U.S. Nuclear Regulatory Commission

Site-Specific RO 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

Applicant Certification

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

_____
Applicant's Signature

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

1. The following plant conditions exist:

   - Following a plant runback due to the loss of RCP-1A, an ICS failure occurs.
   - AP-504, Integrated Control System Failure, has been entered and the Immediate Actions are complete.
   - The plant is now stable.
   - Maintenance and Engineering have been contacted.

   Twenty minutes later the following conditions are observed:

   - Tave is rising
   - RCS pressure is rising
   - PZR level is rising

   Assuming NO additional operator actions have occurred which ONE of the following describes the event in progress and the required operator action?

   A. MUV-31 inadvertently opened

      Close MUV-596, Common Seal Injection/Makeup Isolation

   B. MUV-31 inadvertently opened

      Close MUV-27, MUP-1A/1B/1C to RCP-1A Discharge Isolation

   C. Continuous rod withdrawal

      Select Sequence Override

   D. Continuous rod withdrawal

      Start Emergency Boration

2. The following plant conditions exist:

- An ICS malfunction occurred.
- After completion of AP-504, Integrated Control System Failure, Immediate Actions a *control rod dropped to the bottom of the core.*

- NI-5 upper chamber	35.2%	NI-7 upper chamber	37.9%
- NI-5 lower chamber	43.3%	NI-7 lower chamber	44.4%
- NI-6 upper chamber	43.3%	NI-8 upper chamber	35.1%
- NI-6 lower chamber	44.6%	NI-8 lower chamber	42.9%

Which ONE of the following describes the required *initial* actions IAW TS 3.2.4, Quadrant Power Tilt (QPT)? **(reference provided)**

A. Perform SR 3.2.5.1 once per two hours AND restore QPT to less than or equal to the steady state limit within 24 hours.

B. Reduce thermal power to < 60% of the allowable thermal power within two hours AND reduce the nuclear overpower trip setpoint to ≤ 65.5% of the allowable thermal power within 10 hours.

C. Reduce thermal power ≥ 2% RTP from the allowable thermal power for each 1% of QPT greater than the steady state limit within 30 minutes AND restore QPT to less than or equal to the transient limit within two hours.

D. Reduce thermal power ≥ 2% RTP from allowable thermal power for each 1% of QPT greater than the steady state limit within two hours AND reduce the nuclear overpower trip setpoint and nuclear overpower based on RCS flow and Axial Power Imbalance trip setpoint ≥ 2% RTP from allowable thermal power for each 1% of QPT greater than the steady state limit.

3. The following plant conditions exist:

- A plant startup is in progress.
- RCP-1A, RCP-1C, and RCP-1D are running.
- RCP-2B, AC Lift Oil Pump, has tripped.
- All RCP oil reservoirs are at normal level.
- SWP-1C, "C" Nuclear Services Closed Cycle Cooling Pump, is running.
- RCS temperature is 430° F.
- RCS pressure is 1000 psig.
- All RCP seal flows are stable at 6 gpm per pump.

Which ONE of the preceding conditions would prevent the start of the "B" Reactor Coolant Pump, RCP-1B?

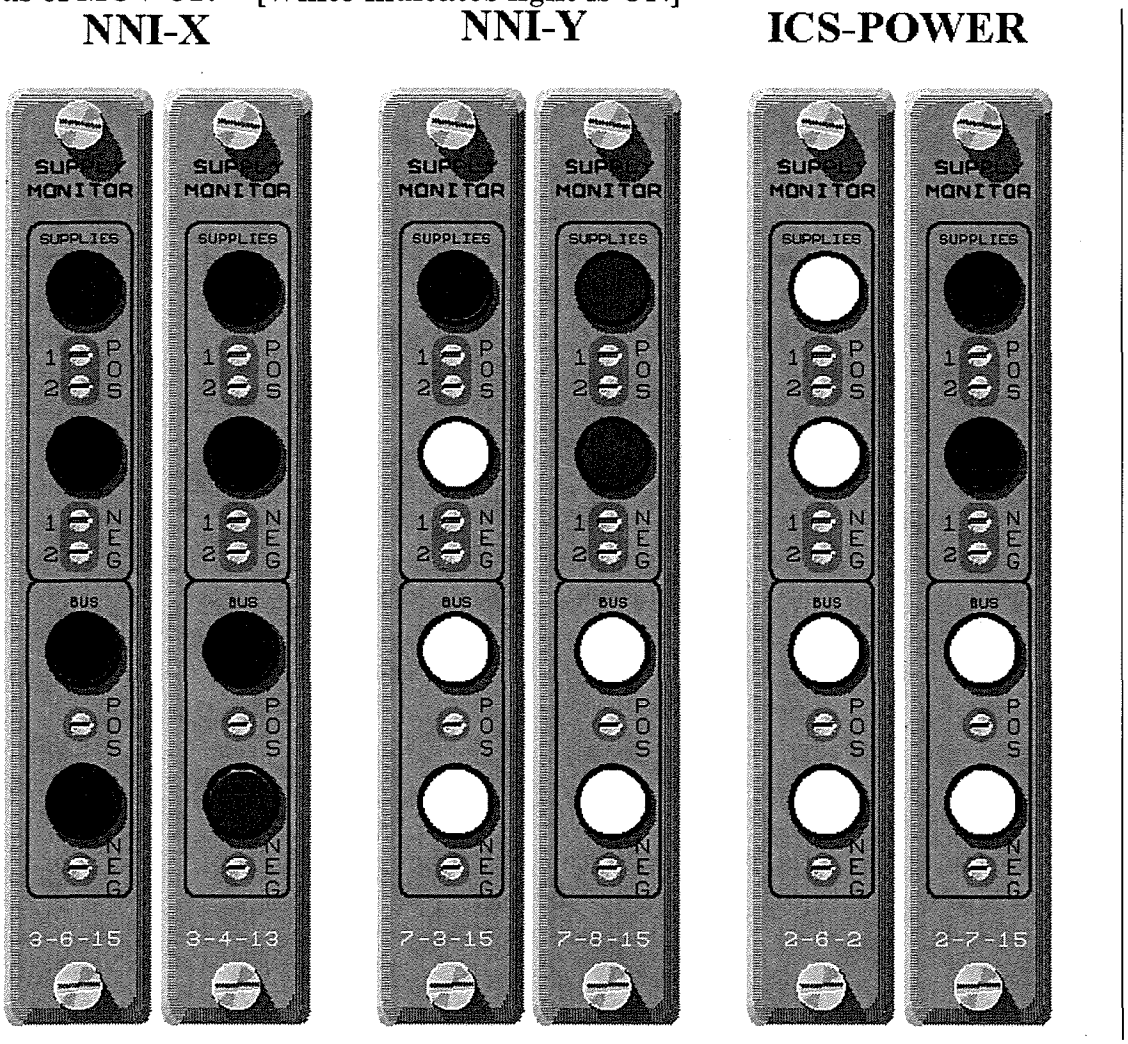
A. RCP lift oil pressure is too low

B. RCS pressure is too low

C. RCP seal flow is too low

D. RCS temperature is too low

4. With the plant operating at 100% power an electrical transient occurs. The following indications are observed on the NNI and ICS Power Supply Monitors. Based on the indications below which ONE of the following describes the current status of MUV-31? [White indicates light is ON]



A. Failed closed - manual valve control, from MCB, is available.

B. Failed closed - manual valve control, from MCB, is NOT available.

C. Maintained "as is" - manual valve control, from MCB, is available.

D. Maintained "as is" - manual valve control, from MCB, is NOT available.

5. The following plant conditions exist:

- The plant is at 90% power.
- Control rod Group 7 is at 80%.
- Control rod 7-4 drops *10% from the group average.*

___(1)___ reactor power to approximately 60% which ensures that ___(2)___ limits are not exceeded.

A. (1) An automatic plant runback will occur reducing
(2) local linear heat rate (LHR)

B. (1) An automatic plant runback will occur reducing
(2) DNBR

C. (1) The operator must manually reduce
(2) local linear heat rate (LHR)

D. (1) The operator must manually reduce
(2) DNBR

6. The following plant conditions exist:

- The plant has shut down for a forced outage to replace a portion of the "A" ES 4160V bus.
- Bus replacement is now in progress and is expected to take 4 days to complete.
- Annunciator window Q-07-06, Plant Line 4 Fault (feed to BEST and Startup transformers), has just annunciated.

Which ONE of the following describes the procedure(s) required to be entered?

AP-404, Loss of Decay Heat Removal
AP-770, Emergency Diesel Generator Actuation
EOP-12, Station Blackout

A. EOP-12 ONLY

B. AP-404 ONLY

C. EOP-12 and AP-770

D. AP-770 and AP-404

7. "A" Decay Heat Removal train is in service. Instrument air pressure is 75 psig and lowering.

   Which ONE of the following describes the correct operator response for the above conditions IAW AP-470, Loss of Instrument Air?

   Manually throttle DCV-17 (A DH Cooler Bypass Control Valve) ___(1)___ and manually throttle DCV-177 (A DH Cooler Outlet Control Valve) ___(2)___ to limit the initial RCS ___(3)___ .

A. (1) closed
   (2) open
   (3) heatup

B. (1) open
   (2) closed
   (3) heatup

C. (1) closed
   (2) open
   (3) cooldown

D. (1) open
   (2) closed
   (3) cooldown

8. The following plant conditions exist:

- A large volume add was made to the BWST.
- Chemistry reports that the BWST boron concentration is 1890 ppm.
- The sample results are confirmed by Chemistry.
- RCS boron concentration is 300 ppm.

Which ONE of the following describes the impact of this error on the ability of the Emergency Core Cooling System (ECCS) to maintain adequate Shutdown Margin (SDM) during a LOCA and what procedural guidance would be used to address the potential consequences caused by this condition?

