SP-354A ensuring the diesel is loaded on the bus for a minimum of 1 hour to restore EGDG-1A to operable status.
- D. Complete relay testing, then complete SP-354A ensuring the diesel is loaded on the bus for a minimum of 1 hour to restore EGDG-1A to operable status.

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17. The following plant conditions exist:

- A reactor trip has just occurred.
- All the normal lights on the NNI-Y power supply monitors are lit.
- The NNI-Y status light on the Redundant Instrument Panel is extinguished.

Which ONE of the following describes the procedure mitigation strategy for this event?

Enter EOP-2, Vital System Status Verification, complete the Immediate Actions,:

- A. and the followup actions prior to performing AP-582, Loss of NNI-Y, due to the loss of NNI-Y DC power.
- B. and the followup actions prior to performing AP-582, Loss of NNI-Y, due to the loss of NNI-Y AC power.
- C. then concurrently perform AP-582, Loss of NNI-Y, due to the loss of NNI-Y DC power.
- D. then concurrently perform AP-582, Loss of NNI-Y, due to the loss of NNI-Y AC power.

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18. The following plant conditions exist:

- The plant is in Mode 3
- A complete loss of offsite power (LOOP) has occurred.
- "B" ES Diesel engine has catastrophically failed.
- Offsite power is not expected back for at least 48 hours.

Which ONE of the following describes the allowable cooldown rate and the maximum time allowed by TS to achieve cold shutdown based on plant conditions? **(reference provided)**

Start an RCS cooldown at a maximum rate of (1) and be (2) .

- A. (1) $\leq 50^{\circ}\text{ F} / 1/2\text{ hr}$
 (2) $< 200^{\circ}\text{ F}$ in 37 hours
- B. (1) $\leq 25^{\circ}\text{ F} / 1/2\text{ hr}$
 (2) $< 200^{\circ}\text{ F}$ in 37 hours
- C. (1) $\leq 50^{\circ}\text{ F} / 1/2\text{ hr}$
 (2) $< 200^{\circ}\text{ F}$ in 44 hours
- D. (1) $\leq 25^{\circ}\text{ F} / 1/2\text{ hr}$
 (2) $< 200^{\circ}\text{ F}$ in 44 hours

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19. The following plant conditions exist:

- The plant is in Mode 3.
- One of the two available PPOs slips and severely sprains his ankle while performing a walkdown of the Reactor Building.
- The PPO is contaminated and is escorted to the hospital by both available Health Physics technicians.

Which ONE of the following describes the Technical Specification requirement, relating to shift staffing, for this situation?

- A. No action is required. Minimum staffing levels are still met.
- B. Another PPO should be called in immediately and should arrive within two hours.
- C. Another HP technician should be called in immediately and should arrive within two hours.
- D. Another HP technician AND PPO should be called in immediately and should arrive within two hours.

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20. The following plant conditions exist:

- FWP-7 is removed from service.
- A large break LOCA has occurred and EOP-08A, LOCA Cooldown, is in progress.
- EFP-3 failed to start and EFP-2 tripped on mechanical overspeed.
- The TSC is operational with limited HP support.
- EOP-14, Enclosure 2, PPO Post Event Actions, and Enclosure 7, EFWP Management, are in progress.

The TSC will be directed to support ____ (1) ____ *first* because ____ (2) ____ .

- A. (1) performing PPO Post Event Actions
(2) high radiation may prohibit access to equipment later in the event
- B. (1) resetting the mechanical overspeed on EFP-2
(2) high radiation may prohibit access to equipment later in the event
- C. (1) performing PPO Post Event Actions
(2) this activity is *required* for core cooling
- D. (1) resetting the mechanical overspeed on EFP-2
(2) this activity is *required* for core cooling

21. The following plant conditions exist:

- A TS required plant shutdown to Mode 4 is in progress due to a broken shaft on DHP-1A.
- RCS temperature is 285° F.
- RCP-1A and 1B are running.

While checking DHP-1B for start the PPO reports an oil spill around the motor and the oil bubbler empty.

Which ONE of the following describes the appropriate action(s) to be taken IAW Technical Specifications?

