Final Submittal
(Blue Paper)

FINAL SRO

WRITTEN EXAMINATION

AND REFERENCES

CRYSTAL RIVER OCTOBER 2007

EXAM NO. 50-302/2007-301

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

Applicant Information

Name:	
Date: October 30, 2007	Facility/Unit: Crystal River Nuclear Plant
Region: II	Reactor Type: BW
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 a 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 Grades	____ / ____ / ____ Percent

1. The following plant conditions exist:

   - The plant is at 100% power.
   - Seal injection flow has been lost.
   - The following RCP information is noted:

Parameter	RCP-1A	RCP-1B	RCP-1C	RCP-1D
SW Out	165° F	170° F	160° F	165° F
Thrust Brg	170° F	200° F	170° F	260° F

Which of the following actions are required to be taken for the above conditions and the basis for those actions per TS Basis?

A. Reduce plant power to 90% using AP-510; stop the affected RCP(s). Power must be reduced prior to tripping the affected RCP(s) to prevent violating DNB limits.

B. Reduce plant power to 90% using AP-510; stop the affected RCP(s). Power must be reduced prior to tripping the affected RCP(s) to prevent violating LHR limits.

C. Trip the reactor and perform EOP-2; stop the affected RCP(s). The reactor must be tripped prior to tripping the affected RCP(s) to prevent violating DNB limits.

D. Trip the reactor and perform EOP-2; stop the affected RCP(s). The reactor must be tripped prior to tripping the affected RCP(s) to prevent violating LHR limits.

2. The following plant conditions exist:

   - The plant is at 100% power.
   - Engineering reports that, due to a recently completed modification, HPI Recirc to RB Sump valves MUV-543, MUV-544, MUV-545, and MUV-546 could not be opened if needed.

   Which LCOs (if any) should be entered for the given condition?

   A. All LCOs are met.

   B. Enter LCO 3.5.2 Condition A; do not enter LCO 3.0.3.

   C. Enter LCO 3.5.2 Condition A; enter LCO 3.0.3.

   D. Do not enter LCO 3.5.2 Condition A; enter LCO 3.0.3.

3. The following plant conditions exist:

- The plant is at 100% power.
- SP-333, Control Rod Exercises, is in progress.
- A malfunction occurs during the evolution and control rods 5-3 and 5-4 drop to 70% withdrawn and remain there. (assume control rods are still trippable).
- No automatic actions occur.

Which of the following action(s) is required and per ITS Bases what is a potential concern with continued operation in this condition?

A. Enter TS 3.1.4 "Control Rod Group Alignment Limits." Continued operation in this condition may result in excessive local LHR.

B. Enter TS 3.1.5 "Safety Rod Insertion Limits." Continued operation in this condition may result in excessive local LHR.

C. Enter TS 3.1.4 "Control Rod Group Alignment Limits." Continued operation in this condition may result in inadequate margin to DNB.

D. Enter TS 3.1.5 "Safety Rod Insertion Limits." Continued operation in this condition may result in inadequate margin to DNB.

4. The following plant conditions exist:

- The plant is operating at 100% power with Tave stable at 579° F.
- Pressurizer level is 221" and MUT level is 92".
- An unisolable RCS leak occurs.
- After 3 minutes, pressurizer level is 182" and MUT level is 88".

Which of the following procedures are required to be used for this event?

Procedure names are as follows:

AP-520	Loss of RCS Coolant or Pressure
EOP-2	Vital System Status Verification
EOP-3	Inadequate Subcooling Margin
EOP-8A	LOCA Cooldown
EOP-10	Post Trip Stabilization
OP-208	Power Shutdown
OP-209	Plant Cooldown
OP-211	Reactor Shutdown

A. AP-520, OP-208, OP-209, and OP-211

B. AP-520, EOP-2, and EOP-8A

C. EOP-2, EOP-3, and EOP-8A

D. AP-520, EOP-2, and EOP-10

5. The following plant conditions exist:

- The Reactor has been shutdown for 10 days.
- "A" Decay Heat Removal train is in service.
- RCS temperature is 90°F.
- RCS level is 136 feet.
- Cold Leg Nozzle Dams are installed.
- The RCS is vented.
- The core has not been unloaded (RV head on).

If a complete loss of decay heat removal occurs, what is the maximum time allowed (per AI-504 "Guidelines for Cold Shutdown and Refueling") to have the reactor building equipment hatch or outage equipment hatch installed? (Reference Included)

A. 64 minutes

B. 71 minutes

C. 2.5 hours

D. 4 hours

6. The following plant conditions exist:

- A large break LOCA is in progress.
- Building Spray was actuated 6 hours ago.
- RB pressure is 8 psig and stable.
- RB atmosphere I-131 is 10 μCi/cc.
- TSC has approved securing building spray if all other requirements are met.