A. SDM could be lost.

EOP-13, Rule 6, Reactivity Control, would be used to start an RCS boration from the BWST.

B. SDM will be maintained.

EOP-13, Rule 6, Reactivity Control, would be used to start an RCS boration from the BWST.

C. SDM could be lost.

EOP-13, Rule 6, Reactivity Control, would be used to start an RCS boration from the BASTs.

D. SDM will be maintained.

EOP-13, Rule 6, Reactivity Control, would be used to start an RCS boration from the BASTs.

9. The following plant conditions exist:

- The plant was at 100% power when a small break LOCA occurred.
- Rule 1, Loss of SCM, has just been completed.
- Current RCS pressure is 1300 psig.
- Current Tincore indication is 425° F.
- RCS cooldown rate is 65° F per 1/2 hr.

Based on these conditions which ONE of the following describes why Rule 4, PTS, is in effect and why HPI flow must be throttled?

Rule 4, PTS, is in effect because ___(1)___. HPI must be throttled to ___(2)___.

A. (1) HPI flow exists with no RCPs running
(2) prevent exceeding NDT limits

B. (1) ITS cooldown rate was exceeded
(2) prevent exceeding NDT limits

C. (1) HPI flow exists with no RCPs running
(2) lower and maintain RCS pressure below 1000 psig

D. (1) ITS cooldown rate was exceeded
(2) lower and maintain RCS pressure below 1000 psig

10. The following plant conditions exist with the plant at 100% power.

- RB pressure at 0.2 psig and stable
- RB sump level is 12 inches and slowly rising
- RCS pressure is stable
- PZR level is 220 inches and stable
- RCDT level is 103 inches and stable
- RCDT temperature is 127° F and stable
- RCDT pressure is 4.5 psig and stable

Which ONE of the following describes a condition that could result in the above indications?

A. RC-1-LT1 (PZR level transmitter) condensing pot leakage.

B. A Core Flood Tank relief valve has lifted.

C. RCP Seal leakage is draining to the sump.

D. A small main steam leak is in progress.

11. During the Immediate Actions following a reactor trip from 100% power, the following conditions exist:

- Seven control rods (three in group 3, four in group 6) remain withdrawn.
- Power Range NI average power is approximately 6% and stable.

The reactor operator is performing this step:

"Verify NIs indicate reactor is shutdown".

Which ONE of the following actions would be the *next* action for these conditions IAW EOP-02, Vital System Status Verification?

A. Manually actuate both trains of HPI for Emergency Boration.

B. Start both Chemical Addition pumps, CAP-1A and 1B, and manually borate RCS through the Batch Controller.

C. De-energize the CRDs by opening breakers 3305 and 3312.

D. Concurrently perform EOP-13, Rule 6, Reactivity Control.

12. The following plant conditions exist:

1000 The plant is in Mode 5
SWT-1 (SW surge tank) level is 9' 6" and stable
SWT-1 pressure is 85 psig and stable

1005 SWV-199, SWT-1 relief valve, fails open and will not reseat.

Per system design adequate NPSH for the SW pumps ___(1)___ maintained and entry into TS 3.7.7, Nuclear Services Closed Cycle Cooling Water (SW), ___(2)___ required.

A. (1) is
(2) is

B. (1) is
(2) is NOT

C. (1) is NOT
(2) is

D. (1) is NOT
(2) is NOT

13. A plant trip has occurred from 100% power due to the loss of the "B" MFWP. EOP-10, Post Trip Stabilization, is in progress when the following indications are observed:

- RCS pressure is 1900 psig and lowering.
- All PZR heaters are on.
- PZR level is 100 inches and stable.
- Makeup Tank level is lowering at a rate of approximately 15 gpm.
- RCDT level and temperature are rising.
- RB sump, temperature and pressure are normal.

This event would be caused by a ___(1)___ . AP-520, Loss of RCS Coolant or Pressure, will be entered and if the transient can NOT be terminated, then initiate ___(2)___ within 4 hours.

A. (1) PZR spray valve leakby
   (2) EOP-08A, LOCA Cooldown

B. (1) PZR steam space leak
   (2) EOP-08A, LOCA Cooldown

C. (1) PZR spray valve leakby
   (2) OP-209, Plant Cooldown

D. (1) PZR steam space leak
   (2) OP-209, Plant Cooldown

14. Which ONE of the following describes the normal method for maintaining/controlling the level in the Nuclear Services Closed Cycle Cooling System Surge Tank (SWT-1)?

A. Manual control by the Primary Plant Operator.

B. Automatic valve control set to maintain level between two setpoints.

C. Manual operation of the control switch for the fill valve on the Main Control Board.

D. Manual operation of the Demin Water transfer pumps on the Main Control Board.

15. The plant has experienced an RCS leak of approximately 100 gpm. A cooldown to Mode 5 is in progress. RCS temperature trend is shown below.

1200	535° F
1230	500° F
1300	470° F

The cooldown rate is ___(1)___ the TS limit and ___(2)___.

A. (1) above
(2) cannot be controlled due to HPI/break cooling

B. (1) above
(2) can be controlled by adjusting TBVs or ADVs

C. (1) below
(2) cannot be controlled due to HPI/break cooling

D. (1) below
(2) can be controlled by adjusting TBVs or ADVs

16. At 1000 the following plant conditions exist:

- Reactor power is 100%
- All RCS parameters are normal

At 1002 a transient occurs resulting in the following plant conditions:

- RCS pressure is 2105 psig
- PZR temperature is 636° F

Which ONE of the following describes the *initial* response of RCS pressure following the 1002 transient and at what minimum PZR temperature will the PZR Spray valve open?

A. RCS pressure rises because all PZR heaters being energized

PZR temperature of 644° F

B. RCS pressure lowers because the PZR is subcooled

PZR temperature of 644° F

C. RCS pressure rises because all PZR heaters being energized

PZR temperature of 651° F

D. RCS pressure lowers because the PZR is subcooled

PZR temperature of 651° F

17. The following plant conditions exist:

- A loss of all offsite power has occurred.
- After the plant trip a large break LOCA occurs.

Which ONE of the following describes the reason the MUP recirc to MUT (MUV-53 and 257) valves are closed for these conditions?

A. HPI pump runout is avoided.

B. EDG maximum loading is not exceeded.

C. Maximum HPI flow to the RCS is achieved.

D. Balanced HPI flow through all injection valves is achieved.

18. The following plant conditions exist:

- The plant was operating at 100% power when the "B" MFWP tripped.
- AP-545, Plant Runback, was entered.
- During the runback the PORV opened and operated as designed.

Which ONE of the following describes the required actions for this event?

A. Manually trip the reactor and enter EOP-02, Vital System Status Verification.

B. Verify plant conditions are approaching stability and complete AP-545, Plant Runback.

C. Ensure AMSAC actuation has occurred and enter EOP-02, Vital System Status Verification.

D. Perform OP-507, Operation of the ES, RPS, and ATWS Systems.

19. Which ONE of the following "As Found" RPS trip setpoints could have resulted in a departure from nucleate boiling (DNB) event?
(consider each setpoint independently)

A. Thot trip setpoint of 625° F.

B. High RCS pressure trip setpoint of 2400 psig.

C. Flux/delta flux/flow trip setpoint corresponding to -20% imbalance at 80% power.

D. Flux/delta flux/flow trip setpoint corresponding to +20% imbalance at 80% power.

20. The following plant conditions exist:

- Plant is at 100% full power.
- ES Channel 3 "Pressure Test Module" is selected to the "Test/Operate" position for maintenance.
- The plant now experiences a loss of VBDP-3.

Which ONE of the following describes the status of the ES system?

A. Only ES Channel 1 will be tripped; no ES actuation will occur.

B. Only ES Channel 3 will be tripped; no ES actuation will occur.

C. Both ES Channels 1 and 3 will be tripped; both "A" and "B" train HPI and LPI actuations will occur.

D. Both ES Channels 1 and 3 will be tripped; both "A" and "B" train HPI, LPI and RBIC actuations will occur.

21. The following plant conditions exist:

- The plant is at 32% power.
- Delta Tcold indicates that "B" OTSG is 5° F hotter than "A" OTSG.

This indication could be caused by a loss of the ___(1)___ RCP. Continued operation with these conditions will cause ___(2)___ concerns.

A. (1) "B"
(2) QPT

B. (1) "C"
(2) QPT

C. (1) "B"
(2) axial power imbalance

D. (1) "C"
(2) axial power imbalance

22. The plant is operating at 34% power with a -6% axial power imbalance.

Which ONE of the following describes the RPS response if the upper chamber of NI-7 fails?

If NI-7 upper chamber fails ___(1)___ the associated RPS channel would trip due to a large ___(2)___ imbalance.

A. (1) high
(2) positive

B. (1) low
(2) positive

C. (1) high
(2) negative

D. (1) low
(2) negative

23. The following plant conditions exist:

- The plant is at 100% power.
- RC-1-LT1, PZR level transmitter, is selected for control.
- "SASS Mismatch" annunciator alarms and does not clear.
- Investigation reveals the amber "Mismatch" lamp to be lit on the Pressurizer Level channel.
- All other lamps in that channel and all other "Mismatch" lamps are off.

Current PZR level readings are as follows: RC-1-LIR-1 = 220"
RC-1-LIR-3 = 228"

RIP indications match MCB indications.

The alarm is:

A. valid. SASS has functioned properly.

B. valid. However, SASS should have also selected RC-1-LT3 for control.

C. NOT valid. The operator should depress the "Annunciator Reset" pushbutton to return the channel to normal operation.

D. NOT valid. The operator should issue a work request on the SASS channel.

24. The following plant conditions exist:

- RCS pressure is 750 psig
- T_{incore} (CET) is 520° F

Which ONE of the following describes the CET (core exit thermocouple) inputs to subcooling margin indications and the condition of the RCS?