- A. Remain in this mode until either DHP-1A or 1B are repaired.
- B. Remain in this mode and declare an Unusual Event based on the "Inability to reach required mode within TS time limits".
- C. Continue to Mode 4 and remain in Mode 4 until either DHP-1A or 1B are repaired.
- D. Continue to Mode 5 since LCO 3.0.3 now applies due to the inoperability of both DH removal trains.

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22. Which ONE of the following conditions requires entry into the Degraded Annunciator Log (DAL) IAW AI-500, Conduct of Operations?

An annunciator link is opened at 0700:

- A. due to a nuisance alarm. The annunciator link is closed at 1800 the following day.
- B. due to a transmitter failure that would not allow the annunciator window to clear. The transmitter failure is now repaired and the annunciator link is closed at 1800 that same day.
- C. IAW an Equipment Clearance Order (ECO). The ECO is released and the annunciator link is closed at 1800 the following day.
- D. IAW a procedure. The procedure is completed and the annunciator link is closed at 1800 that same day.

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23. Which ONE of the following radiation monitors would be the *first* to indicate a failed fuel event and what is the basis for the actions required by TS 3.4.15, RCS Specific Activity, to reduce RCS temperature to $< 500^{\circ}\text{F}$?

A. RM-L1 letdown monitor

RCS saturation pressure at 500°F is less than the lowest OTSG MSSV opening pressure.

B. RM-A6 particulate monitor

RCS saturation pressure at 500°F is less than the lowest OTSG MSSV opening pressure.

C. RM-L1 letdown monitor

RCS temperature and pressure are lowered to minimize further stresses on the fuel and allow for activity levels to be reduced.

D. RM-A6 particulate monitor

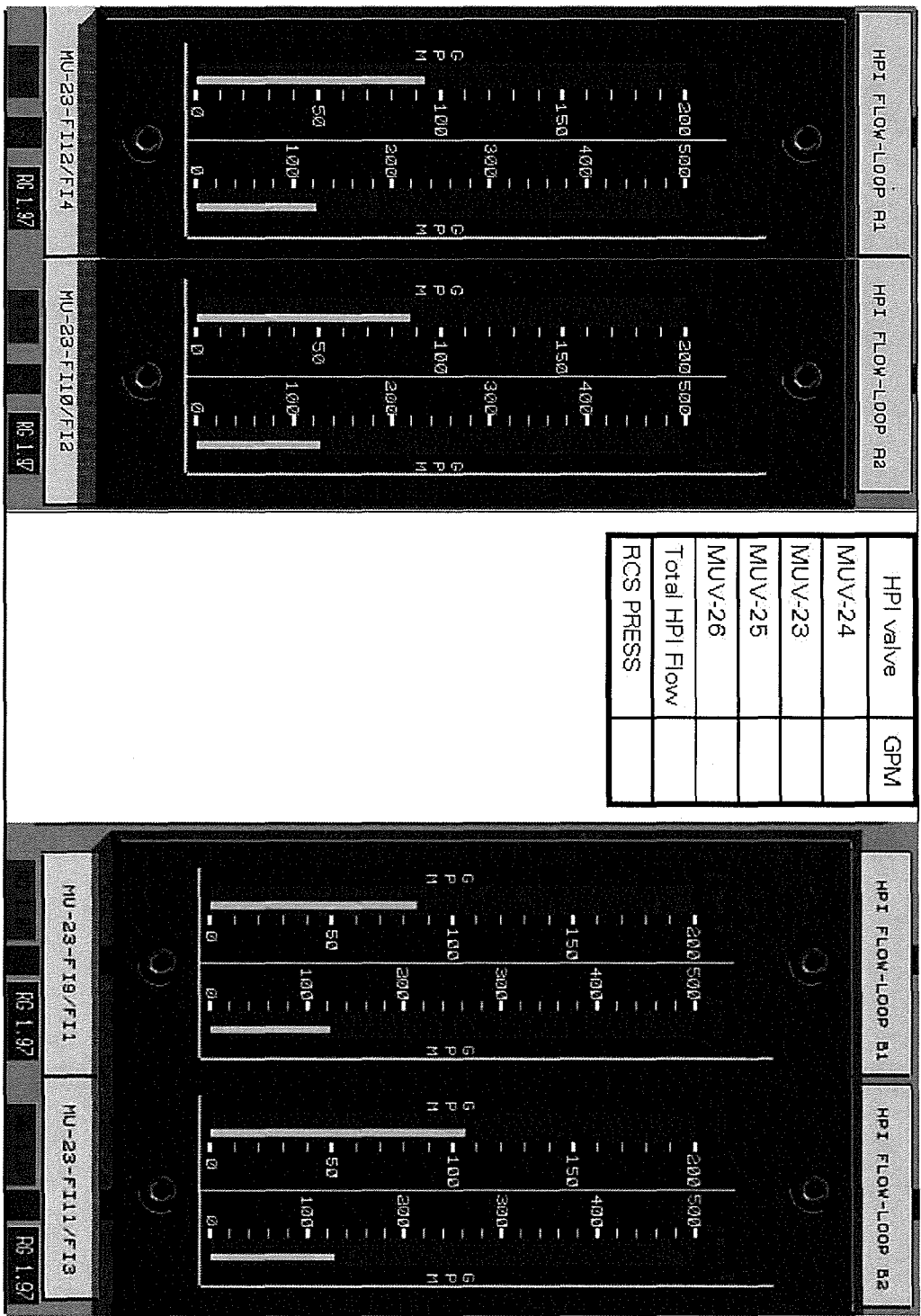
RCS temperature and pressure are lowered to minimize further stresses on the fuel and allow for activity levels to be reduced.