Which ONE of the following choices represents the correct building spray requirements for these conditions?

A. In accordance with EOP-8A, building spray may be secured.

B. In accordance with EOP-3, building spray may be secured.

C. In accordance with EOP-8A, building spray cannot be secured.

D. In accordance with EOP-3, building spray cannot be secured.

7. The following plant conditions exist:

- The plant is operating at 70% power.
- RCP-1C was secured and RCS pressure control has been selected to the 'B' Loop.
- The spray valve has failed open and has been manually isolated.
- RCS pressure is currently stable at:
  A Loop: 2050 psig
  B Loop: 2075 psig

The departure from nucleate boiling ratio (DNBR) is ___(1)___ now than before the spray valve malfunction and the LCO for DNB is ___(2)___.

A. (1) lower
   (2) not met because 'A' Loop pressure is less than the limit

B. (1) lower
   (2) met because 'B' Loop pressure is greater than the limit

C. (1) higher
   (2) not met because 'A' Loop pressure is less than the limit

D. (1) higher
   (2) met because 'B' Loop pressure is greater than the limit

8. Which ONE of the following is the required post-LOCA hydrogen purge flow rate for a purge to be started 1,350 hours after a LOCA?
(Reference Included)

A. If an initial purge is to be started, the required purge flow rate is 17.0 scfm.

B. If an initial purge is to be started, the required purge flow rate is 14.5 scfm.

C. If an initial purge with a flow rate of 20 scfm was secured and a second purge is required, the second purge required flow rate is 17.0 scfm.

D. If an initial purge with a flow rate of 20 scfm was secured and a second purge is required, the second purge required flow rate is 14.5 scfm.

9. The plant is in Mode 6 with fuel handling in progress when the refueling supervisor notes that the audible Source Range Monitor in the reactor building is inoperable. Which of the following describes the required action(s) for this condition?

A. Neither control room or reactor building audible indications are required for source range operability. Core alteration may continue.

B. Only the control room audible indications are required for source range operability. Core alteration may continue.

C. Immediately suspend all core alterations and positive reactivity changes. Fuel handling may resume if an equivalent portable detector with audible indication is placed in the reactor building.

D. Immediately suspend all core alterations and positive reactivity changes. Fuel handling cannot resume until the installed audible indication is repaired.

10. Fuel movement activities in both the RB and Spent Fuel Pool are in progress. Determine which ONE of the following conditions meet the criteria for a "Significant Fuel Handling Event" IAW FP-203, Defueling and Refueling Operations?

A. RM-A1 rises to its "Warning" setpoint.

B. The operating Decay Heat Removal train secured to facilitate core mapping operations.

C. Count rate rises to 2 times initial value unexpectedly.

D. Refueling canal water level is discovered to be 155 ft.

11. The following plant conditions exist:

- A normal plant shutdown is in progress.
- 'B' EFIC Channel experienced a power supply failure that de-energized the channel.
- RCS temperature is 532°F.

The only operating Main Feed Pump trips concurrent with a steam leak on the 'B' OTSG. Several minutes into the transient the following parameters are noted:

	'A' OTSG	'B' OTSG
Level	20" and rising	20" and lowering
Pressure	850 psig and stable	550 psig and lowering
EFW Flow from EFP-3	100 gpm	0 gpm
EFW Flow from EFP-2	500 gpm	0 gpm

The RO reports that EFV-55 (EFP-2 to B OTSG), EFV-56 (EFP-2 to A OTSG), and EFV-57 (EFP-3 to B OTSG) are full open.

Once "B" EFIC Channel is declared operable, what equipment operability concerns exist?

A. The Vector Valve Enable Logic should be declared inoperable for the "A" EFIC Channel. Continuous operation in this mode is NOT allowed since single failure criterion is NOT met.

B. The Vector Valve Enable Logic should be declared inoperable for the "A" EFIC Channel. Continuous operation in this mode is allowed since single failure criterion will be met.

C. The Vector Valve (FOGG) Logic should be declared inoperable for the "A" EFIC Channel. Continuous operation in this mode is NOT allowed since single failure criterion is NOT met.

D. The Vector Valve (FOGG) Logic should be declared inoperable for the "A" EFIC Channel. Continuous operation in this mode is allowed since single failure criterion will be met.