A. (1) The highest one of the CET inputs to SPDS is used to determine SCM.
(2) Current plant conditions indicate that the RCS is subcooled.

B. (1) The highest one of the CET inputs to SPDS is used to determine SCM.
(2) Current plant conditions indicate that the RCS is saturated.

C. (1) The average of the CET inputs to SPDS is used to determine SCM.
(2) Current plant conditions indicate that the RCS is subcooled.

D. (1) The average of the CET inputs to SPDS is used to determine SCM.
(2) Current plant conditions indicate that the RCS is saturated.

25. The following plant conditions exist:

- Plant is at 100% power.
- PZR level has risen to 250 inches due to a minor FW control problem.
- AP-504, Integrated Control System Failure, has been entered and the plant is stable.
- Alarm window H-04-08, Makeup Valves Air Failure, has just annunciated for MUV-31 due to air pressure at its positioner lowering to 20 psig.

Which ONE of the following describes the position of MUV-31 and PZR level response to the above conditions?

Due to MUV-31 being locked in the ____(1)____ position PZR level will ____(2)____.

A. (1) full closed
   (2) lower

B. (1) full closed
   (2) remain stable

C. (1) throttled
   (2) lower

D. (1) throttled
   (2) remain stable

26. Which ONE of the following describes how the discharge air temperature of the Penetration Cooling Fans (AHF-9A & 9B) is controlled?

A. Running fan's discharge dampers modulate to control discharge air temperature.

B. Standby fan auto starts when discharge air temperature reaches its high setpoint.

C. Chilled Water (CH) supply to the cooling coils is adjusted to control discharge air temperature.

D. Nuclear Services Closed Cycle Cooling Water (SW) supply to the cooling coils is adjusted to control discharge air temperature.

27. The following plant conditions exist:

- The RCS is in a draindown condition with level at 133 feet.
- DHP-1A discharge flow is rapidly oscillating between 1600 and 2000 gpm.
- Annunciator window A-03-06, DH Pump A Flow Low, is cycling in and out of alarm.

Which ONE of the following describes the cause for this alarm and the action that would be taken IAW OP-404, Decay Heat Removal System?

A. DH flow rate is below low flow alarm setpoint

Trip DHP-1A

B. DH flow rate is below low flow alarm setpoint

Throttle open DHV-110 (DHP-1A discharge control valve) to raise flow

C. DHP amperage is below operator set low amperage alarm setpoint

Trip DHP-1A

D. DHP amperage is below operator set low amperage alarm setpoint

Throttle open DHV-110 (DHP-1A discharge control valve) to raise flow

28. The following plant conditions exist:

- While in EOP-4, Inadequate Heat Transfer, attempting to restore EFW a LOCA occurred causing a loss of adequate SCM.
- Lowest RCS pressure was 1700 psig.
- Highest RB pressure was 3 psig.
- EOP-3, Inadequate Subcooling Margin, has now been entered and Rule 1, Loss of SCM, is complete.

Currently BSV-3 and 4 (BS flow control valves) are ___(1)___ and if RB pressure exceeds 30 psig BSP-1A and 1B will ___(2)___.

A. (1) open
(2) auto-start

B. (1) closed
(2) auto-start

C. (1) open
(2) NOT auto-start

D. (1) closed
(2) NOT auto-start

29. The following plant conditions exist:

1000 An ES RBIC actuation occurs

1002 SWT-1 (SW surge tank) low level alarm actuates

Which ONE of the following describes the response of the SW system associated with the RCPs and the reason for this response?

SW cooling to the RCPs will automatically isolate at ___(1)___ . Per FSAR Chapter 9 this action is to ensure that ___(2)___ .

A. (1) 1000
(2) containment atmosphere leakage through this potential path is isolated

B. (1) 1002
(2) containment atmosphere leakage through this potential path is isolated

C. (1) 1000
(2) sufficient cooling water flow to the RB main fan assemblies will be maintained

D. (1) 1002
(2) sufficient cooling water flow to the RB main fan assemblies will be maintained

30. The following plant conditions exist:

- The plant tripped from 100% power due to a loss of RCP-1B.
- Following the trip, Atmospheric Dump Valve (ADV) MSV-26 failed open.
- Prior to isolating the ADV pressurizer level lowered to 10 inches.
- MSV-26 has been isolated and the overcooling terminated.
- Tincore is now 546° F and stable.
- RCS pressure is 1835 psig.
- Pressurizer level has just been stabilized at 100 inches.
- Pressurizer temperature is currently reading 590° F.

Which ONE of the following describes the response of RCS pressure over the next five minutes?

A. Rise because spray flow has been minimized with the trip of RCP-1B.

B. Rise because pressurizer heaters are raising pressurizer temperature.

C. Lower because *all* heaters remain de-energized until manually reset.

D. Lower because subcooled liquid insurged into the pressurizer.

31. Which ONE of the following describes the function of the trisodium phosphate dodecahydrate (TSP) baskets located on the 95' elevation of the Reactor Building (RB)?

The TSP baskets add chemicals which ___(1)___ the PH of the water in the RB to limit _____(2)_____ .

A. (1) raise
(2) iodine revolatization when sprayed back into the RB atmosphere

B. (1) lower
(2) iodine revolatization when sprayed back into the RB atmosphere

C. (1) raise
(2) the production of hydrogen when injected back into the RCS

D. (1) lower
(2) the production of hydrogen when injected back into the RCS

32. The boron value used in calculating an ECP (Estimated Critical Position) for reactor startup was higher than actual RCS boron concentration.

Which ONE of the following describes this impact on achieving criticality and a procedural requirement for mitigation of this error?

A. Criticality may be achieved below the 1% Shutdown (Mode 2) position of the ECP. All control rods, except Group 1, must be fully inserted.

B. Criticality may be achieved below the 1% Shutdown (Mode 2) position of the ECP. Immediately trip the reactor and go to EOP-02, Vital System Status Verification.

C. Criticality may NOT be achieved prior to reaching the upper limit of the ECP (Maximum Rod Height). All control rods, except Group 1, must be fully inserted.

D. Criticality may NOT be achieved prior to reaching the upper limit of the ECP (Maximum Rod Height). Immediately trip the reactor and go to EOP-02, Vital System Status Verification.

33. An ATWS event has occurred.

Which ONE of the following describes the required actions to be performed IAW EOP-2, Vital System Status Verification, and the EOP Cross-Step document?

Depress the manual Rx trip push button and verify:

A. control rod groups 1 through 7 are fully inserted.
If any control rod group has NOT fully inserted then open breakers 3305 and 3312.
If breaker 3305 does not open then open additional breakers as required to *de-energize* the CRDs.

B. control rod groups 1 through 7 are fully inserted.
If any control rod group has NOT fully inserted then open breakers 3305 and 3312.
If breaker 3305 does not open then start emergency boration and ensure adequate primary to secondary heat transfer is maintained.

C. all control rods are fully inserted.
If any control rod has NOT fully inserted then open breakers 3305 and 3312.
If the associated buses remain energized then open additional breakers as required to *de-energize* the CRDs.

D. all control rods are fully inserted.
If any control rod has NOT fully inserted then open breakers 3305 and 3312.
If the associated buses remain energized then start emergency boration and ensure adequate primary to secondary heat transfer is maintained.

34. The following plant conditions exist:

- The "B" Decay Heat Train is in operation.
- The Borated Water Storage Tank (BWST) recirculation in progress using SFP-2.
- A Reactor Building (RB) purge is started.
- Refueling operations are in progress.
- The RB Equipment hatch is installed.
- Annunciator G-08-01, Spent Fuel Pool Level High/Low, and G-08-03, Cask Area Level High/Low, have come into alarm.
- NO other alarms are indicated.

Which ONE of the following could be the cause of this condition?

A. The "B" DHHE failed to the full cooling mode which caused SF Pool temperature to lower.

B. The transfer canal deep end drain valves are leaking.

C. The purge has lowered pressure in the RB.

D. BOTH Spent Fuel Heat Exchangers were aligned for cooling which caused SF Pool temperature to lower.

35. Which ONE of the following fuel assemblies can be stored in a Spent Fuel Pool without entering a Technical Specification action? **(reference provided)**

Assy.	Enrichment (%)	Burnup (MWD/KgU)	Configuration	Pool
1	4.5	2.0	Checkerboard with any Category B assembly	A
2	2.0	2.0	Checkerboard with any Category A or B assembly	B
3	3.5	3.0	Side by Side with any Category B or F assembly	A
4	3.0	3.0	Side by Side with any Category B assembly	B

A. 1

B. 2

C. 3

D. 4

36. An OTSG tube rupture has occurred coincident with a loss of all offsite power. EOP-2, Vital System Status Verification, Immediate Actions have been performed. A Symptom Scan is now in progress.

For these conditions which ONE of the following describes the operation of the main steam radiation monitors?

A. RM-G26 and RM-G27, main steam line *radiation* monitors, can be used to measure gamma radiation levels in the steam flowing to the condenser.

B. RM-G26 and RM-G27, main steam line *radiation* monitors, can be used to approximate tube leak rate.

C. RM-G25 and RM-G28, main steam line *release* monitors, can be used to measure gamma radiation levels in the steam flowing to atmosphere.

D. RM-G25 and RM-G28, main steam line *release* monitors, can be used to approximate tube leak rate.

37. The reactor has just been taken critical when an atmospheric dump valve (ADV) fails open.

Which ONE of the following describes what will happen to Tave and nuclear power and what operator actions would be taken?

A. Tave will rise; final power will be at the point of adding heat (POAH). The ADV should be closed and rods inserted to restore Tave.