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24. An ALERT has been declared. Which ONE of the following describes a required action IAW the Emergency Plan?

- A. Declare the TSC operational within 30 minutes.
- B. Declare the TSC operational within 60 minutes.
- C. Declare the EOF operational within 30 minutes.
- D. Declare the EOF operational within 60 minutes.

25.



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25. The following plant conditions exist:

- A loss of adequate SCM has occurred.
- ES has actuated.
- RCS pressure is 1000 psig.
- EOP-03, Inadequate Subcooling Margin, is being performed.

Using the picture above which ONE of the following describes the status of total HPI flow IAW EOP-03 and the mitigation path for these conditions?
(reference provided)

Total HPI flow is:

- A. acceptable.
Remain in EOP-03 and perform normal RCS cooldown.
- B. *not* acceptable.
Remain in EOP-03 and perform maximum RCS cooldown.
- C. acceptable.
Transition to EOP-08A, LOCA Cooldown.
- D. *not* acceptable.
Transition to EOP-08B, HPI PORV Cooldown.

You have completed the test!

3.6 CONTAINMENT SYSTEMS

3.6.2 Containment Air Locks

LC0 3.6.2 Two containment air locks shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

NOTES

1. Entry and exit is permissible to perform repairs on the affected air lock components or for emergencies involving personnel safety.
2. Separate Condition entry is allowed for each air lock.
3. Enter applicable Conditions and Required Actions of LC0 3.6.1, "Containment," when air lock leakage results in exceeding the overall containment leakage rate acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment air locks with one air lock door inoperable.	<p>-----NOTES-----</p> <ol style="list-style-type: none"> 1. Required Actions A.1, A.2, and A.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered. 2. Entry and exit is permissible for 7 days under administrative controls if both air locks are inoperable. <p>-----</p>	
	<p>A.1 Verify the OPERABLE door is closed in the affected air lock.</p> <p><u>AND</u></p>	<p>1 hour</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2 Lock the OPERABLE door closed in the affected air lock.</p> <p><u>AND</u></p> <p>A.3 Verify the OPERABLE door is locked closed in the affected air lock.</p>	<p>24 hours</p> <p>Once per 31 days</p>
B. One or more containment air locks with containment air lock interlock mechanism inoperable.	<p>-----NOTES-----</p> <p>1. Required Actions B.1, B.2, and B.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered.</p> <p>2. Entry and exit of containment is permissible under the control of a dedicated individual.</p> <p>-----</p> <p>B.1 Verify an OPERABLE door is closed in the affected air lock.</p> <p><u>AND</u></p>	<p>1 hour</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 Lock an OPERABLE door closed in the affected air lock.	24 hours
	<u>AND</u> B.3 Verify an OPERABLE door is locked closed in the affected air lock.	Once per 31 days
C. One or more containment air locks inoperable for reasons other than Condition A or B.	-----NOTE----- Successful performance of an overall leakage rate test of the affected air lock may be used to satisfy Required Actions C.1 and C.3 when Condition C is entered as a result of a failure of the door seal leakage rate test. -----	
	C.1 Initiate action to evaluate overall containment leakage rate.	Immediately
	<u>AND</u> C.2 Verify a door is closed in the affected air lock.	1 hour
	<u>AND</u> C.3 Restore air lock to OPERABLE status.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	D.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.6.2.1 -----NOTES-----</p> <ol style="list-style-type: none"> 1. An inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test. 2. Results shall be evaluated against acceptance criteria of SR 3.6.1.1 in accordance with the Containment Leakage Rate Testing Program. <p>-----</p> <p>Perform required air lock leakage rate testing in accordance with the Containment Leakage Rate Testing Program.</p> <p>The acceptance criteria for air lock testing are:</p> <ol style="list-style-type: none"> a. Overall air lock leakage rate is $\leq 0.05 L_a$ when tested at $\geq P_a$. b. For each door, leakage rate is $\leq 0.01 L_a$ when tested at ≥ 8.0 psig. 	<p>In accordance with the Containment Leakage Rate Testing Program.</p>
<p>SR 3.6.2.2 -----NOTE-----</p> <p>Only required to be performed when an air lock is used for entry into containment.</p> <p>-----</p> <p>Verify only one door in the air lock can be opened at a time.</p>	<p>184 days</p>

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources-Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

- a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and
- b. Two emergency diesel generators (EDGs) each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----NOTE-----
LCO 3.0.4.b is not applicable to EDGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE required offsite circuit.	1 hour
	<u>AND</u>	<u>AND</u>
	A.2 Declare required feature(s), with no offsite power available, inoperable when its redundant required feature(s) are inoperable.	Once per 8 hours thereafter
	<u>AND</u>	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore required offsite circuit to OPERABLE status	72 hours
B. One EDG inoperable.	<p>B.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).</p> <p><u>AND</u></p> <p>B.2 Declare required feature(s), supported by the inoperable EDG, inoperable when its redundant required feature(s) are inoperable.</p> <p><u>AND</u></p>	<p>1 hour</p> <p><u>AND</u></p> <p>Once per 8 hours thereafter</p> <p>4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)</p> <p>(continued)</p>

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.3.1 Determine OPERABLE EDG is not inoperable due to common cause failure.	24 hours
	<u>OR</u>	
	B.3.2 Perform SR 3.8.1.2 for OPERABLE EDG.	24 hours
	<u>AND</u>	
	B.4 Restore EDG to OPERABLE status	72 hours
		<u>OR</u>
		14 days if alternate AC power is available