12. Given the following conditions:

- Reactor power was at 100%.
- A station blackout has occurred.
- Reactor Coolant Pressure is 1500 psig.
- Reactor Coolant Temperature is 600°F.

Which ONE of the following choices represents the EOP-13 Rule in effect and the appropriate actions to be taken?

A. Rule 1. Maintain RCS temperature as stable as possible to minimize further RCS shrinkage.

B. Rule 1. Initiate maximum possible cooldown to allow CFT makeup to the RCS.

C. Rule 3. Maintain RCS temperature as stable as possible to minimize further RCS shrinkage.

D. Rule 3. Initiate maximum possible cooldown to allow CFT makeup to the RCS.

13. The plant is operating at 100% power when Q-04-02 "4KV ES Bus Degraded Volt Trip" alarm is received.

    Two of the three 'A' ES Bus degraded voltage (SLUR) relays have actuated.
    Which one of the following states the status of the 'A' EDG and the status of the 'A' ES Bus per AP-730, Grid Instability if bus voltage does not recover?

A. should start. 'A' ES Bus remains operable.

B. should start. 'A' ES Bus must be declared inoperable.

C. should not start. 'A' ES Bus remains operable.

D. should not start. 'A' ES Bus must be declared inoperable.

14. The following plant conditions exist:

- 'A' Decay Heat train is in service.
- RCS pressure is 250 psig.
- RCS temperature is 210° F.
- Total stored EDG lube oil inventory is determined to be 220 gallons.

Which of the following choices represents the required LCO actions and the TS basis for the EDG stored lube oil inventory requirements.

A. Perform ITS LCO 3.8.1 required actions for both EDGs inoperable. The minimum required oil inventory is based on ensuring one EDG can operate for 7 days.

B. Perform ITS LCO 3.8.1 required actions for both EDGs inoperable. The minimum required oil inventory is based on ensuring both EDGs can operate for 7 days.

C. Perform ITS LCO 3.8.2 required actions for A EDG inoperable. The minimum required oil inventory is based on ensuring one EDG can operate for 7 days.

D. Perform ITS LCO 3.8.2 required actions for A EDG inoperable. The minimum required oil inventory is based on ensuring both EDGs can operate for 7 days.

15. The plant is operating at 100% power when Alarm Window F-03-04 "Cntrl Complex Fire Alert" is received. Five minutes after receipt of the alarm, Security calls and reports the following:

- A smoldering fire exists in the 'A' Battery Room
- The fire is contained to the 'A' Battery Room.

Which ONE of the following Emergency Classifications, if any, must be entered 5 minutes after receipt of the alarm?
(Reference Included)

A. No Emergency Classification should be entered

B. Unusual Event

C. Alert

D. Site Area Emergency

16. The following plant conditions exist:

- The plant is in Mode 6.
- The outage equipment hatch is installed and held in place by four bolts.

Which of the following fuel handling and mode restrictions apply based on these conditions in accordance with Technical Specifications?

A. Moving irradiated fuel in containment is acceptable.
The plant can ascend to Mode 4, but not Mode 3.

B. Moving irradiated fuel in containment is acceptable.
The plant cannot ascend to Mode 4.

C. Irradiated fuel cannot be moved in containment.
The plant can ascend to Mode 4, but not Mode 3.

D. Irradiated fuel cannot be moved in containment.
The plant cannot ascend to Mode 4.

17. The primary plant operator stops a WDT-1B ("B" Waste Gas Decay Tank) release when WD-19-FQI (release flow monitor) fails low. Which ONE of the following actions must be taken, if any, to re-initiate the release if the flow recorder cannot be fixed?

A. The release may not be re-initiated until the flow monitor is repaired.

B. Grab samples must be collected and analyzed at least once per four hours.

C. The release flow rate must be estimated at least once per four hours.

D. Two independent samples and an independently verified discharge valve alignment must be performed.

18. The following plant conditions exist:
(All Immediate Actions and the symptom scan are complete for EOP-2, Vital System Status Verification)

- A reactor trip has occurred.
- The "A" steam generator level is 87% and rising.
- The "B" steam generator level is 43% and rising.
- All Reactor Coolant Pumps (RCP) are operating.
- Both Emergency Feedwater Pumps (EFW) are operating.
- Reactor coolant temperature has lowered from 535° F to 533° F in 30 seconds.
- Reactor coolant pressure is 1850 psig.

Based on the above conditions which of the following describes the appropriate Emergency Operating Procedure and associated rule for this situation?