B. Tave will rise; final power will exceed the POAH. The ADV should be closed and secondary parameters used to restore Tave.

C. Tave will lower; final power will be at the POAH. The ADV should be closed and rods withdrawn to restore Tave.

D. Tave will lower; final power will exceed the POAH. The ADV should be closed and secondary parameters used to restore Tave.

38. The following plant conditions exist:

- The plant is at 40% power with turbine control in ICS/Auto.
- The main turbine is selected to "A" header pressure for control.

Which ONE of the following describes the plant response if the selected "A" header pressure transmitter failed instantly to mid-scale?

SASS will:

A. swap to the unaffected transmitter. Turbine and TBV control will *not* be affected.

B. swap to the unaffected transmitter. Turbine control will *not* be affected but the TBV associated with the failed transmitter must be controlled in manual.

C. NOT swap to the unaffected transmitter. Turbine control and control of the TBV associated with the failed transmitter will be affected.

D. NOT swap to the unaffected transmitter. Turbine control will be affected but the TBV associated with the failed transmitter will *not* be affected.

39. The following plant conditions exist:

- A loss of all offsite power has occurred with the plant previously at 40% power.
- EFP-2 did not start.
- EFP-3 has a red light on the control handle but no flow is indicated.

Which ONE of the following "prompt and prudent" actions, as described in AI-505, Conduct of Operations During Abnormal and Emergency Events, would be taken?

Attempt to:

A. start EFP-1.

B. start FWP-7.

C. open MSV-55 and/or MSV-56 (EFP-2 steam isolation valves).

D. open ASV-5 and/or ASV-204 (EFP-2 steam control valves).

40. Which ONE of the following describes why selected DC motors must be stopped in EOP-12, Station Blackout?

This is necessary for the 1E batteries to meet their:

A. 2 hour TS requirement.

B. 4 hour TS requirement.

C. 2 hour coping requirement.

D. 4 hour coping requirement.

41. The following plant conditions exist:

- MUP-1A is tagged out.
- EDG-1A is tagged out.
- A Loss of all Offsite Power occurs coincident with an RCS leak.
- EOP-03, Inadequate SCM, has been entered.
- Rule 1, Loss of SCM, has been completed.
- Lowest RCS pressure attained was 750 psig.

Based on the following ES Status Light indications, which ONE of the following describes the status of ES components following completion of Rule 1, Loss of SCM?

"A" Train		"B" Train	
Component	***ES Status Lights***	***Component***	***ES Status Lights***
MUP-1A	OUT	MUP-1B	OUT
MUP-1B	GREEN	MUP-1C	GREEN
MUV-23	AMBER	MUV-25	GREEN
MUV-24	AMBER	MUV-26	GREEN
MUV-586	GREEN	MUV-586	GREEN
MUV-587	GREEN	MUV-587	GREEN
DHP-1A	AMBER	DHP-1B	AMBER

A. All components have actuated/responded as expected.

B. All "A" Train components have actuated/responded as expected with the exception of MUV-23 and MUV-24.

C. All "B" Train components have actuated/responded as expected with the exception of DHP-1B.

D. All "A" Train components have actuated/responded as expected with the exception of MUP-1B.

42. Which ONE of the following describes the **direct** signal that lowers condensate flow demand on a loss of one MFWP at 80% power?

A. A signal from the DFT high level interlock.

B. A runback signal from the ULD sub-section of the ICS.

C. A signal that compares existing CD flow with FW flow and HW level.

D. A signal that compares existing CD flow with FW flow and DFT level.

43. The following plant conditions exist:

- Annunciator P-07-09, Battery Ground, alarmed.
- One minute later annunciator P-07-08, Battery Charger Trouble, alarmed and the Battery Ground annunciator cleared.
- Local inspection finds Battery Charger 3A (DPBC-1A) tripped.
- The ground detector for the 3A Battery shows no indication of a DC ground.

Which ONE of the following describes the possible cause for the above conditions and the action necessary to prevent a loss of DC power?

___(1)___ caused Battery Charger 3A (DPBC-1A) to trip. Place Battery Charger ___(2)___ in service IAW OP-705, Emergency Power-DC System.

A. (1) A battery charger internal fault
(2) 3E (DPBC-1E)

B. (1) A ground on the ES MCC AC supply breaker to the battery charger
(2) 3E (DPBC-1E)

C. (1) A battery charger internal fault
(2) 3F (DPBC-1F)

D. (1) A ground on the ES MCC AC supply breaker to the battery charger
(2) 3F (DPBC-1F)

44. The following plant conditions exist:

- The plant was at 85% power when RCP-1D tripped.
- The plant has stabilized following the runback.

Which ONE of the following describes the status of the "B" FW main block valve and the "B" MFW pump Bailey control station indication?

The "B" FW main block valve is __(1)__ . Selecting "Meas Var" on the "B" MFW pump Bailey control station should indicate __(2)__.

A. (1) open
   (2) 50

B. (1) closed
   (2) 50

C. (1) open
   (2) 80

D. (1) closed
   (2) 80

45. With the plant at 55% power which ONE of the following sets of conditions will cause an Emergency Feedwater (EFW) actuation?

FWP-1A/B	Main FW Booster pumps
FWP-2A/B	Main FW Turbine driven pumps

__(1)__ trips concurrent with __(2)__ .

A. (1) FWP-1A
   (2) FWP-2A tripping

B. (1) FWP-1A
   (2) FWV-2 (FWP-1B suction valve) stroking 10% from full open

C. (1) FWP-2A
   (2) FWV-8 (FWP-1B discharge valve) stroking 90% from full open

D. (1) FWP-2A
   (2) High - High Deaerator level

46. A channel functional test is being performed on RM-G6 (Makeup Tank Area radiation monitor) IAW SP-335A, Radiation Monitoring Instrumentation Functional Test RMGs. The "As Found" meter reading is normal.

After holding the "Alarm Reset-Operate-Check Source" switch to the "CHECK SOURCE" position for one (1) minute there was no response observed on the RMG meter.

Which ONE of the following could cause the response observed above and based on these results what is the next action directed by SP-335A to be taken for RM-G6?

A. Minor drift of detector high voltage.

Direct HP personnel to expose detector to a wand.

B. High background radiation.

Direct HP personnel to expose detector to a wand.

C. Minor drift of detector high voltage.

Declare RMG channel inoperable and submit work request for repair.

D. High background radiation.

Declare RMG channel inoperable and submit work request for repair.

47. A maintenance worker inadvertently hits the power supply wiring for EFV-58, EFP-3 to 'A' OTSG control valve, pulling the wire out of the valve body.

Which ONE of the following describes how this will affect the EFW system and the actions required to isolate this line?

If an EFIC actuation were to occur, "A" OTSG ____(1)____ . To isolate this EFW line EFV-14, block valve for EFV-58, will be closed and its power supply de-energized at ___(2)___ .

A. (1) will overfill to 100%
(2) DPDP-8C

B. (1) EFW flow would be excessive
(2) DPDP-8C

C. (1) will overfill to 100%
(2) DPDP-8D

D. (1) EFW flow would be excessive
(2) DPDP-8D

48. The following plant conditions exist:

- 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 describes the status of the 'A' EDG and which Abnormal Procedure would be entered?

The 'A' EDG should:

A. start. AP-730, Grid Instability, should be entered.

B. start. AP-770, Emergency Diesel Generator Actuation, should be entered.

C. NOT start. AP-730, Grid Instability, should be entered.

D. NOT start. AP-770, Emergency Diesel Generator Actuation, should be entered.

49. The "Bus A1 125V DC Available" light on the MCB 'Standby Power Status' section has extinguished.

Which ONE of the following describes the reason why this light has extinguished?

A. DC Bus A1 discharge current is > 75 amps

B. "A" Battery Charger voltage is > 140 VDC

C. DC Bus A1 voltage is < 72 VDC

D. "A" Battery Charger voltage is < 124 VDC

50. The following plant conditions exist:

- Window B-08-03, Diesel Gen A Out of Service, has annunciated due to the total loss of DPDP-6A.
- Event Point 1206, "A" EDG Starting Air Pressure Low, is in alarm.

Based on the conditions above the "A" EDG is:

A. running. The "A" EDG can ONLY be stopped locally.

B. running. The "A" EDG can be stopped from the MCB.

C. NOT running. Investigation for the cause of low air pressure should be commenced.

D. NOT running. Consideration should be given to cross connecting the diesel start air systems by opening EGV-25 and EGV-26.

51. The diesel is powering the ES bus while separated from the grid.

While loading the diesel which ONE of the following describes a condition that will trip the diesel *engine*?

A. The K1 (exciter field short) relay actuates.

B. The 46 (negative phase sequence) relay actuates.

C. A governor malfunction resulted in lowering speed to 795 rpm.

D. A governor malfunction resulted in raising speed to 1005 rpm.

52. The following plant conditions exist:

- The plant was operating at 100% RTP.
- IAP-4 is removed from service for overhaul.
- The "A" EDG is removed from service for maintenance.
- A weather related event has caused a loss of ALL offsite power.
- A fire in the "B" ES 4160V switchgear room prevents the "B" ES Diesel from energizing "B" ES 4160V bus.

Which ONE of the following describes the procedure(s) that is/are *initially* performed?

AP-470, Loss of Instrument Air
AP-880, Fire Protection
EOP-12, Station Blackout

A. EOP-12 ONLY

B. EOP-12 and AP-470 ONLY

C. EOP-12 and AP-880 ONLY

D. EOP-12, AP-470 and AP-880

53. With the plant in Mode 1 which ONE of the following describes the operation of the RM-L2/L7 Valve/Pump Interlock Bypass key switch?

When selected to ___(1)___ a liquid release to the environment through ___(2)___ is available ___(3)___.