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) are inoperable.	12 hours from discovery of Condition C concurrent with Inoperability of redundant Required feature(s)
	<u>AND</u> C.2 Restore one required offsite circuit to OPERABLE status.	24 hours
D. One required offsite circuit inoperable. <u>AND</u> One EDG inoperable.	-----NOTE ----- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems Operating," when Condition D is entered with no AC power source to one train. ----- D.1 Restore required offsite circuit to OPERABLE status.	12 hours
	<u>OR</u> D.2 Restore EDG to OPERABLE status.	12 hours
E. Two EDGs inoperable.	E.1 Restore one EDG to OPERABLE status.	2 hours
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met.	F.1 Be in MODE 3.	12 hours
	<u>AND</u> F.2 Be in MODE 5.	36 hours
G. Three or more required AC sources inoperable.	G.1 Enter LCO 3.0.3	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR 3.8.1.2	<p>-----NOTES-----</p> <ol style="list-style-type: none"> 1. Performance of SR 3.8.1.6 satisfies this SR. 2. All EDG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified EDG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.6 must be met. <p>-----</p> <p>Verify each EDG starts from standby conditions and achieves steady state voltage ≥ 3933 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.</p>	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	<p>-----NOTES -----</p> <ol style="list-style-type: none"> 1. EDG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one EDG at a time. 4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.6. <p>-----</p> <p>Verify each EDG operates for ≥ 60 minutes at a load ≥ 2600 kW and ≤ 2850 kW.</p>	31 days
SR 3.8.1.4	Verify each day tank contains ≥ 280 gal of fuel oil	31 days
SR 3.8.1.5	Verify the fuel oil transfer system operates to automatically transfer fuel oil from the storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.6 -----NOTE----- All EDG starts may be preceded by an engine prelube period. ----- Verify each EDG starts from standby condition and achieves, in ≤ 10 seconds, voltage ≥ 3933 V and ≤ 4400 V, and frequency, ≥ 58.8 Hz and ≤ 61.2 Hz.</p>	<p>184 days</p>
<p>SR 3.8.1.7 Verify manual transfer of AC power sources from the normal offsite circuit to the alternate offsite circuit.</p>	<p>24 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.8 -----NOTES-----</p> <p>1. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR.</p> <p>2. Power factor limit only applicable when Surveillance is performed with EDG paralleled with offsite power.</p> <p>-----</p> <p>Verify each EDG operating at a power factor ≤ 0.9 rejects a load greater than or equal to the single largest post-accident load, and:</p> <p>a. Following load rejection, the frequency is ≤ 66.75 Hz;</p> <p>b. Within 3 seconds following load rejection, the voltage is ≥ 3744 V and ≤ 4576 V; and</p> <p>c. Within 4 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.</p>	<p>24 months</p>
<p>SR 3.8.1.9 Verify interval between each sequenced load block is within $\pm 10\%$ of design interval for each emergency load sequencing relay.</p>	<p>24 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.10 -----NOTES-----</p> <ol style="list-style-type: none"> 1. All EDG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODES 1, 2 or 3. However, credit may be taken for unplanned events that satisfy this SR. 3. Only required to be performed prior to entry into MODE 3. <p>-----</p> <p>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ES actuation signal:</p> <ol style="list-style-type: none"> a. De-energization of emergency buses; b. Load shedding from emergency buses; c. EDG auto-starts from standby condition and: <ol style="list-style-type: none"> 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencing relays, 3. achieves steady-state voltage ≥ 3933 V and ≤ 4400 V, 4. achieves steady-state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes. 	<p>24 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.11 -----NOTES-----</p> <ol style="list-style-type: none"> 1. Momentary transients outside the load range do not invalidate this test. 2. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. <p>-----</p> <p>Verify each EDG operates for ≥ 60 minutes at a load ≥ 3300 kW and ≤ 3400 kW.</p>	<p>24 months</p>

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems-Operating

LCO 3.8.9 Train A and Train B AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC electrical power distribution subsystem inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours
B. One AC vital bus subsystem inoperable.	B.1 Restore AC vital bus subsystem to OPERABLE status.	8 hours

(continued)