A. Remain in EOP-2, Vital System Status Verification; EOP-13 Rule 3, EFW/AFW Control.

B. Remain in EOP-2, Vital System Status Verification; EOP-13 Rule 4, Pressurized Thermal Shock.

C. Transition to EOP-5, Excessive Heat Transfer; EOP-13 Rule 3, EFW/AFW Control.

D. Transition to EOP-5, Excessive Heat Transfer; EOP-13 Rule 4, Pressurized Thermal Shock.

19. Chemistry has determined that secondary specific activity is 0.1 μCi/gm dose equivalent iodine.

This is ____(1)____ the TS limit for secondary specific activity.
Per TS 3.7.16 basis, the most limiting accident involving a release of secondary specific activity is a ____(2)____.

A. (1) above
(2) complete loss of AC power

B. (1) above
(2) steam line break between the RB and MSIVs

C. (1) below
(2) complete loss of AC power

D. (1) below
(2) steam line break between the RB and MSIVs

20. 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 the only two available Health Physics technicians.
- Shift turnover is scheduled in two hours.

Which ONE of the following describes the appropriate response, relating to shift staffing, for this situation?

A. No action is required. Minimum staffing levels are still met.

B. No action is required. Minimum staffing levels are not met but the oncoming shift will report within two hours.

C. Another HP technician is required to be called in immediately and is required to arrive within two hours.

D. Another PPO is required to be called in immediately and is required to arrive within two hours.

21. BSP-1A is scheduled to be removed from service for a 36 hour maintenance window. Maintenance plans to perform the work on day shift only. Who (at a minimum) is required to approve this?

A. Operations Work Coordinator

B. Superintendent Shift Operations

C. Manager Shift Operations

D. Plant General Manager

22. The following plant conditions exist:

- A full core offload to the spent fuel pool has been performed
- No DHR trains are available

Which of the following represents the minimum acceptable equipment for spent fuel cooling per AI-504 "Guidelines for Cold Shutdown and Refueling"?

A. One spent fuel cooling train available. One EDG associated with the protected train available, but not necessarily operable.

B. One spent fuel cooling train available. One EDG associated with the protected train operable.

C. Two spent fuel cooling trains available. One EDG associated with the protected train required to be operable.

D. Two spent fuel cooling trains available. Both EDGs required to be operable.

23. The following plant conditions exist:

- A General Emergency has been declared based on the fission product matrix.
- An operator is to be sent into the auxiliary building to perform a discretionary damage assessment.
- The operator has received 1000 mrem TEDE this year, but has received NO dose during this event.

Per EM-104 "Operation of the Operational Support Center" what is the maximum dose the operator can receive for this entry?

A. 4 rem

B. 5 rem

C. 9 rem

D. 10 rem

24. The following plant conditions exist:

- Plant is in Mode 1.

Which ONE of the following areas would require the Fire Protection Engineer to evaluate prior to authorizing fire permits in accordance with FIR-NGGC-0003 "Hot Work Permit"?

A. Makeup Pump Room.

B. Unit 4160 V Switchgear Room.

C. Vital Bus Inverter Room.

D. Nuclear Services Seawater Room.

25. The emergency coordinator (EC) has declared a general emergency. The emergency operations facility, EOF, is not staffed. Besides classification what other duty can NOT be delegated to another emergency team member by the EC?

A. Direct the shutdown of the plant

B. Direct site evacuation

C. Make notifications to the state

D. Determine protective action recommendations

NRC EXAM – 2007

References Provided

Steam Tables

RO EXAM

RM-A12 Conversion Table (Simulator Version)
ITS 3.4.15

SRO EXAM

EM-202, Enclosure 1(Partial)
EM-225A (Partial)
OP-103H (Partial)

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References Provided

Both Exams: *Steam Tables*

NRC EXAM REQUIRED REFERENCES **RO**			
Question #	K/A	Reference	Title
53	076AG2.2.22	ITS 3.4.15	RCS Specific Activity
64	BW/E05EK1.2		RM-A12 Conversion Table (Simulator Version)

NRC EXAM REQUIRED REFERENCES **SRO**			
Question #	K/A	Reference	Title
5	025AG2.1.25	OP-103H	RCS and SFP Decay Heat Tables & Figures *(Enclosure 1 and Tables 5, 9, 16 only)*
8	029G2.1.23	EM-225A	Post Accident RB Hydrogen Control *(Enclosures 7 and 10 only)*
15	067AG2.4.41	EM-202	Duties of the Emergency Coordinator *(Pages 8 and 16 of Enclosure 1 only)*