A. (1) Normal
(2) RM-L7
(3) without starting additional RWPs

B. (1) Normal
(2) RM-L2
(3) without starting additional RWPs

C. (1) Bypass
(2) RM-L7
(3) ONLY if RWP-3A or 3B is started

D. (1) Bypass
(2) RM-L2
(3) ONLY if RWP-2A or 2B is started

54. Which ONE of the following represents the effect of depressing the "CHECK SOURCE" button on RM-L2 and the reason for having a check source?

Pressing this button ___(1)___. A check source is used to ___(2)___.

A. (1) exposes the detector to a known radioactive substance
(2) verify proper monitor response

B. (1) injects an electronic signal downstream of the detector
(2) verify proper monitor response

C. (1) exposes the detector to a known radioactive substance
(2) provide a signal for monitor calibration

D. (1) injects an electronic signal downstream of the detector
(2) provide a signal for monitor calibration

55. The following plant conditions exist:

- A LOCA occurred when the plant was tripped for a fire in the Turbine Bldg.
- To assist fighting the fire the Unit 6900/4160V buses have been de-energized.
- The only available High Pressure Injection (HPI) pump tripped.
- EFP-3 is the only available EFW/AFW pump.
- EOP-7, Inadequate Core Cooling, has been entered based on superheat conditions indicated on SPDS.
- Ten minutes later Tincore is 700° F and RCS pressure is 500 psig.

EOP-07, Step 3.13 states the following:

3.13 ___ Establish and maintain OTSGs as a heat sink.	• ___ Maintain OTSG PRESS using TBVs (preferred) or ADVs to establish primary to secondary $\Delta T \approx 100°F$. See Figure 2

Which ONE of the following describes the action necessary to establish and maintain OTSGs as a heat sink? **(reference provided)**

A. Lower OTSG pressure to 160 psig using the Turbine Bypass valves (TBVs).

B. Lower OTSG pressure to 200 psig using the Turbine Bypass valves (TBVs).

C. Lower OTSG pressure to 160 psig using the Atmospheric Dump valves (ADVs).

D. Lower OTSG pressure to 200 psig using the Atmospheric Dump valves (ADVs).

56. The following plant conditions exist:

- The plant was at 100% power when a loss of ALL offsite power occurs.
- EDG-1B fails to start.

After completion of the Symptom Scan in EOP-2, Vital System Status Verification, which ONE of the following describes the additional procedure(s) that is (are) applicable and would be in use IAW AI-505, Conduct of Operations During Abnormal and Emergency Events?

A. ONLY AP-770, Emergency Diesel Generator Actuation, will be applicable and should be concurrently performed.

B. AP-770, Emergency Diesel Generator Actuation, AND AP-330, Loss of Nuclear Service Cooling, will be applicable and should be concurrently performed.

C. ONLY AP-770, Emergency Diesel Generator Actuation, will be applicable but shall NOT be concurrently performed until directed by EOP-2.

D. AP-770, Emergency Diesel Generator Actuation, AND AP-330, Loss of Nuclear Service Cooling, will be applicable but shall NOT be concurrently performed until directed by EOP-2.

57. The following plant conditions exist:

- CR-3 is operating at 100% RTP.
- The electrical grid is at near record load with minimal reserve capacity.
- CR-5 has tripped due to a failed boiler tube.
- CR-3 remains on line.

Which ONE of the following identifies the response of CR-3's main generator operating parameters IMMEDIATELY following the loss of CR-5?

(Disregard any affects caused by System Load Control functions.)

A. MWe - rise
Hz - rise
MVAR out - rise

B. MWe - rise
Hz - lower
MVAR out - rise

C. MWe - lower
Hz - lower
MVAR out - rise

D. MWe -rise
Hz - rise
MVAR out - lower

58. Which ONE of the following automatic actions would be expected on a total loss of Secondary Services Closed Cycle Cooling (SC)?

A. FWP-1B will trip on high oil cooler temperature at 155° F.

B. CDP-1A will trip on high motor air temperature at 185° F.

C. IAP-3B will trip on high oil cooler temperature at 165° F.

D. IAP-3A will trip on high 2nd stage air temperature at 125° F.

59. The following plant conditions exist:

- A LOCA is in progress
- RCS pressure is 1085 psig
- RCS temperature is 554° F
- No automatic ES actuations have occurred

Following the Symptom Scan which ONE of the following procedures must be entered and what actions must be performed IAW with that procedure?
(reference provided)

A. EOP-3, Inadequate Subcooling Margin

Manually actuate HPI and RBIC

B. EOP-3, Inadequate Subcooling Margin

Manually actuate HPI and Diverse Containment Isolation

C. EOP-4, Inadequate Heat Transfer

Manually actuate HPI and RBIC

D. EOP-4, Inadequate Heat Transfer

Manually actuate HPI and Diverse Containment Isolation

60. Which ONE of the following describes the *minimum* equipment required during a design basis LOCA for maintaining RB parameters within design limits and removal of iodine from the RB atmosphere?

A. ONE RB spray system and NO RB cooling units.

B. ONE RB spray system and ONE RB cooling unit.

C. NO RB spray system and TWO RB Cooling units.

D. NO RB spray system and ONE RB cooling unit.

61. The following plant conditions exist:

- The plant is in Mode 4.
- PM-161, NNI Power Supply/AC Auto Transfer Check and Alarm Verification, is in progress.
- Switch S1 (VBDP-5 input to NNI-X DC power supply) has been opened.
- Prior to re-closing switch S1 VBDP-1 loses power.

Based on the conditions above which ONE of the following describes the status of NNI-X power?

A. ONLY AC power is lost

B. ONLY DC power is lost

C. BOTH AC *and* DC power are lost

D. NEITHER AC *nor* DC power is lost

62. The following plant conditions exist:

- The plant is in Mode 3 with RCS pressure at 2150 psig.
- AP-990, Shutdown from Outside the Control Room, has been entered and transfer to the Remote Shutdown Panel is complete.
- The CRS directs that PZR level be maintained at an *indicated* ≈ 100 inches.

Which ONE of the following actions would be taken IAW AP-990 and what would be the approximate *actual* PZR level for these conditions?

A. Locally control MUV-31; ≈ 160 inches.

B. Use an available HPI valve; ≈ 160 inches.

C. Locally control MUV-31; ≈ 40 inches.

D. Use an available HPI valve; ≈ 40 inches.

63. One of the reasons AP-1040, Aux Building Flooding, was developed is to prevent or mitigate a loss of power to _____ .

A. RCV-11 (PORV Block vlv)

B. AHF-1C (RB Cooling Fan)

C. DHV-3 (Decay Heat Dropline suction)

D. DHV-41 (Decay Heat Dropline isolation)

64. The following plant conditions exist:

- Inadequate Heat Transfer (IHT) is in progress due to a loss of Main and Emergency Feedwater.
- *HPI/PORV cooling has been established* IAW EOP-4, Inadequate Heat Transfer.
- The Subcooling Margin Monitor indicates -7 shortly after opening the PORV.
- AFW restoration is expected.
- OTSG integrity does exist.

Based on these conditions which ONE of the following describes the actions that would be taken?

Perform Rule 1, Loss of SCM, and:

A. remain in EOP-4, Inadequate Heat Transfer.

B. transition to EOP-3, Inadequate Subcooling Margin.

C. transition to EOP-8A, LOCA Cooldown.

D. transition to EOP-8B, HPI Cooldown.

65. Which ONE of the following describes the reason for ensuring only 1 ES selected RB cooling unit is running in low speed per EOP-8A, LOCA Cooldown Cross-Step Document and what indication would be expected to ensure AHF-1A is operating in low speed?

SW temperatures could exceed design limits if the RB Fan Coolers were in a ___(1)___ condition. AHF-1A % load meter is indicating approximately ___(2)___.

A. (1) clean, non-degraded
(2) 0%

B. (1) fouled, degraded
(2) 0%

C. (1) clean, non-degraded
(2) 45%

D. (1) fouled, degraded
(2) 45%

66. The plant is at 100% power. The CRS, OAC and BOP are the only licensed operators in the control room. The OAC needs to step out of the control room to make a personal phone call. Per AI-500, Conduct of Operations, which ONE of the following describes the requirements for this activity?

The OAC:

A. must be relieved by a licensed operator other than the current BOP or CRS.

B. may be relieved by the current BOP.

C. must remain in the Red Carpet Area at all times unless formally relieved by another licensed operator.

D. may leave the control room, with CRS permission, for up to 10 minutes without being relieved.

67. Refueling is in progress with eight (8) fuel assemblies in the core. As the ninth assembly is being placed in the core the following NI readings are observed:

- NI-1 rises from a base count of 203 to 430 cps.
- NI-2 rises from a base count of 240 to 390 cps.

Which ONE of the following actions, if any, would be taken for these conditions?

A. No action is required. This is an expected NI response for initial core reloading.

B. Once the assembly is placed in the core contact reactor engineering to perform a Co/Ci calculation.

C. Stop insertion of the fuel assembly and maintain assembly in its current position until reactor engineering is contacted for resolution.

D. Withdraw the fuel assembly, stop any other core alterations in progress, perform Co/Ci calculations and obtain a boron analysis.

68. The following plant conditions exist:

- The plant is in "No Mode" condition with the reactor defueled.
- Preparations are being made to reload the core.
- Main Fuel Handling Bridge (FHCR-1) testing is in progress when a limit switch failure prevents testing from being completed.
- The control room has been informed that initial troubleshooting is in progress.
- The troubleshooting team desires to operate TS-3, Bridge Interlock bypass, in order to move the bridge to repair the limit switch.

Which ONE of the following describes the approval and concurrence, if any, required for this action in accordance with FP-601A, Operation of Main Fuel Handling Bridge FHCR-1?