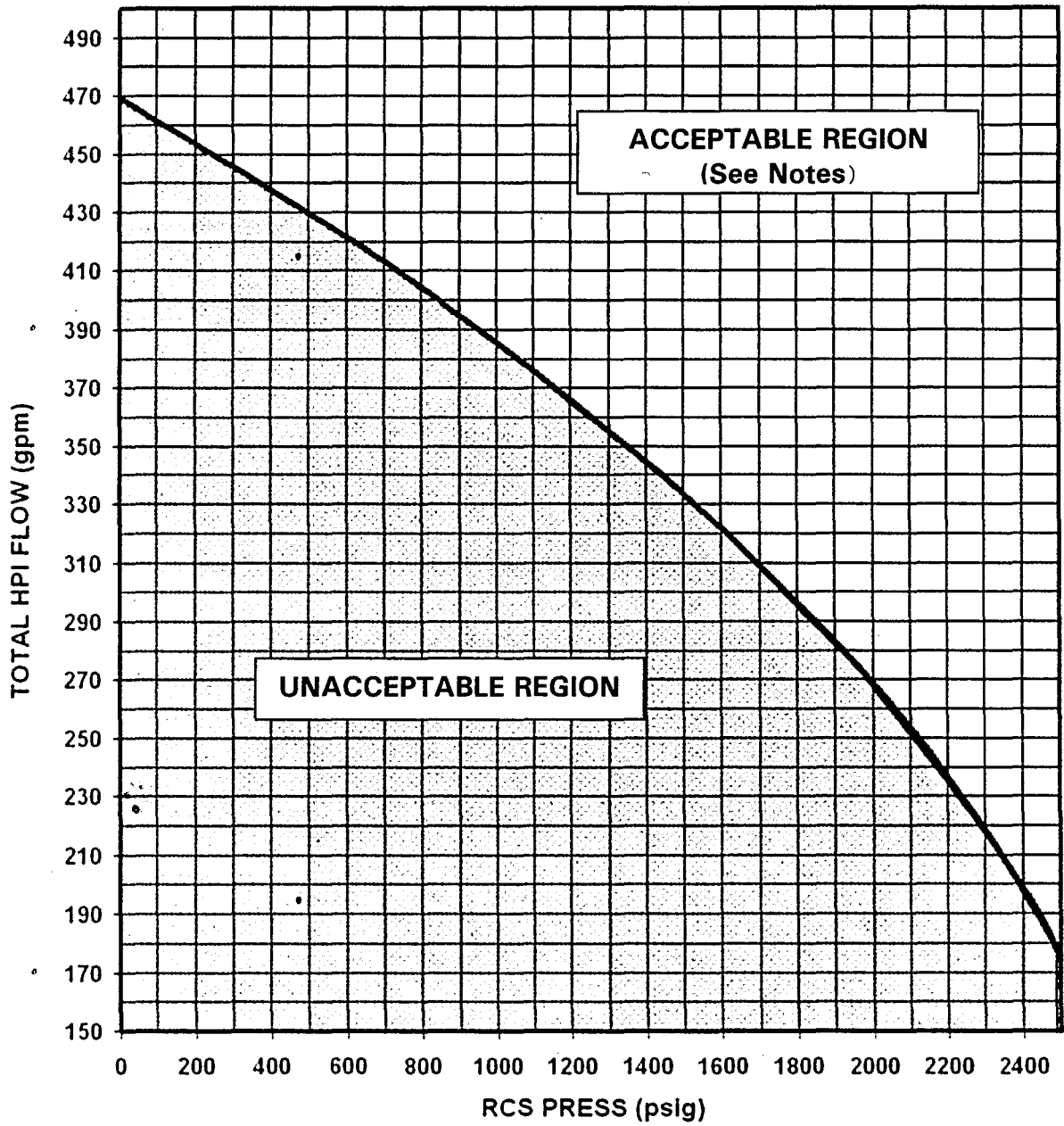
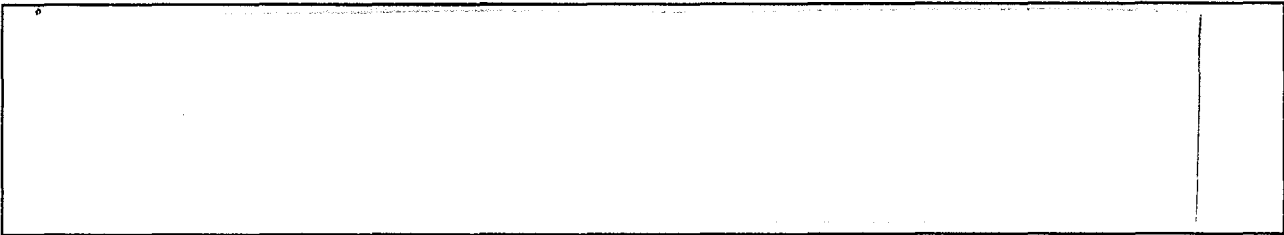
ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One DC electrical power distribution subsystem inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	2 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. <u>AND</u>	6 hours
	D.2 Be in MODE 5.	36 hours
E. Two trains with inoperable distribution subsystems that result in a loss of function.	E.1 Enter LCO 3.0.3	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments and voltage to required AC, DC, and AC vital bus electrical power distribution subsystems.	7 days

4.0 FIGURE 3 MINIMUM REQUIRED TOTAL HPI FLOW



Crystal River 3 Questions 1-75 RO Exam. Questions 76-100 SRO Exam.

Examination Answer Key 09/22/2009

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