A. The Shift Manager must approve. NO concurrence is required.

B. The Shift Manager must approve with concurrence of Reactor Engineering.

C. The Refueling Supervisor must approve. NO concurrence is required.

D. The Refueling Supervisor must approve with concurrence of Reactor Engineering.

69. After performance of a surveillance procedure on the "A" EDG the diesel is determined to be inoperable.

Which ONE of the following actions would be taken IAW AI-500, Conduct of Operations Department Organization and Administration, to ensure troubleshooting activities will not render the redundant train inoperable?

A. Fill out a cross train work authorization form.

B. Assign one individual to be the single point of accountability for the duration of the repairs.

C. Verify protected train signs are posted and conduct a field walkdown of the appropriate opposite train equipment.

D. Post a dedicated operator at the doors to the "B" ES 4160V switchgear room so that only personnel approved by the Shift Manager will have access.

70. Which ONE of the following describes the equipment required to meet the Limiting Condition of Operation (LCO) for ITS 3.4.14, RCS Leakage Detection Instrumentation?

A. Wide range RB sump level and RM-A6 iodine channel

B. Wide range RB sump level and RM-A6 particulate channel

C. Narrow range RB sump level and RM-A6 iodine channel

D. Narrow range RB sump level and RM-A6 particulate channel

71. The following plant conditions exist:

- The plant is operating in Mode 5.
- The Reactor Building (RB) Equipment Hatch is off.
- An RB purge is in service.
- High radiation in the RB caused RM-A1 to actuate.
- All purge supply and exhaust fans remain running.

Which ONE of the following describes the operator actions necessary to terminate an *unmonitored* release from the RB?

A. Stop the purge fans IAW AP-250, Radiation Monitor Actuation, to terminate any unmonitored release path from the RB.

B. Establish Containment Closure IAW AP-250, Radiation Monitor Actuation, to terminate any unmonitored release path from the RB.

C. Stop the purge fans IAW OP-417, Containment Operating Procedure, to terminate any unmonitored release path from the RB.

D. Establish Containment Closure IAW OP-417, Containment Operating Procedure, to terminate any unmonitored release path from the RB.

72. An area in the RCA is fenced and conspicuously posted with a flashing red light.

Which ONE of the following describes the classification of this area and the MINIMUM approval authority needed for entry?

	Area Classification	Individual Approving Entry
A.	Very High Radiation Area	Shift Outage Director
B.	Very High Radiation Area	Supervisor Radiation Control
C.	Locked High Radiation Area	Shift Outage Director
D.	Locked High Radiation Area	Supervisor Radiation Control

73. The following plant conditions exist:

- The plant is operating at 100% RTP.
- RB pressure, temperature and sump level are normal.
- PZR level is stable.
- MUT level is lowering at approximately 5 gpm.
- RM-A12, Condenser Vacuum Pump Exhaust Gas Radiation Monitor, is rising.

Which ONE of the following describes the event procedure that is applicable and a potential location for *significant* elevated radiation levels?

A. AP-510, Rapid Power Reduction; the affected condensate and feedwater heaters.

B. EOP-06, Steam Generator Tube Rupture; the affected condensate and feedwater heaters.

C. AP-510, Rapid Power Reduction; the condensate demineralizers.

D. EOP-06, Steam Generator Tube Rupture; the condensate demineralizers.

74. AP-990, Shutdown from Outside the Control Room, has been entered.

After control has been transferred to the RSP a followup step directs the RO to ensure the BSP-1A auto-start function is defeated.

Which ONE of the following describes where this action is performed and its purpose?

A. The "A" ES 4160V switchgear room; to protect the pump from loss of essential support functions.

B. The "A" ES 480V switchgear room; to protect the pump from loss of essential support functions.

C. The "A" ES 4160V switchgear room; to ensure pump runout conditions will not occur due to the loss of automatic control of the pump's discharge control valve.

D. The "A" ES 480V switchgear room; to ensure pump runout conditions will not occur due to the loss of automatic control of the pump's discharge control valve.

75. Which ONE of the following choices completes the statement below?

IAW AI-505, Conduct of Operations During Abnormal and Emergency Events, if an Abnormal Procedure (AP) Entry Condition is met during the performance of an Emergency Operating Procedure (EOP) the ___(1)___ will direct ___(2)___ .

A. (1) Procedure Director
(2) concurrent performance of the AP by an available operator

B. (1) Shift Manager
(2) concurrent performance of the AP by an available operator

C. (1) Procedure Director
(2) performance of the AP after major actions of the controlling EOP have been completed

D. (1) Shift Manager
(2) performance of the AP after major actions of the controlling EOP have been completed

You have completed the test!

3.2 POWER DISTRIBUTION LIMITS

3.2.4 QUADRANT POWER TILT (QPT)

LCO 3.2.4 QPT shall be maintained less than or equal to the steady state limits specified in the COLR.

APPLICABILITY: MODE 1 with THERMAL POWER > 20% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. QPT greater than the steady state limit and less than or equal to the transient limit.	A.1.1 Perform SR 3.2.5.1. OR	Once per 2 hours
	A.1.2.1 Reduce THERMAL POWER ≥ 2% RTP from the ALLOWABLE THERMAL POWER for each 1% of QPT greater than the steady state limit. AND	2 hours OR 2 hours after last performance of SR 3.2.5.1
	A.1.2.2 Reduce nuclear overpower trip setpoint and nuclear overpower based on Reactor Coolant System flow and AXIAL POWER IMBALANCE trip setpoint ≥ 2% RTP from the ALLOWABLE THERMAL POWER for each 1% of QPT greater than the steady state limit. AND	10 hours OR 10 hours after last performance of SR 3.2.5.1

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Restore QPT to less than or equal to the steady state limit.	24 hours from discovery of failure to meet the LCO.
B. QPT greater than the transient limit and less than or equal to the maximum limit due to misalignment of a CONTROL ROD or an APSR.	B.1 Reduce THERMAL POWER ≥ 2% RTP from ALLOWABLE THERMAL POWER for each 1% of QPT greater than the steady state limit. AND	30 minutes
	B.2 Restore QPT to less than or equal to the transient limit.	2 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Reduce THERMAL POWER to < 60% of the ALLOWABLE THERMAL POWER. AND	2 hours
	C.2 Reduce nuclear overpower trip setpoint to ≤ 65.5% of the ALLOWABLE THERMAL POWER.	10 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. QPT greater than the transient limit and less than or equal to the maximum limit due to causes other than the misalignment of either CONTROL ROD or APSR.	D 1 Reduce THERMAL POWER to < 60% of the ALLOWABLE THERMAL POWER. AND	2 hours
	D.2 Reduce nuclear overpower trip setpoint to ≤ 65.5% of the ALLOWABLE THERMAL POWER.	10 hours
E. Required Action and associated Completion Time for Condition C or D not met.	E.1 Reduce THERMAL POWER to ≤ 20% RTP.	2 hours
F. QPT greater than the maximum limit.	E.1 Reduce THERMAL POWER to ≤ 20% RTP.	2 hours

QUADRANT POWER TILT

QUADRANT POWER TILT Limits For Thermal Power ≤ 60%

For Operation from 0 EFPD to EOC
100%RTP = 2609 MWt

QUADRANT POWER TILT As Measured By:	STEADY-STATE LIMIT(%)	TRANSIENT LIMIT(%)	MAXIMUM LIMIT(%)
Symmetrical Incore Detector System	7.50	10.03	20.0
Power Range Channels	4.94	6.96	20.0
Minimum Incore Detector System	3.07	4.40	20.0
Measurement System Independent	8.58	11.07	20.0

QUADRANT POWER TILT Limits For Thermal Power > 60%

For Operation from 0 EFPD to EOC
100%RTP = 2609 MWt

QUADRANT POWER TILT As Measured By:	STEADY-STATE LIMIT(%)	TRANSIENT LIMIT(%)	MAXIMUM LIMIT(%)
Symmetrical Incore Detector System	4.29	10.03	20.0
Power Range Channels	1.96	6.96	20.0
Minimum Incore Detector System	1.90	4.40	20.0
Measurement System Independent	4.92	11.07	20.0

These limits are referred to by
Technical Specification LCO 3.2.4

3.7 PLANT SYSTEMS

3.7.15 Spent Fuel Assembly Storage

LCO 3.7.15 The combination of initial enrichment and burnup of each spent fuel assembly stored in Storage Pool A and Storage Pool B, shall be within the acceptable region of Figure 3.7.15-1 or Figure 3.7.15-2.

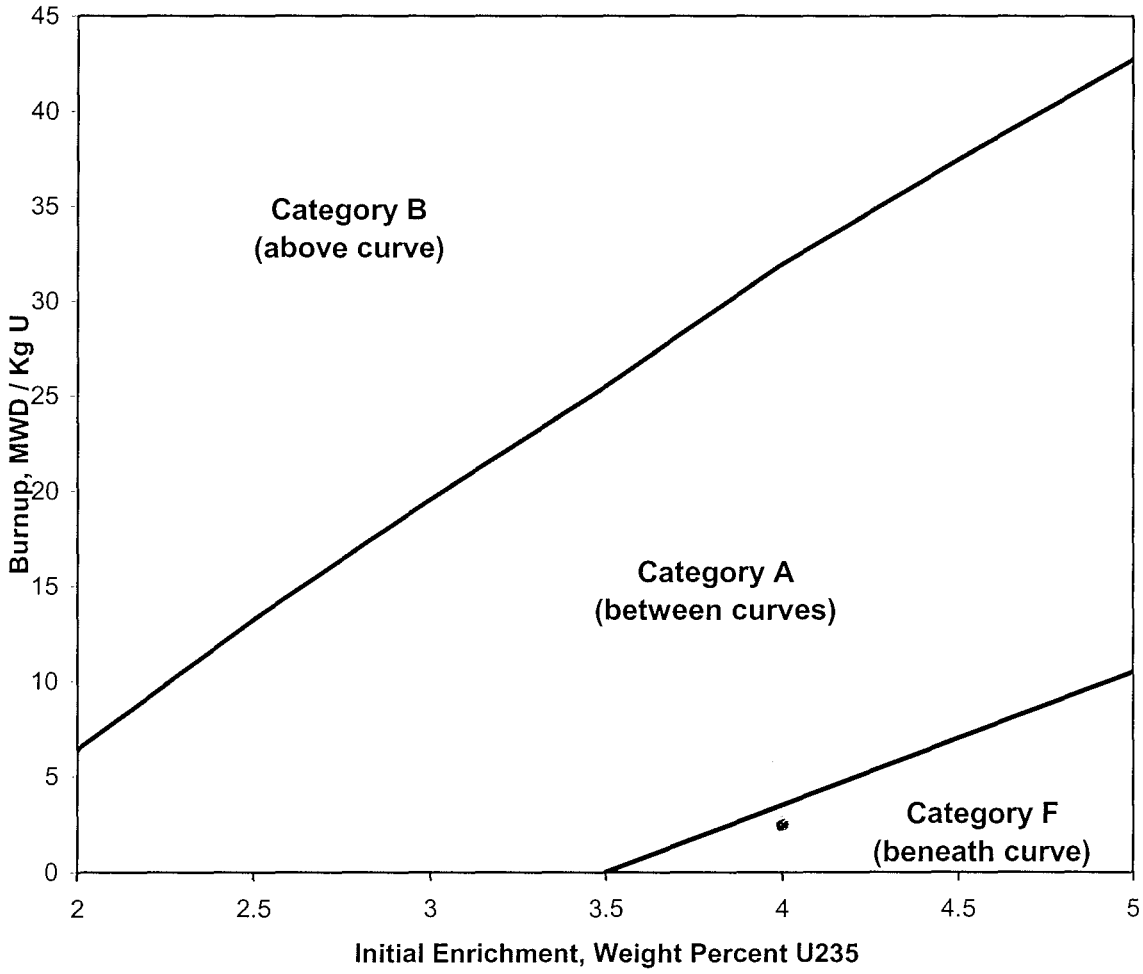
APPLICABILITY: Whenever any fuel assembly is stored in Storage Pool A or Storage Pool B of the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 ---------NOTE-------- LCO 3.0.3 is not applicable. ---------- Initiate action to move the noncomplying fuel assembly to an acceptable configuration.	Immediately

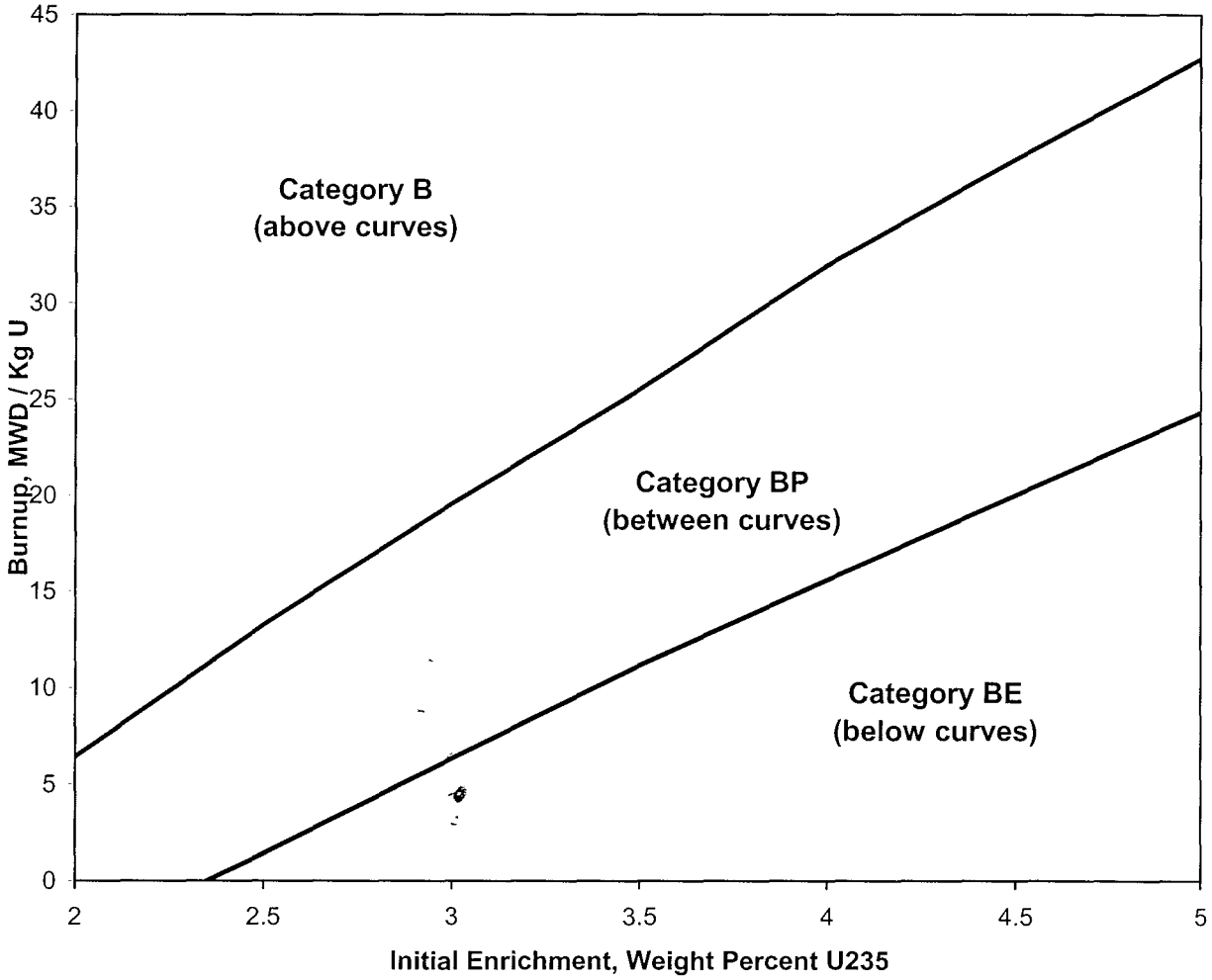
SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.15.1	Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Figure 3.7.15-1 or Figure 3.7.15-2.	Prior to storing the fuel assembly in Storage Pool A or Storage Pool B.



1. Category B: Fuel from this category can be stored with no restrictions except as noted below.
2. Category A: Fuel from this category can be stored with fuel from Categories A or B.
3. Category F: Fuel from this category must be stored in a one-out-of-two checkerboard configuration with fuel from Category B or empty water cells. Category F fuel stored in a checkerboard pattern with either Category B fuel or empty water cells must be separated from Category A fuel by a transition row of Category B fuel.

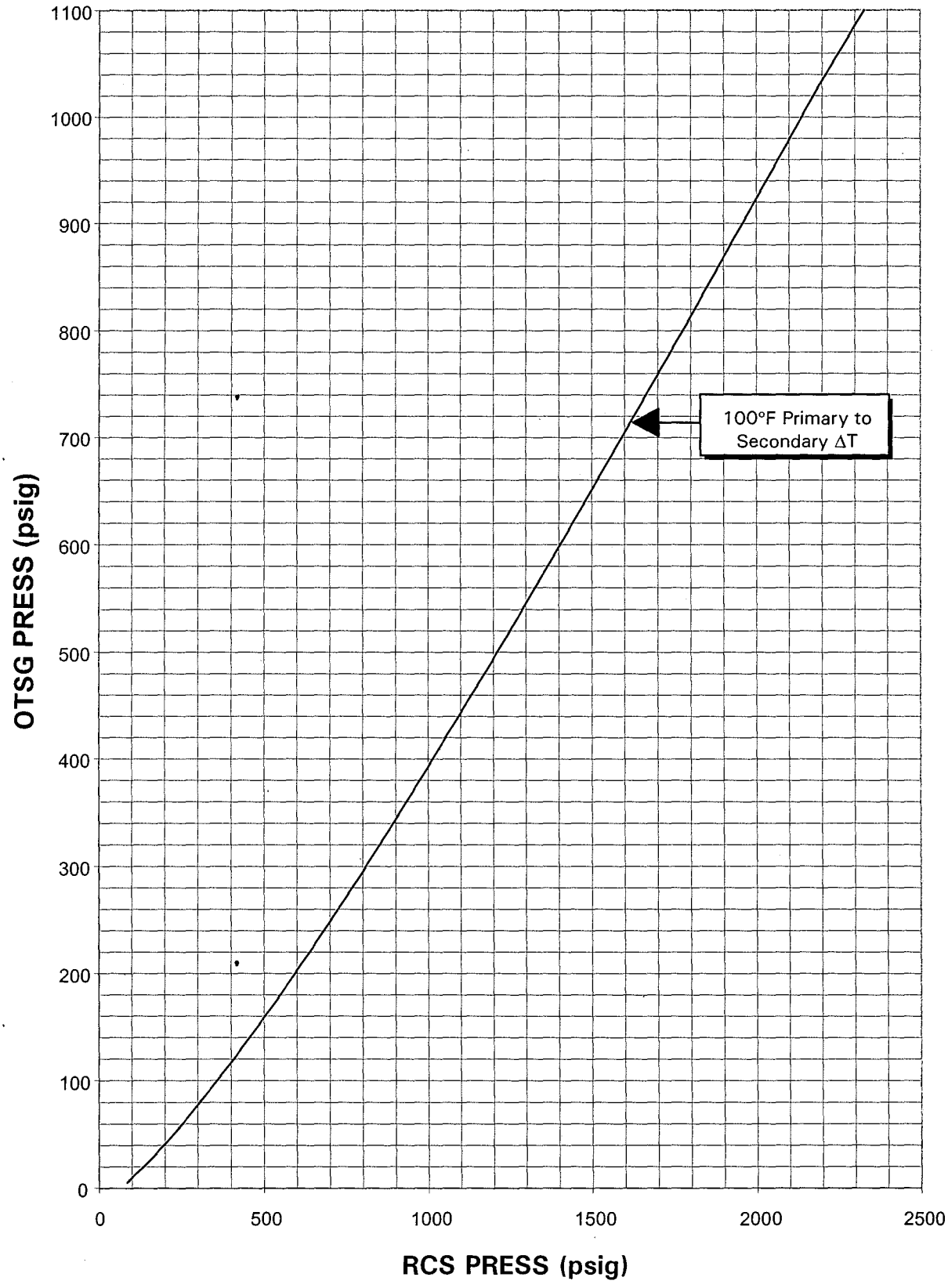
Figure 3.7.15-1
Burnup versus Enrichment Curve for
Spent Fuel Storage Pool A



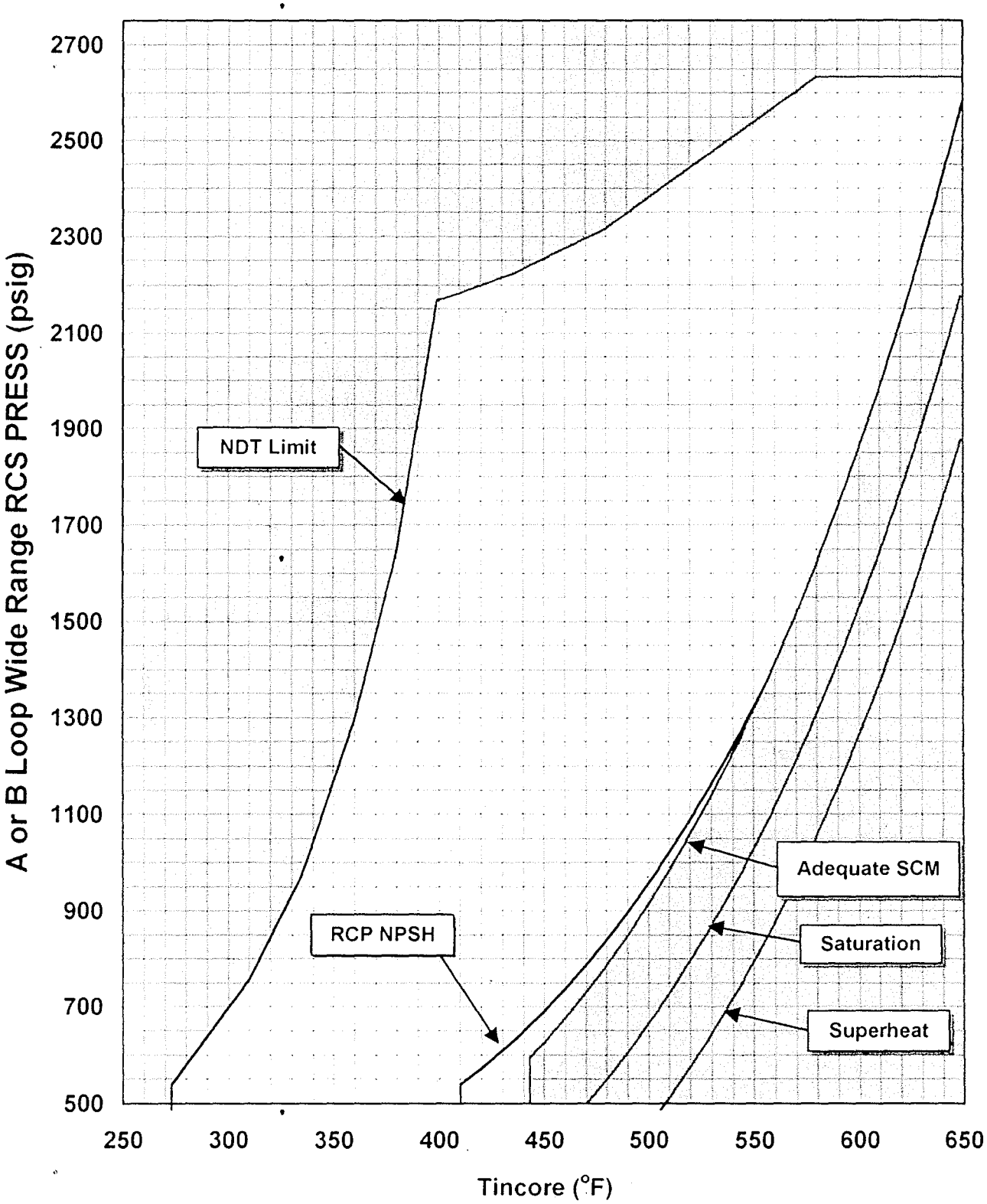
1. Category B: Fuel from this category can be stored with no restrictions except as noted below.
2. Category BP: Fuel from this category (between lower and upper curves) can be stored in the peripheral cells of the pool.
3. Category BE: Unacceptable for storage unless surrounded by eight empty water cells.
4. Fuel of any enrichment and burnup including fresh, unburned fuel may be stored in Pool B if surrounded by eight empty water cells. Category BE fuel assemblies must be separated by two adjacent empty cells in Pool B.

Figure 3.7.15-2
Burnup versus Enrichment Curve for
Spent Fuel Storage Pool B

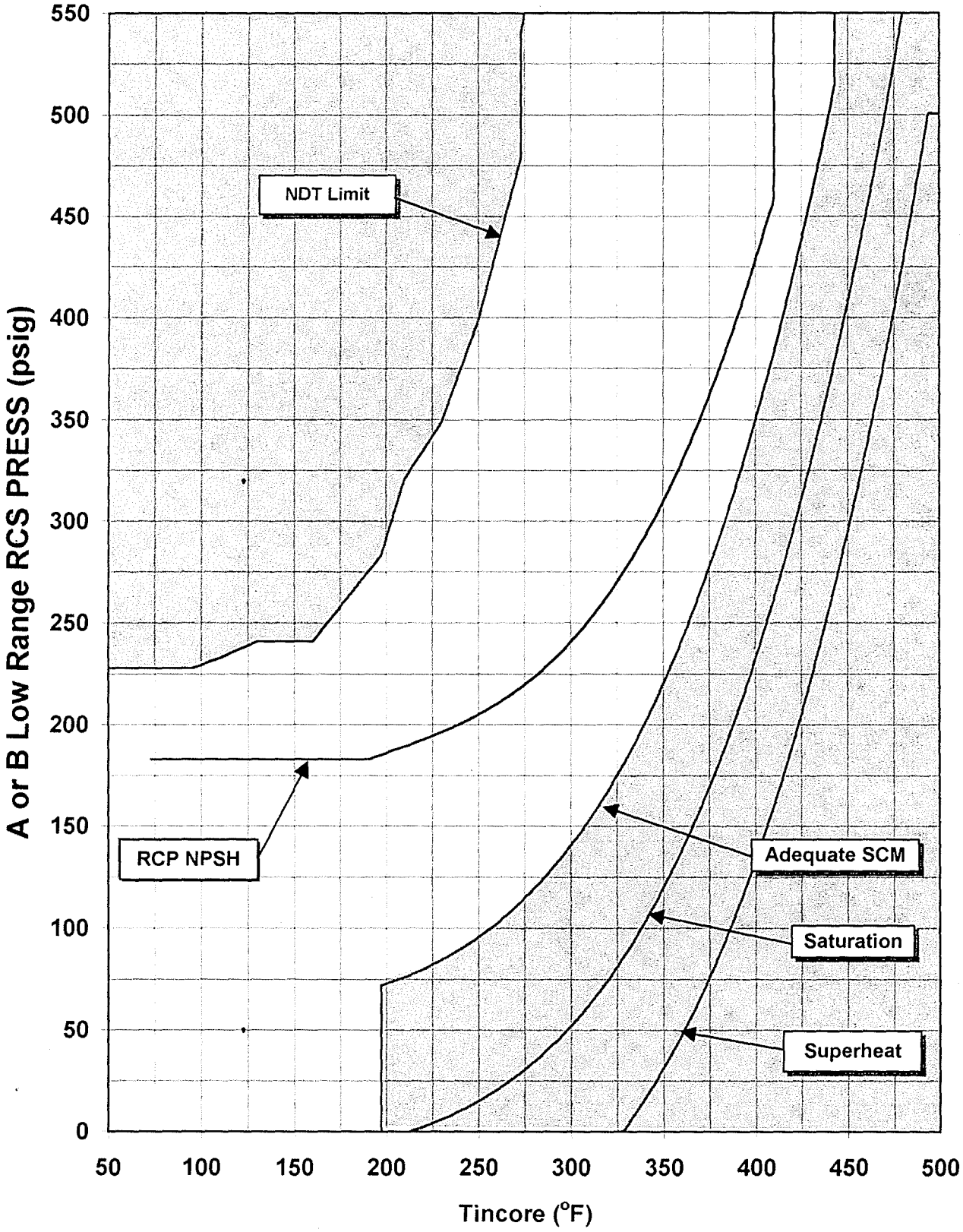
4.0 FIGURE 2 OTSG PRESS TO ESTABLISH 100°F PRIMARY TO SECONDARY ΔT



4.0 FIGURE 1 RCS PRESS AND TEMP (WIDE RANGE)



4.0 FIGURE 2 RCS PRESS AND TEMP (LOW RANGE)



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
19	A	44	D	69	C	94	C Post Exam
20	C	45	B	70	D	95	A Comment.
21	A	46	B	71	B	96	C
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